

**Backward Transfer from L3 German to L2 English of L1  
Chinese Speakers: A Cross-Linguistic Study on Word Order**

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**Yang Xue**

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1. Gutachter: Prof. Dr. Peter Siemund
2. Gutachterin: Dr. Eva Maria Luef
3. Gutachter: Prof. Dr. Volker Gast

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## Abbreviations

|             |                               |
|-------------|-------------------------------|
| <b>Acc</b>  | Accusative                    |
| <b>Adj</b>  | Adjective                     |
| <b>Adv</b>  | Adverbial/Adverb              |
| <b>AdjP</b> | Adjective Phrase              |
| <b>AdvP</b> | Adverbial Phrase              |
| <b>AJT</b>  | Acceptability Judgment Task   |
| <b>Aux</b>  | Auxiliary                     |
| <b>CEM</b>  | Cumulative-Enhancement Model  |
| <b>Chn</b>  | Chinese                       |
| <b>CL</b>   | Classifier                    |
| <b>CLI</b>  | Cross-Linguistic Influence    |
| <b>COMP</b> | Complement                    |
| <b>CON</b>  | Continuous order for VPC      |
| <b>DAT</b>  | Dative                        |
| <b>DEF</b>  | Definite                      |
| <b>DISC</b> | Discontinuous order for VPC   |
| <b>DO</b>   | Direct object                 |
| <b>EFL</b>  | English as a Foreign Language |
| <b>Eng</b>  | English                       |
| <b>FIN</b>  | Finite verb                   |
| <b>FLA</b>  | Foreign Language Acquisition  |
| <b>Gen</b>  | Genitive                      |
| <b>Ger</b>  | German                        |
| <b>IND</b>  | Indefinite                    |
| <b>INTJ</b> | Interjection                  |
| <b>IO</b>   | Indirect object               |
| <b>IPFV</b> | Imperfective                  |



|              |                                          |
|--------------|------------------------------------------|
| <b>LPM</b>   | Linguistic Proximity Model               |
| <b>Gr</b>    | Grammatical                              |
| <b>L1</b>    | First language                           |
| <b>L2</b>    | Second language                          |
| <b>L3</b>    | Third language                           |
| <b>L4</b>    | Fourth language                          |
| <b>Ln</b>    | An additional language acquired after L3 |
| <b>LOC</b>   | Locative                                 |
| <b>MD</b>    | Mean deviation                           |
| <b>MKD</b>   | Marked                                   |
| <b>M1</b>    | Mean ratings assigned by trilinguals     |
| <b>M2</b>    | Mean ratings assigned by bilinguals      |
| <b>N</b>     | Number                                   |
| <b>NEG</b>   | Negative                                 |
| <b>NOM</b>   | Nominal/Nominative                       |
| <b>NP</b>    | Noun Phrase                              |
| <b>O/OBJ</b> | Object                                   |
| <b>PASS</b>  | Passive                                  |
| <b>PFV</b>   | Perfective                               |
| <b>PP</b>    | Prepositional Phrase                     |
| <b>Prep</b>  | Preposition/Prepositional                |
| <b>Pron</b>  | Pronominal/Pronoun                       |
| <b>Ptcl</b>  | Particle                                 |
| <b>RVC</b>   | Resultative Verbal Compound              |
| <b>S/SUJ</b> | Subject                                  |
| <b>Sg</b>    | Singular                                 |
| <b>SLA</b>   | Second Language Acquisition              |
| <b>SFL</b>   | Swedish as a Foreign Language            |
| <b>TPM</b>   | Typological Primacy Model                |

|                 |                            |
|-----------------|----------------------------|
| <b>U test</b>   | Mann-Whitney U Test        |
| <b>Ungr</b>     | Ungrammatical              |
| <b>WSR test</b> | Wilcoxon signed-rank Test  |
| <b>V</b>        | Verb                       |
| <b>V2</b>       | Verb-second                |
| <b>V3</b>       | Verb-third                 |
| <b>VF</b>       | Verb-final                 |
| <b>VPC</b>      | Verb-Particle Construction |
| <b>X</b>        | Sentence constituent X     |
| <b>Y</b>        | Sentence constituent Y     |

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# 1 Introduction

*Cross-linguistic influence* (hereafter: CLI) refers to various ways in which a person's knowledge of one language affects that person's knowledge or use of another language (Jarvis & Pavlenko, 2010, p. 1). The concept has been noted as early as the beginning of the 19<sup>th</sup> century but has not been discussed on a scholarly ground until the mid-1990s. The nature of CLI was first analyzed in-depth in Weinreich's *Languages in Contact: Findings and Problems* (1953), where he discussed the effects of language contact, including the phenomena of linguistic borrowing, code-switching, and language shift in shaping the linguistic landscape of multilingual communities along the French-German linguistic border and between German and Romansh in the canton of Grisons. In this work, Weinreich introduced the concept of *interference*<sup>1</sup> to describe the non-facilitative impact of one language on another in a contact situation. Since then, CLI research has developed more systematically and become a thriving area of inquiry, particularly when it pertains to multilingualism and its increasing prevalence in modern society. CLI is integral to the phenomenon of *transfer*, initially defined as "the influence resulting from the similarities and differences between the target language and any other language that have been previously (and perhaps imperfectly) acquired" (Odlin, 1989, p. 27). It also relates to the phenomenon of language retention, a less frequently researched topic. In the current study, the terms *CLI* and *transfer* are used interchangeably.

Below, we begin with a brief review of how CLI research has shifted its foci since the middle of the 20th century. Then, we will state the motivation for this study and outline the structure of the dissertation.

---

<sup>1</sup> Weinreich (1953) referred to the phenomenon as "those instances of deviation from the norms of either language which occur in the speech of bilinguals as a result of their familiarity with more than one language" (p. 1).

## 1.1 Shift of Research Foci: From CLI Phenomenon to Mechanism

Research on CLI has shifted from observing and documenting CLI as a phenomenon toward explaining its mechanism using views from different linguistic subfields. Jarvis and Pavlenko (2010) describe the history of CLI research in four general phases. While each phase has its own research focus, they may overlap.

Phase 1 focused on the transfer phenomenon as a variable in language acquisition. Weinreich's publication in 1953 signified a major milestone in this phase, establishing a foundation for subsequent phases. Since then, the first and essential step in empirical CLI studies has consistently been the identification of transfer phenomena, forming the basis for subsequent analysis of other contributing variables. Until now, CLI has been observed in almost all linguistic domains, including phonology (e.g., Lepetit, 1989; Gut, 2010; Wrembel, 2011, 2015), morphology/lexicon (e.g., Dewaele, 1998; Ringbom, 2001; De Angelis, 2005; Verhoeven & Perfetti, 2011), syntax (e.g., Gass, 1984; Flynn et al., 2004; Bardel & Falk, 2007; Serratrice, 2016; Kupisch & Rothman, 2016), and semantics (e.g., Jiang, 2004; Torrijos, 2009; Slabakova, 2010), to name a few. It occurs also across linguistic domains, such as the syntax-pragmatics interface (e.g., Hulk & Müller, 2000; Serratrice et al., 2004; Sorace, 2004).

Research on CLI transcends the mere documentation of language transfer as a phenomenon. Initially, the primary focus was on the criteria for determining when something has been transferred or when language transfer has occurred (Gass, 1984, p. 117). Later, the research focus has shifted to the more intricate objective of *transferability*, i.e., the investigation of “what makes something likely to be transferred in the first place” (Jarvis & Pavlenko, 2010, p. 174). This shift of research focus is especially observed in Phase 2, where research centers around the identification, scope, and quantification of transfer effects, including the verification of sources and causes, constraints, directionality, and selectivity of transfer (p. 5). In short, factors contributing to the occurrence of transfer phenomena have been intensively researched in this phase.

While Phase 2 is still in progress, the onset of Phase 3 can be identified by attempts to develop theoretical models and frameworks, which serve to explain the

characteristics and mechanisms of CLI in a more systematic way. Distinctive hypotheses, principles, or models have been introduced to explain CLI under different circumstances. One of the earliest explanatory works is the *transfer to somewhere* principle proposed by Anderson (1983), positing that transfer occurs in the initial stage of language acquisition if one's second language (L2) is perceived to have a similar counterpart in the first language (L1). For example, L1 English learners of L2 French overgeneralized the SVO word order when constructing French sentences with object pronouns, producing non-target-like instances such as \**Je vois le* ('I see him'), a structure that resembles the English word order (Kellerman, 1995, pp. 126–127).

Anderson's *transfer to somewhere* principle, however, cannot be used to explain instances where learners do not deploy the similarities between languages to facilitate their foreign language acquisition. In this light, Kellerman (1995) introduced an additional principle called *transfer to nowhere*, in which he stated that "there can be transfer which is not licensed by similarity to the L2 and where the way the L2 works may very largely go unheeded" (p. 137). While the *transfer to somewhere* focuses on the roles of formal aspects of languages, the *transfer to nowhere* principle, then, takes a cognitive perspective, examining the transfer phenomenon by emphasizing the role of the "L1 way of thinking" (Alonso, 2002, p. 233). Other frameworks on this topic, such as the *hypothesis testing process* (Schachter, 1983), *Full Transfer/Full Access* (Schwartz & Sprouse, 1996), *conceptual transfer* (Pavlenko, 1999; Jarvis, 2016), and *linguistic relativity* (Odlin, 2005), each offer different emphases.

While Phase 3 is still ongoing, the research has taken a neurolinguistic turn in Phase 4, investigating, for instance, how languages are stored and how they operate in the brain with the help of neurophysiological devices (Jarvis & Pavlenko, 2010, pp. 7–8). While this branch of research offers promising new insights into how CLI takes place, progress is nonetheless constrained by the need for specialized tools and technologies that can require years, if not decades, to develop.

Not only has the focus of CLI research evolved from documenting transfer phenomena to exploring their characteristics and underlying mechanisms, but there has also been a transition in the research scenario from bilingualism to multilingualism.

Contemporary research efforts are increasingly directed toward investigating additional dimensions that differentiate multilingual acquisition from bilingualism, such as the relationships among the languages being learned, their interactions, and the role of the mother tongue, heritage languages, and the first foreign language in subsequent language acquisition. The present study, therefore, seeks to explore the transfer direction, quality, and mechanism within a trilingual context. These aspects will be elaborated further in the following section.

## **1.2 Motivation**

In early studies on CLI, researchers emphasized the role of one's L1 in shaping the acquisition of L2. Transfer is accommodated as a learning procedure: as a reception procedure, it implies that the learner processes the incoming utterances of L2 based on the linguistic knowledge of L1; as a production procedure, it refers to the selection and combination of rules and elements that are known to the learner in performing the L2 (Færch & Kasper, 1987, pp. 113–115). Since the end of the last century, the growing mobility of populations has led to the increasing importance of multilingual education. As a result, CLI research has transitioned from a primary focus on bilingualism to exploration in the context of multilingual acquisition. As more languages take center stage, the scope of variables under examination has significantly expanded. There has been a shift of attention from the role of L1 as a source language to the role of a later-acquired language, as noted by Hammarberg (2010): “[T]he basis for [CLI] on the acquisition and use of the new language is different. Whereas the learner of a first L2 can only receive CLI from L1, the learner of further languages can also get influenced by one or more prior L2s, which creates more complex patterns of CLI” (p. 95).

The increased diversity in variables in multilingual scenarios can change the patterns of linguistic interaction, making it more challenging to isolate the sources and effects of influence. For instance, in discussions where the impact of structural similarities and contrasts is a focal point, analysis becomes notably more intricate when more languages come into play because more possibilities emerge for delineating

feature similarities and constraints. This stands in sharp contrast to the bilingual context, where the scope is limited to two possibilities: either two languages share similar structures in a specific linguistic domain, or they exhibit distinctions. Apart from the fundamental formal contrasts, other factors have been considered, such as language dominance, frequency, language typology, proficiency levels in each language, language modes, and external factors. Comprehensive models have hence been introduced to explain the features and mechanisms in the multilingual acquisition process, each offering a distinct perspective and focus. Notable examples are the *L2 Status Factor Model* (Bardel & Falk, 2007), which highlights the importance of the second language (L2) in learning a subsequent foreign language; the *Cumulative-Enhancement Model* (Flynn et al., 2014), which emphasizes the facilitative effect of incremental language acquisition; the *Typological Primacy Model* (Rothman, 2011), which addresses learners' sensitivities to typological universals; the *Linguistic Proximity Model* (Westergaard et al., 2017), which focuses on the property-by-property transfer pattern and diverse quality of transfer effects; and the *Scalpel Model* (Slabakova, 2017), which considers factors external to languages. Several of these frameworks are highly relevant to the current study and will be discussed later.

Up to this point, one of the central tasks is the inquiry into the source of transfer, namely, the relativeness of the pre-existing linguistic knowledge within one's linguistic repertoire to the acquisition of a new language. Researchers are engaged in investigating the effects of any prior acquired languages or acquisition experience on subsequent language learning. The examination extends beyond the influence of one's first language (L1) on subsequent languages (L2/L3/.../Ln) and encompasses the impact of a foreign language on the later-acquired language, such as L2 on L3. Meanwhile, due to issues related to population mobility, such as migration and integration, the role of the heritage language and its interplay with the dominant language has also become a subject of significant interest in the field of foreign language acquisition and education (e.g., Montrul & Ionin, 2010; Cuza & Frank, 2011; Siemund & Lechner, 2015; Lorenz et al., 2019).

In light of the intrinsic connection between CLI and the language acquisition process, it is logical that scholarly attention has been predominantly focused on investigating *forward transfer*, meaning how previously acquired languages exert an influence on the acquisition of subsequent ones. Nevertheless, it is imperative to acknowledge that the inquiry into the reverse occurrence of language transfer, i.e., *backward transfer*, has not been given the same level of attention. Starting from this point, we conduct the current research.

In contemporary societies characterized by increased population mobility and intercultural communication, individuals inevitably acquire additional languages to facilitate effective communication. From the pure perspective of language acquisition, the learning of an additional language will eventually progress to an advanced stage, wherein learners finally attain a proficient command of the new foreign language.

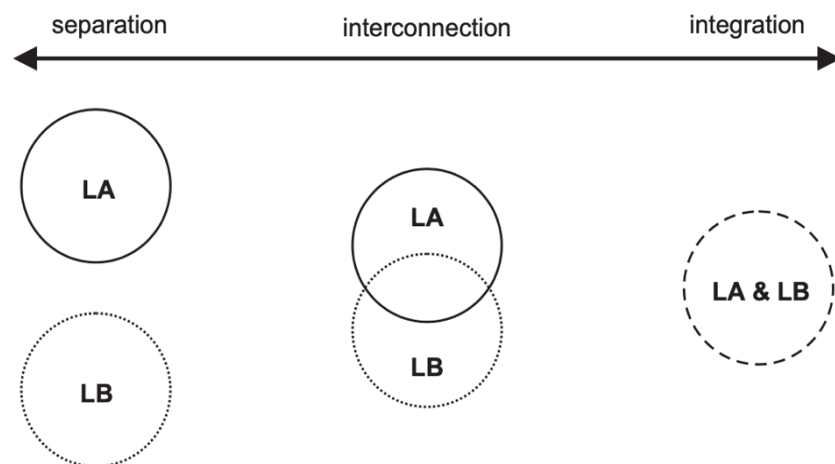
From the sociolinguistic perspective, the multilingual context of communication is no longer a rarity, as any language within one's profile is likely to be integrated into daily practices. Increased language contact inherently elevates the potential for CLI to manifest in both directions, thereby challenging the exclusion of bidirectional transfer. In research on bilingualism, there has been some work focusing on backward transfer, albeit far fewer than studies on forward transfer. The focus lies primarily on the phenomenon of L1 attrition, denoting the phenomenon of L1 forgetting due to changes in the linguistic environment and dominant language use (e.g., Anderson, 1999; Pavlenko, 2004; Chamorro et al., 2016). In the same vein, we can delve into the backward transfer phenomenon within the context of multilingualism, where more possibilities for transfer emerge: from one foreign language to another, from a foreign language to the mother tongue.

From a more cognitive point of view, Cook introduced the concept of multi-competence, which refers to "knowledge of two or more languages in one mind" (Cook, 1991, as cited in Cook, 2003, p. 2). According to Cook (2003), a multilingual user's mind can be understood as an "integration continuum," as shown in Figure 1. Languages in a bilingual mind may have null, partial, or full overlap with each other. This continuum might be related to different stages of L2 development; it does not



necessarily imply a direction of movement, nor does it necessarily apply to the whole language system (p. 9).

**Figure 1:** *The Integration Continuum of Possible Relationships in Multi-Competence in Cook (2003)*



Consequently, the development of an additional language ( $L_n$ ) should not be viewed in isolation from one's existing linguistic systems. The linguistic features of a later-acquired language may, in turn, serve as sources of influence on previously acquired ones. For example, when a later-acquired language maintains primary usage, it becomes reasonable to assume its potential for reverse transfer.

However, research into this phenomenon has been extremely scarce and mostly focused on the influence of L2 on L1. Yet, as multilingualism has become a norm in contemporary society, it no longer suffices to limit the research scope within bilingual scenarios, nor should the focus solely be laid on unidirectional linguistic influence. If Cook's multi-competence framework holds, the linguistic properties of a later-acquired non-L2 language should equally have the potential to influence a previously acquired one. This raises two major questions. Using backward transfer from L3 to L2 as an example, the first question concerns the phenomenon itself: *Does an L3 exhibit reverse transfer effects on L2, and what can be transferred?* The second question moves from transfer phenomenon to transfer mechanism: *If backward transfer occurs, of what*

*nature and why?* Though achieving a definite answer may be difficult, exploring this topic remains meaningful and worthwhile. Taking these questions as a starting point, the current project explores the backward transfer phenomenon in a specific linguistic domain: influence from L3 German syntax on L1 Chinese speakers' perception of word order of their L2 English.

### **1.3 Structure of the Thesis**

Apart from Chapter 1, the introduction, this dissertation consists of seven chapters.

Chapter 2 provides the theoretical and empirical background for the research. Section 2.1 extensively discusses factors contributing to the CLI phenomenon summarized in previous empirical studies. These factors include similarities and differences in linguistic properties, (psycho)typological proximity, frequency, recency, perceptual salience, and language dominance. Then, Section 2.2 outlines the most relevant CLI models that illustrate the mechanisms and characteristics of language transfer in multilingual contexts. The CLI factors serve as important references in designing the experiment and in explaining our findings. While most CLI models primarily explain the characteristics and causes of language transfer along the chronological progress of language acquisition, namely, forward transfer, we examined their applicability to the context of backward transfer. Section 2.3 summarizes the very few empirical studies that have explored the backward transfer phenomenon, including explanatory attempts.

Building upon the current research status on the topic, Chapter 3 discusses the research questions and research significance, raising three core questions regarding the manifestations, characteristics, and mechanisms of backward syntactic transfer.

Chapter 4 presents a contrastive discussion detailing the similarities and disparities between the syntactic properties of German, English, and Chinese. First, in Section 4.1, we introduce the structure of German main clauses, characterized by three fields and two verb positions. The distinctive features of the German verbal bracket, coupled with the grammar rules for linearizing constituents within each field, determine the contrasts

in word order between German and the other two languages and its potential for transferability. We will explore four main scenarios where syntactic transfer might occur from German to English: (1) subject-verb inversion, (2) word order variation in transitive verb-particle constructions (VPCs), (3) placement of adverbials in SV main clauses, and (4) patterns in ditransitive constructions. Sections 4.2, 4.3, 4.4, and 4.5, respectively, introduce the structural overlaps, similarities, and mismatches across German, English, and Chinese in these four scenarios.

Specifically, Section 4.2 extensively discusses two types of inversion: *subject-auxiliary inversion* and *subject-simple verb inversion*. Each type's grammaticality is contingent upon the semantic feature of the fronted element, and each language varies in allowing inversion. In Section 4.3, we describe the disparities between German, English, and Chinese in supporting two types of word order for forming a transitive VPC: *continuous order* and *discontinuous order*. In Section 4.4, we specify language contrasts in placing adverbial adjuncts in an SV main declarative clause with simple tenses. The adverbial placement involves four sub-scenarios, including clauses with the presence of a direct object, an intransitive VPC, a transitive VPC, and a PP complement. Section 4.5 examines the grammaticality and productivity of patterns in constructing ditransitive constructions based on the form of objects. Overall, Chapter 4 provides an extensive review of grammar rules that not only underpin the experimental design but also serve as a comprehensive contrastive reference for future research.

Building upon the contrastive review in Chapter 4, Chapter 5 develops the methodology for the empirical part of this study, introducing an acceptability judgment task (ATJ), which served as our main approach to investigating the potential for backward transfer. Thirty trilingual participants (hereafter: trilinguals) of L1 Chinese-L2 English-L3 German and thirty bilinguals of L1 Chinese-L2 English participated in the ATJ, rating stimuli featuring various word orders showcasing syntactic contrasts. The chapter consists of two parts: Section 5.1 presents the recruitment process, the demographic information, and the linguistic backgrounds of the participants; Section 5.2 details the experimental design, including two general hypotheses regarding trilinguals' performance, stimuli in the ATJ, and evaluation methods. The first

hypothesis posits that compared with the bilinguals, the trilinguals would exhibit higher acceptability for English stimuli whose word orders align with German syntax but differ from the canonical syntactic patterns of English and Chinese. The second hypothesis suggests that when two orders are available in English grammar, trilinguals are more likely to accept the word order variant that is grammatical only in German. Based on these two general hypotheses, we introduce concrete sub-hypotheses for each scenario.

Chapter 6 offers a comprehensive analysis of the data collected from the ATJ, presenting detailed quantitative and qualitative findings. Sections 6.1 to 6.4, respectively, delve into the results and group differences observed in rating stimulus sets featuring specific word orders, as well as any attitudinal differences within groups toward word order variation, if present. Each section or subsection follows a similar structural approach: (1) revision of sub-hypotheses, (2) data presentation and identification of backward transfer, (3) validation of sub-hypotheses through analyzing rating patterns and providing an explanation, and (4) an interim summary synthesizing the observed characteristics of backward transfer from L3 German and the possible transfer mechanisms.

Chapter 7 serves as a comprehensive discussion of the entire study, where we answer the three research questions. Section 7.1 traces back to our initial question regarding the manifestations of transfer and analyzes the potential interaction between L3 German and L1 Chinese. Then, in Section 7.2, the second question regarding the characteristics of transfer from German reveals its nature: non-facilitative, indirect, and partial. Section 7.3 reviews the language-related factors and external factors contributing to CLI, which have been introduced in Section 2.1. We analyze their roles in the context of backward transfer. Section 7.4 examines the applicability of the current CLI models in the context of backward transfer. Finally, in Section 7.5, drawing on insights from the *Linguistic Proximity Model* (Westergaard et al., 2017) and the *Scalpel Model* (Slabakova, 2017), we propose a novel explanatory framework for illustrating CLI in multilingual contexts: the *Bi-Directional Transfer Model*. This model acknowledges the presence of backward transfer and, importantly, considers the dynamics of foreign language acquisition beyond initial stages.

Lastly, Chapter 8 concludes the entire project. It recaptures the most significant findings of the study and addresses its limitations. At the end of the chapter, we offer an outlook for future research.

## **2 CLI Research in Multilingual Contexts and Backward Transfer**

This chapter serves as the theoretical background for the study and is divided into four sections. Section 2.1 discusses the key factors contributing to CLI within multilingual contexts. These factors have been verified by empirical studies and provide plausible explanations of transfer phenomenon. Section 2.2 focuses on four current CLI models, which systematically explain the characteristics and development of CLI throughout different stages of language acquisition. Section 2.3 delves into the theoretical frameworks for the phenomenon of backward transfer and summarizes the most relevant research in this field.

### **2.1 CLI Factors**

Previous research has examined and substantiated a myriad of CLI factors and their observable impact on the quality of linguistic transfer. In this section, we will not provide an exhaustive list that elaborates on every influencing factor explored by past research but compile the most relevant ones to this study.

CLI has many causes: some are linguistic, some are social, and some are psychological (Kellerman, 1995, p. 142). Some CLI factors include linguistic features inherent to both source language and target language, such as construction frequency (e.g., Bybee & Thompson, 1997; Ellis, 2002), linguistic salience (e.g., Boswijk & Coler, 2020; Kerswill & Williams, 2002; Jarvis & Pavlenko, 2010), and objective structural similarities and contrasts between languages (e.g., Smith & Kellerman, 1986; Odlin, 1989, 2005; Ecke, 2015). Other factors are external to languages, pertaining to the relationship between the language and its user. These factors include perceived sociolinguistic perspectives such as proficiency level (e.g., Odlin, 1989; Dewaele, 2001; Murphy, 2003), amount of language exposure and use (e.g., Poulishse & Bongaerts, 1994), and language dominance (e.g., Navé et al., 2005; Treffers-Daller, 2019), as well as psycholinguistic aspects such as perceived typological proximity (e.g., Rothman & Cabrelli Amaro, 2010; Rothman, 2010), users' language identification and perception

(e.g., Schachter, 1983; Cenoz et al., 2001; Bardel & Lindqvist, 2007), and cognitive mode (e.g., Grosjean, 1998, 2013). It should be noted that certain factors listed under these two categories may not be entirely independent. For instance, factors related to learners' language perception, defined as *interlingual identification* by Jarvis and Pavlenko (2010), encompass both objective linguistic properties and the users' subjective perception of these properties.

It is imperative to acknowledge that the variables discussed above do not inherently constitute necessary or sufficient conditions that guarantee the occurrence of cross-linguistic transfer but are rather potential factors that may increase the likelihood of CLI, as shown in several empirical studies (e.g., Bosch & Unsworth, 2021; Slabakova, 2015; Paradis et al., 2017; Puig-Mayenco et al., 2020). Sometimes, it is the interplay between several factors that leads to transfer, and some factors can turn out to be more influential than others, depending on specific circumstances.

The next sections focus on the most pertinent predictors of CLI in relation to the present study. Additionally, we have examined select empirical studies, with particular emphasis on recent findings that provide solid evidence for these variables.

### **2.1.1 Similarities and Differences in Linguistic Properties**

*“The greater the difference between the systems, i.e. the more numerous the mutually exclusive forms and patterns in each, the greater is the learning problem and the potential area of interference” (Weinreich, 1953, p. 1).*

One of the core factors contributing to CLI is grounded in the fundamental components of languages—*linguistic features* (interchangeable with *properties* and *parameters* in this study). The mismatches or contrasts between languages are rooted in the manner in which linguistic parameters vary. In the process of language acquisition, learners acquire the variation of a certain feature and apply it in their language use. For the same grammar entity, the linguistic representation can be different. If languages share the same parameter, they have an overlap; if not, a dissimilarity is seen. In turn, transfer is

identified if the representation of a certain linguistic feature of one language is observed in acquiring or using another language.

Since the mid-1970s, congruence between languages has been identified as a source of transfer in the process of foreign language acquisition (FLA), as noted by Gass (1984): “[a] crucial prerequisite is a certain amount of similarity between L1 and L2 structures to enable the learner to recognize that a similarity between the L1 and the L2 structure exists” (p. 118). In one example, young L1 German learners of L2 English produced patterns such as *Marylin like no sleepy*, or *I’m steal not the base*. Having perceived the similarity between L1 German and L2 English in making post-copula negations, the learners transferred this structure to negating lexical verbs in English (Wode, 1977, as cited in Gass, 1984, p. 119).<sup>2</sup> Transfer due to proximity in linguistic features also applies in multilingual contexts. For instance, it was observed that Norwegian-Russian individuals had better performance compared with Norwegian monolinguals in rejecting sentences featuring verb-second (V2) placement in L3 English, suggesting an influence from their L2, Russian (Westergaard et al., 2017).

Not only the similarities but also the contrasts between languages may influence one’s language output, as noted by Kupisch (2014): “[I]n case of extreme vulnerability resulting from variation, complexity, the need to combine information from different models and performance under time pressure, bilinguals show a tendency to overstress [what is different] rather than [what is common] in their two languages” (p. 223). This pattern has primarily been observed among adult bilinguals. In Kupisch’s study, the heritage Italian adults produced significantly high numbers of non-target-like responses in a timed acceptability judgment task (ATJ), whereas the same pattern was not observed by the bilingual children. The adults overused the post-nominal placement of adjectives, a structure that is not supported by their dominant L1, German. In another study by Anderssen et al. (2018), some English-Norwegian bilingual participants

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<sup>2</sup> German uses post-verbal and post-copula negation, whereas English does not support the former (e.g., *I don’t steal* instead of *I steal not*). After young learners noticed the similarity between L1 German and L2 English in using post-copula negation, they transferred this structural similarity to negate lexical verbs.



overused the typical Norwegian noun-possessive determiner word order and inhibited the possessive determiner-noun word order, although the latter structure is grammatical in both their dominant language, English, and in Norwegian.

It is important to note that whether dissimilarity is a source of transfer is closely related to learners' stage of acquisition and their cognitive development. In Kupisch's (2014) study, the subjects were adults who were able to learn the grammar rules logically instead of acquiring them intuitively. In Anderssen et al.'s (2018) research, the bilinguals were heritage Norwegian speakers who had achieved high proficiency in Norwegian. Hence, when analyzing CLI factors, it is imperative to consider the biography of the subjects, controlling variables such as age, onset of acquisition, and language proficiency.

### ➤ *Surface Structural Overlap*

A factor closely related to structural proximity is the degree of structural overlap at the surface syntax level. Under the lens of generative linguistics, cross-linguistic transfer is argued to occur when two conditions are met: (1) the interface between syntax and pragmatics is involved; (2) language A has a syntactic construction that may seem to allow more than one syntactic analysis, and, at the same time, language B contains evidence for one of these two possible analyses. That is, there has to be "a certain overlap of the two systems at the surface level" (Hulk & Müller, 2000, p. 229).

Particularly relevant to syntactic transfer is the second condition. Provided that two syntactic constructions are available in the language input, a learner parses these structures to arrive at two possible analyses, which are referred to as *Analysis 1* and *Analysis 2*. If language A provides evidence for both analyses, whereas language B only provides evidence for *Analysis 1*, an overlap between the surface structures of the two languages emerges. Such an overlap reinforces *Analysis 1* as a possible analysis of language A. If the first condition is met, then CLI can be predicted from language B to language A (see Unsworth, 2003, p. 144; Argyri & Sorace, 2007, p. 81; Kupisch, 2014, p. 222). In other words, a linguistic property is more likely to be transferred if it is represented with two structures in one language, but only one of these structures is

employed in the other language. For example, there is a surface overlap between Greek and English regarding the options of overt subject and pre-verbal subject. Whereas Greek also supports the null-subject parameter and post-verbal subject, English does not. This overlap explains why English-dominant Greek-English bilingual children performed less accurately than their Greek-dominant bilingual peers in judging post-verbal subjects in *what*-embedded interrogatives. Moreover, they overgeneralized the use of pre-verbal subjects to wide-focus contexts, where post-verbal subjects are the felicitous option (Argyri & Sorace, 2007).

It must be acknowledged that no consensus has been reached on whether surface overlap is a necessary condition for CLI, and there have been calls for refining the existing hypothesis, as articulated by Unsworth (2003) and Bosch and Unsworth (2021). Also, structural overlap is not the sole contributing factor to CLI. The findings described above also highlight the role of language dominance, as the Greek-dominant bilinguals did not exhibit any differences in performance compared with their monolingual peers. Another limitation of the surface overlap hypothesis is that most empirical studies on it are limited to the scenario of bilingualism and early-age language acquisition, but not in multilingual contexts or FLA for adult learners.

### **2.1.2 (Psycho)typological Proximity and Distance**

*Although language transfer does occur in areas of language use where the source and recipient languages are objectively different, it is the similarities that L2 users perceive or even just assume to exist between languages that serve as the main driving force behind the mental associations that lead to instances of CLI. (Jarvis & Pavlenko, 2010, p. 182)*

In discussions of similarity, a distinction is made between *objective similarity* and *subjective similarity*. The former indicates the actual degree of congruence observed between languages, such as the structural similarities or overlapping mentioned earlier; the latter underscores the cognitive perspective, referring to the degree of congruence

the language user believes or perceives to exist (Jarvis & Pavlenko, 2010, p. 177). During the LA process, once the perceived similarities reach a certain threshold, they often prompt the learners to assume additional similarities, even in cases where such similarities do not objectively exist in the target language (p. 180). The perceived similarity between L1 and L2 structures increases the likelihood of transfer, whereas the perceived dissimilarity tends to lead to the avoidance of learning those structures in L2 (Kellerman, 1983, as cited in Murphy, 2003, p. 5). In the literature, the learner's individual perception of language distance is referred to as *psychotypology* (Kellerman, 1983, as cited in Kellerman, 2001, p. 187 and De Angelis, 2019, p. 169).

From a language-user perspective, the (psycho)typological similarity has been posited as a prospective instigator of language transfer (Rothman & Cabrelli Amaro, 2010; Rothman, 2010). This viewpoint highlights the importance of the perceived typological closeness over the actual similarity of specific linguistic properties shared by the source language and the target language. If learners see the language they are acquiring as typologically similar to a previously learned language, they may apply the linguistic features of the previously learned language to the acquisition of the new language.

The most representative works on this topic focused on the role of Finnish and Swedish in the acquisition of English, where Finnish and English are typologically more distant than English and Swedish. One of the earliest studies dates back to the mid-1970s when evidence showed L1 Finnish speakers made errors in L3 English production that could be traced back to their L2 Swedish (Sjöholm, 1976, as cited in Kellerman, 1977, pp. 80–81). Later studies showed that the L1 Finnish speakers made use of the lexical knowledge of their L2 Swedish rather than their native language when learning L3 English, whereas the L1 Swedish speakers did not rely on their major L2, Finnish, in their performance of English (Jarvis & Pavlenko, 2010, pp. 179–181). The Finns tended to assume that any Swedish form was cognate with an English one, while the Finnish words could rarely be the possible cognate (Ringbom, 1987, as cited in Odlin, 2003, p. 472). In other words, native Finnish learners relied on the

(psycho)typological similarity between English and other Germanic languages, above all, Swedish, to learn English (Ringbom, 1985, p. 56).

(Psycho)typological proximity was also observed to be a CLI factor in other language constellations and other linguistic domains. In a more recent investigation, L1 English-L2 Spanish speakers transferred the null-subject parameter from Spanish during the initial stage of L3 French/Italian acquisition. Although French and English match each other as neither of them is a null-parameter language, the assumed typological similarity between Spanish and French turned out to be the primary cue that the L1 English speakers used when learning French (Jason & Cabrelli Amaro, 2010).

### 2.1.3 Frequency

*“Humans are sensitive to the frequencies of events in their experience” (Ellis, 2002, p. 145).*

Empirical studies found that linguistic properties of significant frequency in either the target language or the source language could have a high potential transferability (for a detailed summary of studies, see Ellis, 2013; Jarvis & Pavlenko, 2010). The notion of *frequency* is further divided into *token frequency* and *type frequency*,<sup>3</sup> with the former referring to how often a particular form appears in a language, such as a specific lexical item or a syntactic structure, and the latter indicating the frequency of a type of linguistic construction or pattern that can be applied to different lexical items, such as the ‘-ed’ form of the English regular past tense (Bybee & Thompson, 1997; Bybee, 2017).

In one of the first empirical works on this topic, Giesbers (1989) argued that words that are high in (token) frequency and have been used recently require less cognitive activation for lexical access compared with low-frequency words and words that have not been used recently (Giesbers, as reviewed in Poulish & Bongaerts, 1994, p. 42). In

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<sup>3</sup> The terms were originally introduced to explain the effect of frequency in grammaticalization, extensively discussed in Bybee (2017).

Poulisse and Bongaerts's (1994) corpus, more function words from L1 Dutch were unintentionally switched in the L2 production than content words. A plausible explanation for this result is that functional words have a higher token frequency than content words and are therefore selected faster in one's speech production (p. 47). In another study, German-French bilingual children used more determiners in German than their German monolingual peers (Kupisch, 2008). One of the contributing factors is the higher token frequency of articles in French (94% in French vs. 82% in German), which has plausibly raised the French-learning child's awareness of pre-nominal determiners at an earlier age compared with the German-learning child (pp. 213–214).

Type frequency plays an important role in the determination of productivity, raising the likelihood that a construction or pattern is being applied to new forms (Bybee & Thompson, 1997, p. 384). Human categorization may be more sensitive to type frequency than to simple token frequency, which is a key issue for language acquisition (Ellis, 2002, p. 148). A high type frequency increases the likelihood of a construction being used more frequently, which strengthens its representational schema and makes it more accessible for further use with new items (Bybee & Thompson, 2000, as cited in Ellis, 2002, p. 166). From this perspective, it is reasonable to assume that frequently used structures of the target language are more likely to be transferred in the acquisition of a new language.

However, the relation between frequency and its application in the context of multilingualism can be questioned, as argued by Murphy in the case of lexical transfer (2003):

[T]he frequency factor is not as clear-cut in third language transfer. The above-mentioned claim by Poulisse and Bongaerts that the frequency of L1 function words determines their transferability is less valid in multilingual transfer. When function words are transferred in an L3 utterance, they are overwhelmingly supplied by the L2 even though the L1 function words must still have higher activation if the L1 is the language of highest proficiency. (p. 15)

#### 2.1.4 Recency

*“[T]he languages that a person has used recently tend to bear a high level of activation in the person’s mind...the effects of recency are much clearer in cases where multiple languages are involved” (Jarvis & Pavlenko, 2010, p. 184).*

Besides frequency, another important factor that contributes to language transfer is *recency*. Speakers tend to transfer the same linguistic pattern from the recent language input into their subsequent language output.

Particularly related to the current study is the phenomenon of *syntactic priming* (also called *structural priming* or *structural repetition*), which denotes “the effect of [how] processing a particular grammatical form affects subsequent processing of grammatical form” (Hartsuiker et al., 2004, p. 410). Originally, this phenomenon was observed in language production patterns in monolingual contexts. Speakers display a tendency to repeat the same or related structures that they have recently comprehended or produced themselves (see Pickering & Branigan, 1999, p. 136; Gries & Kootstra, 2017, p. 235). A corpus-based investigation showed a clear priming effect for ditransitive and prepositional datives as well as particle placement. For the former case, if the word order of V-DO-Prep-IO had been used in the previous utterance, the chance that the same alignment appeared in the subsequent utterance became higher than that of the alternative V-IO-DO word order (Gris, 2005).

Syntactic priming holds equal applicability in bilingual contexts involving foreign language acquisition, as the source of priming may also emanate from the utterance in a different language (Loebell & Bock, 2003, p. 791). Importantly, it is the shared-syntax account that predicts cross-linguistic syntactic priming, rather than the separate-syntax account (Hartsuiker & Bernolet, 2015, p. 410). In a picture-description task carried out by Loebell and Bock (2003), fluent adult L2 English speakers with German as their L1 primed the ditransitive structures and their German counterparts written in the same word order. For example, the German sentence in the V-IO-DO structure *Der Junge schickte seinem Brieffreund einen Brief* was uttered in English in the same structure *The boy sent his pen pal a letter* rather than the prepositional alternative *The boy sent a*

*letter to his pen pal*. The result is credited to the same structural configurations in German and English (p. 807). However, the same effect was not observed in pairing passives, ascribed to the dissimilarity between German and English in passive constructions. Cross-linguistic syntactic priming in speech production was shown in another experiment conducted among Spanish-English bilingual children. The participants displayed a tendency to produce English passive sentences more often after hearing a Spanish passive sentence than after hearing a Spanish intransitive or active sentence (Hartsuiker et al., 2004, p. 412). Since one alternative in Spanish to formulate passive constructions mirrors the English word order, this result further confirms the argument that the surface structural overlap is a catalyst for syntactic priming.

Thus far, we see that language transfer is related to both recency and structural similarity. It should be noted that syntactic priming exhibits a non-unidirectional nature. For instance, despite a tendency toward more priming from German to English, likely attributed to the native language dominance in German, priming effects have been noted both from German to English and vice versa. This provides evidence for the bidirectional characteristic of CLI.

### **2.1.5 Perceptual Salience**

*“When particular aspects of a language are more salient than others, it is reasonable to believe that learner’s attention will be drawn to the more salient feature”*  
(Comeaux, 2016, p. 8).

The third factor that is related to frequency and recency is *perceptual salience*, a term originally used to describe intrinsic properties of linguistic entities that make them more prominent and noticeable—a property of a stimulus to stand out from the rest (Ellis, 2017, p. 71; Boswijk & Coler, 2020, p. 718). The concept originates from the research field of second language acquisition (SLA) and foreign language didactics and relates to the *Noticing Hypothesis*, which argues that noticing is the necessary and sufficient condition for converting input to intake and that subliminal learning is impossible

(Schmidt, 1990, p. 129). Furthermore, it specifies that “it is not just the input in a global sense, but whatever features of the input are relevant for the target system” (Schmidt, 1992, p. 209). If a linguistic feature is made salient during the acquisition process, it is easier for the learner to notice, thereby facilitating the learning process. Evidence for this hypothesis was provided in a study by Bardovi-Harlig (1987), who found that adult learners of English acquired prepositional stranding, the marked construction, before pied piping, the unmarked one. She attributed the outcome to the salience of this structure in the data.<sup>4</sup>

James (1996) further differentiates two potential sources of perceptual salience: an inherently salient form in the target language and a salient form in the target language that contrasts with the corresponding form in the mother tongue, also denoted as *contrastive salience*. Contrastive salience is argued to be crucial in language acquisition because it highlights the differences between linguistic properties in the target language and their equivalents in the native language. This distinctiveness makes certain features of the target language more noticeable to learners, aiding in the identification and correction of typical transfer errors from the mother tongue (Odlin, 1996, as reviewed in James, 1996, p. 143). This concept relates to the role of structural disparities in language acquisition and explains, for instance, the experiment result of Kupisch (2014) mentioned earlier, where dissimilarities between languages were observed as sources of language transfer among adult learners.

Perceptual salience also plays a role in the context of multilingual acquisition. More salient features in any of the earlier-acquired languages may stand out and facilitate the acquisition of additional foreign languages. Taking article use as an example, Jarvis (2002) found out that Finnish students who received more years of Swedish as a foreign language (SFL) instruction had better performance in using English definite articles than those who received more years of English as a foreign

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<sup>4</sup> However, Bardovi-Harlig (1987) was rather vague about the definition of *salience*. In her study, salience was understood as the availability of involved structures in the data, which appears to relate to objective type frequency and the degree of type frequency perceived by learners.



language (EFL) instruction but less SFL instruction. The explanation was that the definite article in Swedish does not only have very similar functions to the English definite article but is also “far more perceptually salient” than the English counterpart (Jarvis & Pavlenko, 2010, p. 185). In comparing the performance of Russian/Vietnamese-German bilingual and Russian/Vietnamese monolingual learners of English, Siemund and Lechner (2015) observed that learners with German knowledge outperformed the monolinguals in English article use. The results could be attributed to the influence from German, whose articles are “highly frequent and salient,” whereas articles lack in Vietnamese and Russian (p. 157).

Finally, it should be noted that scholars have varying understandings of the concept of *salience* in different sub-fields of linguistics and FLA (see Boswijk & Coler, 2020, for a comprehensive summary). As a contributing factor to CLI, perceptual salience overlaps with other factors, especially the perceived linguistic dissimilarities and mismatches.

#### **2.1.6 Language Dominance**

*“Language dominance is often seen as relative proficiency in two languages, but it can also be analyzed in terms of language use—that is, how frequently bilinguals use their languages and how these are divided across domains” (Treffers-Daller, 2019, p. 375).*

A term that has emerged under bilingual and multilingual backgrounds is *language dominance*, which indicates a comparison of the status of different languages within the linguistic repertoire of an individual or a specific group of language users. The dominance status is measured by a series of language user-related variables. As stated in the above quotation, one way of measuring language dominance is by testing *language proficiency*, referring to the level of an individual’s productive or receptive knowledge of a language; the other way is by examining *language use*, related to the frequency and distribution of a multilingual speaker’s language use across different

settings, such as home, work, and school (Treffers-Daller, p. 378). In this section, the relation between language dominance and language transfer is illustrated under these two main aspects.

#### **2.1.6.1 Language Proficiency**

The term *language proficiency* refers to an individual's proficiency in both the source language and the target language. Previous studies have found a correlation between language proficiency and occurrence of transfer.

Specifically, two main viewpoints are related to the issue of proficiency. The first is that transfer is more likely to occur from a language in which the user has higher proficiency to a language in which the speaker has lower proficiency. For example, in the case of structural priming, L1 Dutch-L2 English speakers with higher English proficiency exhibited stronger syntactic priming of the “*of*-genitive” structure from L1 to L2 (Bernolet et al., 2013). An explanation for such an outcome is that “high-proficient bilinguals have formed abstract representations and so they do show priming across languages” (Hartsuiker & Bernolet, 2017, p. 228). In the case of multilingual acquisition, it was revealed that the overgeneralization of the discontinuous verb placement in embedded clauses in L3 English was linked to the low L2 German proficiency in the use of verb-final position and inversion (Sánchez, 2020). However, the role of language proficiency seems less clear when multilingualism is involved. The empirical findings of Lloyd-Smith et al. (2021) provide a counterexample. The scholars conducted an AJT to examine the acquisition of embedded *wh*-questions in L3 English of German-dominant speakers of varying levels of Italian as a heritage language. The results indicated no correlation between syntactic transfer and proficiency in Italian (p. 435).

The second point of view holds that since proficiency is a dynamic factor, transfer effects may manifest differently as language proficiency changes. In the early stages of L2 or L3 acquisition, forward transfer effects have been observed to be pronounced due to the low proficiency in the target language; however, transfer effects become unclear

as the proficiency in the target language increases (Angelovska et al., 2023, p. 118). For example, Siemund and Lechner (2015) observed that 16-year-old bilingual learners of English produced significantly fewer non-target-like items in English compared with the 12-year-old cohort. Similarly, in a long-term study that examined CLI among heritage speakers of Russian, Turkish, and Vietnamese with German as their dominant language, Lorenz et al. (2019) observed that older cohorts, who had “a marked increase in proficiency in English” due to more English training, underwent less CLI, while younger cohorts’ English performance was influenced by their heritage languages (p. 1421). These observations indicate that increased proficiency in the target language may result in greater resistance to cross-linguistic transfer. This, in turn, raises the intriguing question of whether the direction of CLI will shift when the proficiency of a later-acquired language has reached a certain threshold, namely, whether the target language will become the source of transfer once the learner has achieved a higher proficiency in it than in any other earlier-acquired language.

#### **2.1.6.2 Language Use**

The other important measurement of language dominance discussed here is *language use*. It is closely linked to a series of factors, such as language mode<sup>5</sup> and levels of activation (Grosjean, 1985, 2020), frequency of use (Paradis, 1985; Flege et al., 2002; Birdsong, 2009), language (re)exposure (Unsworth, 2015; Köpke & Genevskaja-Hanke, 2018), as well as the degree of language contact and contact situation (Appel & Muysken, 2005; Thomason & Kaufman, 2001).

In his early works, Grosjean (1985, 1989) addressed the concept of *dynamic interference*, denoting the “ephemeral and accidental intrusions of the other languages (as in the ... use of a syntactic structure taken from the language not being spoken)” (Grosjean, 1989, p. 9). The key argument is that multilingual speakers often transition

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<sup>5</sup> Language mode refers to “the state of activation of the bilingual’s languages and language-processing mechanisms at a given point of time” (Grosjean, 2020, p. 429).

between different language modes, where the activation levels of each language vary. In the monolingual mode,<sup>6</sup> other languages are deactivated or inhibited; nonetheless, this deactivation is never absolute. Linguistic interference may still take place due to the residual, involuntary influence of those not completely deactivated languages that are not being used (Paradis, 1985; Grosjean, 1989, 2020).

However, the term *activation* is understood differently depending on the context. When referring to internal language contact—where languages in one’s linguistic repertoire interact during language use—it pertains to how languages are actively involved at the moment of language reception or production (e.g., language mode). Here, *activation* contrasts with *inhibition*. In the context of external language use, it indicates the frequency and the extent of language exposure speakers receive, and the degree to which they actively engage with the language or deploy their linguistic knowledge. From a sociolinguistic perspective, a language achieves dominance if “it is the one most frequently used in education, government, and other functions” (Treffers-Daller, 2019, p. 377).

The *frequency of language use* proves to be a strong indicator of activation and language transfer. Paradis (1985) noted that “[t]he activation threshold of the neural circuits underlying a given language seems directly proportional to the frequency of its use. The more often a language is used, the more available it is” (p. 17). Consequently, a more strongly activated language is more likely to influence a less activated one (Paradis, 2007, as cited in Grüter & Hopp, 2021, p. 1). Against this backdrop, considerable attention has been dedicated to exploring the relationship between language-use-oriented dominance and its potential impact on the occurrence of CLI.

Another research subject concerning the correlation between language use and CLI is language dominance among bilingual or multilingual heritage speakers. Empirical studies have shown that the greater exposure a speaker has to a language, the higher the likelihood that this language will impact the performance of other languages. For

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<sup>6</sup> A bilingual speaker is in a monolingual mode if the interlocutor only speaks one of the languages, or is not proficient in the other language, or does not want to mix languages (Grosjean, 2020, p. 432).

instance, Paradis and Navarro (2003) examined the use of overt subjects of bilingual children of Spanish and English. Despite the native speaker-like size of lexicon, one bilingual subject produced more overt use of subjects,<sup>7</sup> which is argued to be the result of frequent English input in the family. In another investigation, bilingual children with relatively higher exposure to Dutch and lower exposure to English demonstrated significantly reduced sensitivity to the ungrammaticality of V2 word order in English (Bosch & Unsworth, 2021). These observations lead to the conclusion that decreased exposure and limited use of the heritage language might have a detrimental effect on speakers' ability to perform various linguistic tasks (Montrul & Ionin, 2010, p. 294). This conclusion can also be applied to scenarios of unbalanced late bilingualism or multilingualism.

### 2.1.7 Conclusion

*Since the first language and the other language or languages are in the same mind, they must form a language super-system at some level rather than be completely isolated systems. Multi-competence then raised questions about the relationship between the different languages in use. (Cook, 2003, p. 2)*

Language acquisition is a dynamic process, and how CLI occurs in a multilingual mind is complex. The direct source of CLI is linguistic properties from all linguistic subdomains involving languages acquired and being acquired. The driving power can be multifaceted. It includes factors inherent to the languages that interact during language acquisition and language use, such as similarities of certain linguistic features, structural mismatches/overlaps, and disparities in the frequency of occurrence of linguistic items. It also involves user-related factors including but not limited to subjective language perception, language mode, proficiency, language of exposure, and individual language use.

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<sup>7</sup> An overt subject is obligatory in English but optional in Spanish.

From a more language-internal viewpoint, the acquired linguistic properties constantly interact with each other, providing abundant opportunities for grammatical cross-pollination. Over time, this interaction “lead[s] to representational changes, mainly in the language to be learned, but also in the previously acquired grammars” (Westergaard et al., 2023, p. 225). From a more macroscopic perspective, a multilingual mind stores more linguistic information than a monolingual or bilingual mind and amplifies the magnitude of maximal linguistic interaction. With an additional language coming into play, multilingual speakers may process the same linguistic representation differently because they are faced with more possibilities of parsing a specific structure.

In the CLI process, language-inherent factors, such as *structural (dis)similarities*, *frequency*, and *objective salience*, may change the quality of linguistic interaction. It must not be forgotten that language users themselves play a central role in CLI, because the interactions between the languages are, after all, based on how they are perceived by the individuals as part of their linguistic repertoire. In many cases, it is the *perceived structural similarities/differences*, *perceptual salience*, and the *assumed typological proximity/distance* that potentially result in transfer.

Meanwhile, it is important to note that language acquisition is a dynamic process and that CLI patterns can change over time. We have reviewed several variables that affect *language dominance*, such as proficiency and stages of learning, language exposure, frequency of use, and language status. These factors, though not always consistent, have been observed to be potential catalysts of transfer. The linguistic performance of multilingual speakers may vary, depending on the language mode at the moment of speaking (Grosjean, 1995). The same language might exert a different type of impact on children compared with adults (Kupisch, 2014; Sorace et al., 2009). The degree of CLI might vary across early and advanced stages of language acquisition.

Three aspects merit further attention. First, the factors contributing to CLI might exhibit complex interrelationships. This necessitates a holistic perspective rather than an isolated examination of separate factors, especially in linguistic contexts with great complexity. Perceived salience may, for instance, manifest as a positive correlation with structural dissimilarity. If Language A and Language B use different syntactic

representations to denote one grammar entity, it is natural to posit that learners of these languages will easily notice the contrast between the two languages. Recency is related to language dominance. The structures typically used in one's dominant (foreign) language may be more often and more recently heard and thus exert an influence on the output of another language.

Second, the influencing factors explored in this section do not invariably constitute sufficient conditions for CLI occurrences. They may partially explain the mechanism of language transfer, but a fuller understanding of CLI still requires individualized analysis of specific linguistic features considering the user's biographical context.

Third, since language acquisition is a dynamic process involving an individual's progress and concrete situations of language use, the direction of transfer may change over time: from *forward transfer* to *backward transfer* or *bidirectional transfer*. This change may be steered by the interplay of various CLI factors. For instance, variations in the amount and frequency of an individual's language use may directly impact the status of language activation. The proportion of language input and output may play a crucial role in the directional change of CLI (Hervé & Serratrice, 2018, p. 784). A prominent example in bilingual scenarios is the phenomenon of L1 attrition: speakers may experience language loss if the language fails to reach a threshold of activation and eventually be replaced by the frequently used elements of L2 (Paradis, 2004, as cited in Schmid, 2007). In a highly mobilized society offering diverse possibilities for language contact, it becomes imperative to investigate the qualitative changes of CLI and the factors at play. These are core issues explored in the current study, and we will extensively discuss them in Section 2.3.

## **2.2 Current CLI Models in Multilingual Acquisition**

A major distinction between CLI in bilingualism and CLI in multilingualism is that the latter involves more than one potential source of transfer. During the process of L3/L<sub>n</sub> acquisition, as learners develop various mental representations of knowledge of phonetics, lexis, and grammar, cross-linguistic transfer correspondingly adopts a more

dynamic character (Rothman, 2010, p. 108; Cenoz, 2013, p. 8; Slabakova, 2017, p. 658). Meanwhile, it becomes clear that language transfer is not solely determined by a single factor; instead, it may arise from the complex interaction of several aspects, encompassing aspects internal and/or external to languages. Therefore, examining isolated factors contributing to language transfer is no longer sufficient. A critical task is to develop integrated explanatory frameworks that account for, if possible, as many aspects as possible of the CLI phenomenon: its sources, characteristics, and driving mechanisms. In pursuit of this objective, endeavors since the late 20<sup>th</sup> century have been directed toward developing models that systematically illustrate the patterns and mechanisms of transfer phenomena in multilingual acquisition.

Two pivotal aspects are considered in parallel. The first aspect pertains to the characteristics of transfer, with central inquiries exploring whether it is facilitative or non-facilitative and whether it is holistic or partial. Another inquiry concerns the direction of the transfer. The mainstream research focuses on forward transfer, emphasizing the impact of any previously acquired languages on subsequent FLA (e.g., L1 to L3, L2 to L3). The research focus has shifted from investigating the role of L1 in subsequent language acquisition to that of any language available in one's linguistic repertoire in learning additional languages. The issue of backward transfer has received scant scholarly attention since the extensive discussion of L1 attrition and influence from L2 to L1 (for related works, see Cook, 2003; Pavlenko, 2000, 2004; Schmid, 2007, 2013; Schmid & Köpcke, 2009), and no substantial advancements, particularly in terms of multilingualism, have been made.

The second aspect delves into the relation between CLI and stages of acquisition. The patterns of CLI are expected to undergo changes across various stages of the acquisition process. Multilingual acquisition involves not only complex factors and effects associated with the interactions among languages being learned but also the processes and effects of learning them (Cenoz, 1997, p. 278). This dedicates the potentiality of the evolving nature of transfer effects. Therefore, the central topic has shifted from determining the most applicable CLI patterns for multilingual acquisition to understanding how CLI patterns transition across different stages of learning.



Four models are especially relevant to this; they are the *Cumulative-Enhancement Model* (CEM, Flynn et al., 2004), the *Typological Primacy Model* (TPM, Rothman, 2011), the *Linguistic Proximity Model* (LPM, Westergaard et al., 2017), and the *Scalpel Model* (Slabakova, 2017), outlined below.

### **2.2.1 The *Cumulative-Enhancement Model***

The *Cumulative-Enhancement Model* (CEM), introduced by Flynn et al. (2004), posits that FLA is an accumulative process where the knowledge of all prior known languages can serve as a potential source of transfer (p. 14). This model argues for either neutral or enhancing effects of grammatical properties of previously acquired languages on the patterns for subsequent language learning. This stands in contrast to deficit models that advocate for cross-linguistic interference, i.e., non-facilitative transfer effects (p. 5).

Initial evidence for CEM came from an elicited imitation task that compared the performance of English relative clauses of L1 Kazakh-L2 Russian speakers learning L3 English. A precursory study by Flynn (1983) in a bilingual context indicated differences in performances between L1 Spanish and L1 Japanese learners of L2 English. Relative clauses in Japanese are head-final and left-branching, while those in Spanish and English are head-initial and right-branching. Two major observations were made. First, the learning pattern of L1 Japanese adult learners of L2 English mirrored that of L1 English children, as both groups needed to establish a head-initial, right-branching grammatical representation as new linguistic properties. On the contrary, L1 Spanish adult learners of L2 English exhibited a different learning pattern, as the head-initial, right-branching configuration is already available in their L1 Spanish (see Flynn et al., 2004, pp. 8–9). Second, in terms of errors, Spanish L1-English L2 learners often replaced the lexically headed relative with free relatives. However, this occurred rarely among Japanese L1-English L2 participants (p. 13).

While Russian shares the same head direction parameter with English (head-initial, right-branching), Kazakh does not (head-final, left-branching). In a later study, Flynn et al. (2004) found that participants chose the linguistic property of L2 Russian, not that

of L1 Kazakh, to learn relative clauses of L3 English. This outcome showed a positive influence from L2. Meanwhile, the facilitative effects were also observed from L1 Kazakh: unlike the L1 Spanish-L2 English participants, the Kazakh-Russian bilinguals rarely converted free relatives to lexical relatives, a pattern also exhibited by the L1 Japanese group.

These results have demonstrated that both L1 and L2 can be sources of linguistic transfer, exerting facilitative influence on L3 acquisition. Language acquisition is cumulative—the linguistic knowledge that has already been established in the mind of the learner may determine the patterns of learning subsequent languages (p. 15).

### **2.2.2 The *Typological Primacy Model***

As implied by its name, the *Typological Primacy Model* (TPM), introduced by Rothman (2011), argues that language transfer is rooted in the perceived typological similarities between a previously acquired language and the language being learned. This model arises from a thorough debate regarding whether the L1 is the default source of language transfer, leading to the recognition that previously acquired non-L1 languages can also be sources of transfer (see *L2 Status Factor* in Bardel & Falk, 2007; CEM in Flynn et al., 2004).

Rothman has sought to predict what the most deterministic variable a multilingual language learner is likely to transfer when learning an  $L_n$  in the initial state is (Rothman, 2010, p. 245; Berkes et al., 2012, p. 144). Initial evidence came from a grammaticality judgment task by Rothman and Cabrelli Amaro (2010), where L1 English-L2 Spanish learners transferred the null subject parameter in learning L3 French and L3 Italian. Although neither L1 English nor L3 French supports the null subject parameter, the participants made judgments based on the proximity of language typology instead of the similarity of a specific parameter.

Moreover, the result showed that influence from a previous language might be detrimental, as opposed to the claim of CEM. Similar CLI effects were observed in another study, where Rothman (2010) examined the L3 acquisition of Brazilian

Portuguese among L1 English-L2 Spanish and L1 Spanish-L2 English speakers. Even though English and Brazilian Portuguese are more similar in certain linguistic configurations,<sup>8</sup> both groups used the syntactic features of Spanish as references for learning Brazilian Portuguese. This outcome indicated that neither L1 nor L2 was the sole source of language transfer, rejecting the *L2 Status Factor*, which argues for the greater influence of L2 on L3 acquisition. Taken together, TPM is specified as follows:

Initial State transfer for multilingualism occurs selectively, depending on the comparative perceived typology of the language pairings involved, or psychotypological proximity. Syntactic properties of the closest (psycho)typological language, either the L1 or L2, constitute the initial state hypotheses in multilingualism, whether or not such transfer constitutes the most economical option. (Rothman, 2011, p. 112)

It should be noted that TPM is acknowledged as an explanatory framework for the early stage of multilingual acquisition, where learners still lack sufficient grammar representations of the  $L_n$ . Naturally, the concept of typological proximity becomes particularly applicable for explaining CLI patterns in this stage. However, as the acquisition process unfolds, the patterns of CLI may change, as speculated by Rothman et al. (2019): “[T]he typology-based CLI pattern at the initial stage of LA will shift toward entirely property-by-property based transfer during L4 acquisition” (as cited in Westergaard et al., 2023, p. 225).

### **2.2.3 The *Linguistic Proximity Model***

One of the most recent endeavors to explain CLI in multilingual contexts is the *Linguistic Proximity Model* (LPM) introduced by Westergaard et al. (2017). The scholars articulate the central claims as follows:

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<sup>8</sup> In his study, Rothman (2010) examined participants’ preference for word order restrictions relating to transitive and intransitive verb in declarative, interrogatives, and relative attachment.

*L<sub>n</sub>* acquisition involves incremental property-by-property learning and allows for both facilitative and non-facilitative influence from one or both previously acquired languages. CLI occurs when a particular linguistic property in the *L<sub>n</sub>* input reveals abstract structural similarity with linguistic properties of the previously learned languages. (Westergaard et al., 2017, p. 670)

The major difference between LPM and TPM lies in their perspectives on the mechanism of transfer. The former advocates for full transferability based on typological proximity/distance, whereas the latter supports property-by-property transfer. While LPM does not entirely reject the possibility of full transfer, it acknowledges its potential by stating that not “everything does transfer,” but “anything may transfer” (Westergaard, 2021a, p. 400). Consistent with CEM, LPM posits that all previously acquired languages remain active and may influence the learning patterns of *L2/L<sub>n</sub>* (p. 380). However, it differs from CEM in stating that CLI is not necessarily facilitative.

The first evidence for LPM came from a study that examined the syntactic acquisition among L1 Norwegian monolingual, L1 Russian monolingual, and simultaneous Norwegian-Russian bilingual learners of English. In an ATJ, the L1 Norwegian children over-accepted ungrammatical English word orders that conform to Norwegian syntactic parameters, whereas the L1 Russian and Norwegian-Russian bilinguals noticed errors more often. Also, the L1 Russian monolinguals had better performance than their bilingual peers. The results contradicted CEM in that the Norwegian had a negative impact on English acquisition in this case. Moreover, typology-based models have been challenged—Russian showed significant facilitating effects in English learning, even though Norwegian and English are typologically nearer.

Regarding changes in CLI patterns, the scholars acknowledge that superficial heuristics might play a role in the initial stage of L3 acquisition, particularly when the learner has not yet received enough input of L3 to identify similarities at a more abstract level (Westergaard et al., 2017, p. 677). Hence, a prediction is made that as exposure

to L3 increases, the CLI will shift from typological proximity to a pattern on a property-by-property basis, where structural similarity should become an increasingly dominant factor (Westergaard et al., 2023, pp. 226, 236).

#### **2.2.4 The *Scalpel Model***

Another model that has similar claims to LPM is the *Scalpel Model* proposed by Slabakova (2017), which posits that “activated grammatical possibilities of the L1-plus-L2 combined grammar act with a *scalpel-like precision*, rather than as a blunt object, to extract the enhancing, or facilitative, options of L1 or L2 parameter values” (p. 655). However, the precision of the scalpel can be affected by factors other than linguistic properties.

In light of LPM, the *Scalpel Model* considers (dis)similarities between linguistic features as sources of transfer and argues that CLI can be facilitative, neutral, or detrimental (pp. 655–656). Neither L1 nor L2 has a privileged status concerning transfer (p. 654). It rejects the wholesale transfer for both theoretical and empirical reasons; for instance, it is less economical to block off one linguistic system already acquired than to proliferate and subsequently differentiate sub-grammars (Amaral & Roeper, 2014, as cited in Slabakova, 2017, p. 258).

The central claim of the *Scalpel Model* is that CLI is not solely a result of interactions of different grammars in a multilingual brain, but also several additional factors, including experiential factors, construction frequency, misleading input, processing complexity, and prevalent use, among others (Slabakova, 2017, p. 653; Westergaard et al., 2023, p. 225). Using the scholar’s own metaphor, “[t]hey are the factors that can lead the scalpel away from precision” (Slabakova, 2017, p. 662).

### 2.2.5 Summary and Implementation in the Current Study

In summarizing current CLI frameworks, it becomes evident that while significant insights have been garnered, there remains a critical need to explore the direction of transfer in greater depth.

Language acquisition is a dynamic process influenced by multiple factors. Initially, learners encounter new grammar rules with limited exposure to the target language. As the acquisition process continues, learners typically experience an increase in proficiency and greater exposure to the target language, which allows for an enhancement in language skills and increased proficiency in language use. With different linguistic systems in play and changing of learner statuses, the mechanism of language transfer becomes more dynamic (Amaral & Roeper, 2014, as cited in Slabakova, 2016, p. 8). A question naturally arises: *Does the direction of language transfer change alongside progression in foreign language acquisition?*

This is a question that current CLI models do not fully address. Existing models primarily center on the forward transfer as a default, as it is a natural outcome of language acquisition as a continuum. Among them, CEM appears to be the most relevant to the question. Acknowledging the cumulative effect of language acquisition, the scholars posit that such effects may impact overall language performance and do not deny reverse transfer. Nevertheless, they have not explicitly tackled the issue of transfer direction concerning the stages of the acquisition process.

LPM and the *Scalpel Model* acknowledge the potential correlation between learner-based factors (e.g., proficiency) and the magnitude of CLI. However, there is a need to take a closer look at the relationship between these factors and specific CLI patterns. Exploring the specific conditions under which typology-based CLI to property-based one is crucial. In turn, questions arise regarding the threshold of exposure or proficiency required for this shift. Will forward transfer, resulting from grammar interaction, gradually diminish and eventually disappear? Which linguistic properties are more transferable, and are they also transferable in reverse? What determines transferability? In terms of syntax, it warrants investigation into whether

and which syntactic properties are transferred entirely (e.g., wholesale copying of the word order of the whole sentence) or partially (e.g., copying a specific word order of a sentence/phrase). These questions arise in later stages of additional language acquisition and should be delved into in future studies.

## **2.3 Backward Transfer**

In this section, we will first review the theoretical background for backward transfer, then introduce a few empirical studies in this field, which are relevant to the current research.

### **2.3.1 Theoretical Background**

*The practice of alternately using two languages will be called BILINGUALISM, and the persons involved, BILINGUAL. Those instances of deviation from the norms of either language which occur in the speech of bilinguals as a result of their familiarity with more than one language, i.e. as a result of language contact, will be referred to as INTERFERENCE phenomena. It is these phenomena of speech, and their impact on the norms of either language exposed to contact, that invite the interest of the linguist. (Weinreich, 1953, p.1)*

The excerpt above is from Weinreich's (1953) book *Languages in Contact: Findings and Problems*, one of the earliest works addressing the phenomenon of CLI. In this pivotal passage, Weinreich indicated that language transfer can be of a bidirectional nature, as seen in the reference to "the norms of *either* language." Nowadays, studies on CLI have developed into a huge network that covers all linguistic domains. Most of them focus on the unidirectional transfer during the acquisition process, i.e., the impact of previously acquired languages on subsequently learned ones. As outlined in Section 1.2, the research focus has shifted from investigating the role of the mother tongue in learning a foreign language (e.g., L1 to L2/L3) toward examining how any already

acquired languages may manifest transfer effects on the most recent language being acquired (e.g., L2 to L3). However, the phenomenon of *backward transfer* (also referred to as *reverse transfer* or *reverse influence*), denoting the impact of a later-acquired language on those previously acquired ones, is still regarded as “a somewhat marginal issue” (Schmid, 2013, p. 94).

### **2.3.1.1 Backward Transfer and Language Attrition**

*Is the transfer always unidirectional?* The answer is unequivocally “no,” at least in the context of bilingualism. The best evidence is *first language attrition* (L1 attrition), which refers to “a change in the native language system of the bilingual who is acquiring and using a second language... [due to] interferences from the L2 on all levels” (Schmid & Köpke, 2009, p. 211). The attrition phenomenon is argued to result from two factors: (1) the presence, development, and dominance of the L2 system, and (2) the dramatic reduction in L1 use and input (pp. 210–211). In essence, the direction of transfer is related to the power relation between the two languages being used. Even if a person’s native language system is stable, it may undergo language attrition if the later-acquired or encountered language becomes the dominant one, such as in situations like emigration. As the major linguistic environment changes, a subordinate bilingual group will shift to the language of a monolingual group (Thomason & Kaufman, 2001, p. 4). A related phenomenon is *unbalanced bilingualism*, denoting that a bilingual has one dominant language (Lorenz et al., 2019, p. 1422). This is often observed in heritage bilingualism, where one language often “wins out over the other, owing to the shifting attention that arises from shifting sociolinguistic circumstances” (Polinsky & Scontras, 2020, p. 4).

The second question regards the cause of reverse influence. It appears that most studies on L1 attrition or unbalanced bilingualism emphasize the impact of external factors. These include either sociolinguistic ones or the implication of the “weaker” language itself—“the limitations of online resources and/or inadequate input” of the heritage language (Polinsky & Scontras, 2020, as summarized in Meisel, 2020, p. 33).



Regarding language-internal factors, limited research exists. Notable contributions have been made by Pavlenko (1999, 2000), whose works delve deeply into how linguistic entities of L2 directly influence L1. She categorizes backward transfer from L2 to L1 into five types: (i) *borrowing transfer* (lexical borrowing), (ii) *convergence* (creation of new structures between L1 and L2), (iii) *shift* (moving away from L1 structure for L2 structure), (iv) *restructuring transfer* (incorporating L2 into L1), and (v) *L1 attrition* (see Pavlenko, 2000, pp. 179–200 for details). Particularly, Pavlenko notes that transfer can be bidirectional or mutual: “Bidirectionality is seen by SLA scholars as facilitation that can be applied equally to speakers of language A learning language B and to speakers of language B learning language A” (p. 175). This view is in line with that of Weinreich (1953).

Another question arises: *Does backward transfer occur in scenarios exclusively involving successive foreign language acquisition, such as L3 to L2, and Ln to L2?* In one respect, if L1, which has already established a stable grammar system in one’s mind, may undergo attrition, it is then natural to consider the possibility for any later-learned languages to experience attrition, particularly when these languages have lower proficiency. In another respect, since language dominance is observed to be a key factor in explaining the attrition phenomenon, it is logical to consider that a dominant foreign language can also impact a weaker foreign language, irrespective of the sequence of acquisition.

A relevant issue is *foreign language attrition*, or *L2 attrition* among individuals,<sup>9</sup> denoting the loss of linguistic skills of a later-acquired non-native language over time (De Bot & Weltens, 1995). While studies on L2 attrition primarily focus on the forward transfer direction, they clearly highlight the role of language dominance in individual language use. Chances are, many multilingual learners experience that when a foreign language is not regularly used, it tends to “rust.” For a more objective measurement of foreign language attrition, empirical studies adopt several criteria. These include

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<sup>9</sup> Language attrition can also occur among both speech communities and individuals (De Bot & Weltens, 1995, p. 151). As the current study specifically focuses on language transfer among individual language users, the collective attrition phenomenon will not be discussed.

observing whether speakers overgeneralize or oversimplify grammar rules, lose morphological complexity, show a reduction in registers of use, lose grammar accuracy, or show disfluency (e.g., Kuhberg 1992; Tomiyama, 1994, 2009; Bardovi-Harlig & Stringer, 2010).

The factors leading to foreign language attrition appear to overlap with those resulting in L1 attrition. Among them, the main precursors include changes of linguistic environment (e.g., Olshtain, 1989), amount of input and use during FL instruction and reinforcement (e.g., Hedgcock, 1991; Jessner et al., 2021), length and frequency of exposure to L2 (e.g., Miller & Rothman, 2020), original/initial proficiency (e.g., Weltens & Cohen, 1989; Mehotcheva, 2010), and maturational factors such as the onset of FLA (e.g., Tomiyama, 2009). Any linguistic system deprived of a sufficient “linguistic diet” will inevitably undergo degradation over time (Miller & Rothman, 2020, p. 870).

The key distinction between attrition phenomena in bilingualism and multilingualism is that the latter involves a shift in language dominance between two or more foreign languages. Many catalysts can lead to changes in power relations between these languages. If trilingual individuals relocate to an environment where L3 is the primary language of communication, they may likely face attrition in L2, such as loss of fluency and forgetting lexicon. Or, if someone stops learning L2 to learn L3, and the latter becomes the dominant foreign language, there would be a likelihood of forgetting L2 grammar. If L3 is practiced more frequently, it is possible that its grammar gradually influences the speaker’s perception of L2 grammar rules, leading to uncertainty in L2 usage. In short, the influence of one foreign language on another can vary depending on the language constellation and individual use.

### **2.3.1.2 Linguistic Multi-Competence**

The issue of why and how the transfer direction changes gains insights when examined through the lens of cognitive linguistics.

The bidirectional nature of linguistic transfer is explained in Cook's *multi-competence framework* (1992, 2003, 2016a, 2016b). According to Cook, a bilingual or multilingual mind is not just a matter of different languages coexisting as isolated systems; instead, all the languages are somehow amalgamated and form a rather complex interweaving system. Multi-competence is hence not a final steady-state of knowledge; instead, it refers to "a person's knowledge of more than one language system [where] there is language knowledge of an L2 that is not simply assimilated by the L1" (Cook, 1992, p. 581).

Multi-competence involves the dynamic process of language acquisition and language use, and transfer is a part of it. Cook (1992) points out the difference between language acquisition and language use: the former is a *code-breaking* process where learners understand the grammar rules and parameter setting, and the latter is a *decoding* process where a speaker uses the established knowledge in a synchronic state. Transfer involves both code-breaking and decoding (pp. 580–581). This view offers rationale for the bidirectional potential of transfer: forward transfer deals with how learners consciously or unconsciously deploy the already-established linguistic knowledge in their subsequent language learning, a code-breaking process, whereas backward transfer takes place when linguistic knowledge of a later-acquired language interferes with the user's decoding process for an earlier-learned language.

Here, the notion of *backward transfer* differs from *language attrition*. The latter denotes that a previously acquired language is forgotten or vanishes, whereas the former refers to the phenomenon where features of a later-learned language influence the perception or use of a prior language. Namely, transfer "denotes a relationship between existing elements, not bringing a language into being or into non-existence," and "some kind of copy is made and stored in the other language" (Cook, 2016b, pp. 29–30). In turn, in explaining the phenomenon, the focal point is the dynamic relationships between languages in a multilingual mind, as noted by the scholar: "[M]ulti-competence concerns the total system for all languages (L1, L2, L<sub>n</sub>) in a single mind or community and their inter-relationship" (p. 28).

One characteristic of multi-competence is that it is highly dynamic and user-based. Dewaele and Pavlenko (2003) describe it as “an ever-changing and highly complex system” that is not always equilibrium and can be changed by any unexpected change, such as a change in the frequency or nature of the linguistic input or specific activity (as cited in Dewaele, 2016, p. 461). From a pure language-internal perspective, acquiring additional parameters changes the dynamics by expanding the possibilities of interaction across linguistic entities. In this process, the language user must decide, either consciously or unconsciously, whether and how to deal with parameter learning and resetting. This acts as a catalyst for CLI to occur in any direction. This view resonates with how Westergaard and colleagues (2023) explain the mechanism of transfer in their recent work:

The processes of multilingual development are based on access to the multiple grammar already built and being built...The three (or more) languages constantly interact in the minds of multilingual speakers and the one(s) not in use must be inhibited. This extensive interaction provides abundant opportunities for grammars to influence each other, and over time, this interaction may lead to representational changes, mainly in the language to be learned, but also in the previously acquired grammars. (p. 225)

To sum up, for a multilingual mind, all acquired linguistic representations, once successfully integrated into one's inventory of linguistic knowledge, should serve as the potential source of transfer. This empirical observation holds, at least within the domain of bilingualism. In the next section, we will present a selection of the limited existing studies that delve into the rarely researched topic: backward transfer in multilingual acquisition.

### **2.3.2 Empirical Research on Backward Transfer and Explanation Attempts**

This section presents several relevant empirical studies on the backward transfer phenomenon. Among them, a few specifically focused on reverse CLI between

successively acquired foreign languages (e.g., L3 to L2, L4 to L3). The methodologies employed in these precursory studies provide valuable references for our research.

### 2.3.2.1 Backward Transfer in Bilingual Contexts

*“Those who know other languages have demonstrated different L1 performances from their monolingual peers”* (Cook, 2003, p. 1).

In the past decades, a few empirical CLI studies have provided evidence for backward transfer in the scope of bilingual acquisition across various linguistic domains. In these studies, differences between monolinguals and bilinguals in their L1 performances have been observed to manifest in both language input and output: *language perception* (e.g., word order judgment: Seliger, 1991; lexicon: Pelc, 2001; phonetic perception: Zhao et al., 2003; argument structure processing: Oliveira et al., 2017), *language production* (e.g., lexicon diversity: Laufer, 2003; Hopp & Schmid, 2013; word order: Isurin, 2005; speech production: Ivanova & Costa, 2008), or both (e.g., grammatical aspects: Bylund & Jarvis, 2011). Nevertheless, most studies examining L2 effects on L1 are concerned with language attrition, a phenomenon caused by factors such as “diminished use of the L1, separation from the L1-speaking community, a low degree of acculturation, and a low level of L2 attainment at least in the first generation” (Tsimpli et al., 2004, pp. 257–258). Adults who successfully acquire a foreign language but maintain regular usage of their L1s have seldom been the focus of studies on backward transfer.

Pavlenko and Jarvis (2002) conducted a pioneering study focusing on reverse transfer in the true sense, i.e., how the linguistic property of L2 influences L1. They investigated whether Russian and English had a synchronic impact on each other among adult native Russian speakers of English as a late-acquired language. Subjects were 22 L1 Russian-L2 English bilinguals who learned English post-puberty and had spent between three and eight years in the USA, interacting in both Russian and English daily. Through a narrative task, evidence of backward transfer from L2 English to L1 Russian emerged, particularly in lexical borrowing and case marking. Moreover, bidirectional

transfer manifested in paradigmatic categories like framing transfer and semantic extension, as well as in syntagmatic categories such as loan translation and subcategorization (refer to the *Scheme of paradigmatic and syntagmatic relations* in Pavlenko & Jarvis, 2002, pp. 197–204). In their Russian speech production, bilinguals often used constructions and expressions that were either uncommon or atypical in L1 Russian but were typical in L2 English. Unlike the previously mentioned studies, which strongly supported extralinguistic factors as major causes of reverse influence, the research of Pavlenko and Jarvis indicated that such external factors, including length of exposure and age of arrival, did not yield a significant impact on the directionality and amount of transfer in their sample (p. 209).

Scholar attention on backward syntactic transfer is relatively rare. A relevant study is that of Tsimpili et al. (2004), who delved into the syntactic attrition of near-native L2 English speakers who continued using their L1 Italian regularly. Influence from L2 English was evident in bilingual participants' interpretation of overt subject pronouns in subordinate clauses. In Italian, as overt subjects are employed to indicate markedness and focus, in (a) and (b), only when the subject of the subordinate clause is covert does it refer to the subject of the main clause, *l'anziana signora* ('the old lady').

- (a) *Quando lei<sub>k1</sub> attraversa la strada, l'anziana signora<sub>i</sub> saluta la ragazza<sub>k</sub>.*  
 while she crosses the street the old woman greets the girl  
 'While she crosses the street, the old woman greets the girl.'
- (b) *L'anziana signora<sub>i</sub> saluta la ragazza<sub>k</sub> quando lei<sub>k1</sub> attraversa la strada.*  
 the old woman greets the girl when she crosses the street  
 'The old woman greets the girl when she is crossing the street.'

When parsing forward anaphora, as in (a), the monolingual Italian more readily interpreted the pronominal subject *lei* ('she') as a new referent, while the bilinguals exhibited greater ambiguity. Additionally, more bilinguals interpreted it as the subject of the main clause, a pattern inconsistent with Italian grammar. When interpreting backward anaphora, as in (b), the bilinguals also succumbed to L2 influence, showing

a greater willingness to parse the subject pronoun as *l'anziana signora* ('the old lady')—the “continued topic” (p. 273).

### ➤ *The Competition Model*

Endeavors are made not only to document the backward and bidirectional transfer as CLI phenomena but also to elucidate their mechanisms using established frameworks in language acquisition. The *Competition Model*, proposed by Bates & MacWhinney (1981), serves as such a theoretical paradigm in explaining transfer effects from the perspectives internal to linguistics. Initially introduced to illustrate native language acquisition, this model was soon extended to the scenario of investigating SLA and language loss in aphasia (MacWhinney, 1987, p. 317). It illustrates the role of the linguistic characters of a known language in the subsequent acquisition process, as well as their influence on language users in processing other languages.

According to the *Competition Model*, language acquisition is characterized as “cue-driven distributional analysis” (Bates & MacWhinney, 1989, p. 23). A language user (processor) employs a diverse range of surface structure features, referred to as *cues*, which can be syntactic, morphological, phonological, or lexical in form in learning and processing languages (Morett & MacWhinney, 2013, p. 132). For example, English speakers may use word order (SVO) as a major cue to identify the subject in the sentence *The wolf sees the girl*, where the noun phrase occupies the sentence-initial position. Spanish or German speakers may rely on case cues to exclude *la niña/das Mädchen* ('the girl') as the subject in *El lobo ve a la niña/Der Wolf sieht das Mädchen* ('The wolf sees the girl'). In Spanish, the personal direct object is marked by *a* ('to'). In German, the accusative determiner *den* ('the') is used to identify the singular masculine object; whereas in the sentence, *der Wolf* ('the wolf') is marked by the definite nominative determiner *der* ('the'), a marker for singular masculine subjects.

Cues compete or converge not only because speakers assign different weights to different cues during real-time sentence processing, but also because the same cue has varying strengths in different languages (Li & MacWhinney, 2013, p. 1). In the example above, the word order cue in English does not have the same weight as the case cue in

Spanish and German. Such a competitive character of cues determines that a multilingual mind must react differently to the same cue when using different languages.

Furthermore, the way an individual manages each cue may change throughout the language acquisition process. In the early stage of L1 and L2 acquisition, learners control grammar by simply looking at the *cue validity*, which is assessed by *availability* (i.e., the ratio of cases in which the cue is available over the total number of cases in a given task domain) and *reliability* (i.e., the ratio of cases in which a cue leads to the correct conclusion) of cues in each language (MacWhinney, 1987, p. 321). When the acquisition enters the late stage, the learner has already established a “construction of systems of cues” and therefore needs to “pay attention to ways in which cues interact to form systems” (p. 321).

Four patterns of cue weights for bilingual acquisition are concluded, and such a classification has been supported by a growing body of empirical research: (i) transfer from L1 to L2 (e.g., Bates & MacWhinney, 1981), (ii) abandonment of L1 for L2 (e.g., Heilenman & McDonald, 1993), (iii) merger of L1 and L2 (e.g., Wulfeck et al., 1986; Hernandez et al., 1994; Dussias, 2001), and (iv) partial attainment of separate L1 and L2 systems (e.g., Kilborn & Cooreman, 1987). These four patterns overlap the five manifestations of L2 transfer summarized by Pavlenko (1999, 2000), as mentioned in Section 2.3.1.1. The outcome of these patterns can be mixed, depending on variables such as the languages involved, proficiency, and the stages of bilingualism (Liu et al., 1992; Sasaki, 1994; Su, 2001). Transfer effects from L2 to L1 can be identified if these patterns occur in one’s L1 processing. Specifically, negative backward influence from L2 occurs when a language user utilizes a predominant cue in processing L2, leading to an inaccurate or inefficient parsing of L1. Due to the mixed employment of cues as well as the changes in cue validity, individuals experience a deterioration in the processing ability of L1.

As a functionalist processing model, the *Competition Model* has been widely adopted as a framework by many studies, which examines the implicit knowledge of advanced language users, namely, “how learners’ underlying representation changes during the process of L2 acquisition and how they interfere with process mechanism”



(Morett & MacWhinney, 2013, p. 132). Drawing on this theoretical framework, a few studies explored, among other aspects, the effects of L2 on L1. Su (2001) investigated the potential influence of L2 on the use of surface cues of word order, verb agreement, and noun animacy when processing sentences in their L1 and L2. In her study, participants were different proficiency groups of L1 Chinese-L2 English and L1 English-L2 Chinese speakers. They were asked to choose one out of two nouns as the agent of the sentences written in different (but necessarily canonical or grammatical) word orders, such as *The door bumps the rabbit* or *\*The mouse the window pushes*. Normally, Chinese monolingual speakers use the semantic cue (noun animacy) as a strategy in processing sentences, while English monolinguals use the syntactic cue (word order) as a norm in interpreting thematic roles. Bidirectional transfer was observed by means of a noun-interpretation task. Forward transfer was evident as subjects used the L1-based cue in L2 processing. Backward transfer turned out not only to have a correlation with L2 proficiency but also to show a divergence in different language groups. First, while the L2 beginners demonstrated significant reliance on using the animacy cue when interpreting Chinese sentences, the intermediate and advanced L2 English speakers transferred the L2-based word order strategies in interpretation (p. 102). Second, minimal evidence of L2 Chinese influencing L1 English was observed. Backward transfer was more evident in Chinese learners of English than in English learners of Chinese (p. 108). The findings suggested an unpredictable nature of backward influence.

The study by Cook and colleagues (2003), however, yielded divergent outcomes. Using the same approach, monolingual speakers of Japanese, Spanish, and Greek, alongside their L2 English bilingual peers, were tasked with defining one of the two nouns as the subject of a given sentence. Multiple sentences with varying word orders were presented based on cues including animacy, case, and agreement. These cues have different validity in each language. The bilingual subjects were expected to be influenced by the L2-based cues when processing their respective L1. Although all three groups of bilinguals performed differently from the monolinguals, “the shift [in employing cue types] does not seem solely in the direction of English” (p. 211). For

instance, Japanese bilinguals displayed a stronger preference for plural nouns as subjects in comparison with the monolingual controls, but none of the cues of English or Japanese could account for this result. Hence, the data merely revealed general tendencies of English affecting language users' overall concept of language, but it could not discern the impact of specific linguistic properties of one language on another. In other words, the effect of L2 English was shown only in augmenting the metalinguistic awareness of the bilingual users, as articulated by the authors, "acquiring English has opened [the L2 users'] eyes to universal grammatical categories" (p. 212).

The last study we choose to present in this section is the one conducted by Morett and MacWhinney (2013), who investigated the effect of language-common cues<sup>10</sup> and language-specific cues of L1 English and L2 Spanish on bilingual speakers' sentence processing in comparison with the monolinguals. The researchers hypothesized that less advanced L2 Spanish learners would have a greater dependence on their L1 English and tend to rely more on word order cues, while more advanced learners would increasingly utilize additional cues to interpret English sentences (p. 135). The research findings demonstrated a correlation between the degree of L2 exposure and backward transfer, wherein participants with greater exposure to Spanish exhibited decreased reliance on the dominant word order cue of English. Instead, they tended to use the animacy cue, which has high reliability in L2 Spanish but is exclusive to L1 English, to determine the subject of the English sentence (p. 143). Even the sentence interpretation strategies of the less advanced L2 learners were influenced subtly by case cues other than word order cues (p. 145). The study also revealed that the need for additional attention to case marking to process the more flexible word order in Spanish had a secondary effect of enhancing attention to case marking in English (p. 149). These findings all indicated a weak, reverse influence from L2 Spanish.

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<sup>10</sup> Language-common cues, as opposed to language-specific cues, refer to the cues shared by the two languages (Morett & MacWhinney, 2013, p. 134). Most of the previous studies used sentences with identical cues in each language. By examining language-specific cues, the differentiation between the two languages can be better investigated. See Morett & MacWhinney (2013, pp. 136–137) for language-common and language-specific cues in English and Spanish.

In summary, these studies not only have substantiated the manifestations but also demonstrated the characteristics of backward transfer from L2 to L1 across various dimensions. These include the changes (dropping, shifting, and merging) in the use of language-common cues as well as language-specific cues in native language perception, the change of strategies in processing L2, and the enhancement of metalinguistic awareness simultaneously in one domain. Regarding reverse transfer in the domain of syntax, there still exists unjustified skepticism. Although previous studies have broached this topic, their primary focus encompassed the interaction between various linguistic properties during language processing, changes in cue validity, and the shift of language processing strategies in different stages of SLA. In other words, these inquiries did not directly examine the potential transferability of specific linguistic features of one language to another. Unlike the CLI models presented in Section 2.2, the *Competition Model* framework neither offers predictive insights into transferability nor provides explanatory background to explain transfer mechanisms within a particular linguistic domain, such as the circumstances dictating the transfer of a syntactic representation from language A to B.

Several questions remain open. First, there still lacks a mechanism to directly account for how L2 cue weight impacts L1 processing, as noted by Su (2001). Also, no explanation has been provided for the distinctive, unbalanced manifestation of transfer patterns, i.e., why backward transfer has turned out to be more pronounced for L1 Chinese learners of English than L1 English learners of Chinese (p. 109). Moreover, instances in multilingual contexts have not been the subjects of investigation within the *Competition Model* framework. It is thus incumbent upon us to address this gap by specifying the components and constraints of backward transfer.

### **2.3.2.2 Backward Transfer in Multilingual Contexts**

While backward transfer within the bilingual context has been discussed in the literature, the current state of research on transfer effects from non-L2 foreign languages on earlier-acquired ones is marked by a dearth of empirical studies. Since the last decade,

researchers have made several exploratory attempts to investigate the occurrence of reverse influence and identify plausible explanations for this phenomenon. For the present study, we will summarize empirical studies that investigate backward transfer in multilingual scenarios, reviewing their research methods and respective findings.

Up to this point, several studies have documented the occurrence of backward transfer between non-native languages, e.g., from L3 to L2. Regarding the characteristics of transfer effects, the studies yielded varied outcomes: whether the effect is positive, detrimental, or neutral depends on the specific languages and variables under investigation.

Among the languages examined (German, English, and Chinese), the study conducted by Cheung et al. (2011) is probably the most relevant to our project. Their research revealed that L1 Chinese speakers of L2 English-L3 German experienced transfer effects from German to English in terms of tense-aspect. Since German uses the perfect form to denote a past event without bearing on the present moment, which is compatible with the English *simple past*, Cheung et al. anticipated that trilingual participants would overuse the *present perfect* to refer to past occurrences. Through a narrative writing task and an ATJ, the researchers validated the hypothesis. Participants with German as L3 exhibited a significant preference for the English *present perfect* for situations in the past without relevance to the present. Also, they were less likely to use the *simple past* to refer to the past, which was a typical non-target-like use transferred from L1 Chinese. Apart from identifying a non-facilitative effect from L3 German, this study showed that German exerted an indirect, positive impact, as it might have neutralized the negative influence of L1 Chinese for not having a tense-aspect system.

Using Cook's multi-competence framework as a theoretical background, Fung and Murphy (2016) explored whether learning French as L3 would influence the implicit and explicit knowledge of L2 English due to the differences between the two languages in tense-aspect features for describing past events. There is no direct semantic or functional correspondence between the English past simple and present perfect tenses and their formally equivalent structures in French. To assess the accuracy of tense-

aspect knowledge in English morphosyntax, the researchers conducted a grammaticality judgment task and a proofreading task. The results revealed that the L3 French-L2 English group had a higher rate of accepting the ungrammatical use in simple past and past perfect compared with the English monolingual group and the L1 English-L2 French group, whereas no significant differences were found between the latter two groups. Additionally, no significant contrast was observed between the L3 French group and the control groups. These findings provided evidence of negative backward transfer from L3 French to L2 English in implicit knowledge of the syntax-semantics relation of tense-aspect features.

Several studies included investigations on factors contributing to the backward transfer. Rah (2010) identified syntactic transfer from L3 English to L2 French in syntax-driven sentence processing and found a correlation between the occurrence of backward transfer and language dominance. Her study was based on the contrasts between English and German/French in relative clause attachment: the high-attachment preference in German and French, as opposed to the low-attachment preference in English. She hypothesized that native German speakers who learned English before French would prefer low-attachment when processing French relative clauses with ambiguous attachment. Contrary to the hypothesis, a low-attachment preference was only observed in the L2 French-L3 English group, but not in the L2 English-L3 French group. This outcome indicated a backward transfer from L3 to L2 rather than a forward transfer from L2 to L3. Nonetheless, not all participants experienced transfer from English to French: including language dominance in the analysis revealed a clear positive correlation between high-attachment preference and proficiency in French.

While high proficiency in L3 appears to be a premise for backward transfer to take place, it is not clear-cut whether proficiency in L2 plays a role. Tsang (2015) compared the correlation between language acquisition and perceived language differences among L1 Cantonese-L2 English and L1 Cantonese-L2 English-L3 French speakers. A potential backward influence of L3 was identified, as the trilingual group could better perceive the distinctions between languages. However, the scholar argued that this occurred only when the L3 learners had attained a specific threshold in L3 proficiency

(p. 331). The proficiency of L2 seemed less influential for reverse transfer to occur. Ahn et al. (2022) detected transfer effects from L3 Korean on native Chinese speakers' understanding of reflexives in L2 English. The effect of L2 proficiency in affecting interpretation accuracy was excluded, as no significant difference was seen between the two proficiency groups.

Regarding the characteristics of backward transfer, the studies by Cheung et al. (2011) and Fung and Murphy (2016), outlined above, indicated non-facilitative effects. Participants in these studies simply relied on a specific parameter from L3 as a reference for representing the same grammar entity in their L2. The results suggested that linguistic properties of L3 might potentially impede speakers' perception of L2.

Facilitative reverse influences from L3 have been observed from two perspectives. First, L3 may neutralize potential influences from L1, particularly when a grammatical structure is absent in L1 but present in L3 and used in L2. This perspective is demonstrated by Cheung et al. (2011), who argue that the common use of *present perfect* in L3 German fills the gap where this grammar is missing in L1 Chinese but is frequently used in L2 English.

The second perspective concerns the broader impact of multilingual acquisition itself, rather than the transfer effect of specific linguistic features. Acquiring an additional foreign language may enhance learners' metalinguistic awareness, as suggested by Tsang's (2015) study, mentioned previously. In the same vein, Griessler (2001) investigated students' English proficiency in a German-English bilingual school with an immersion program, a German-English-French trilingual school, and a regular high school (*Bundesrealgymnasium*, abbr. BRG) in Austria. Results showed that the students from the trilingual school outperformed their peers in BRG in English vocabulary and verbal morphology, although the two schools shared the same curriculum for the English subject. Besides, L3 French students had the highest developmental progress in L2 English lexical learning. The scholar highlights that language learning experience plays a significant role in multilingual acquisition: through learning a third language, students make progress faster in their second language (p. 54). Other contributing factors include language aptitude, attitude and

motivation, parental interest, and teacher commitment. The research of Griessler (2001) has examined the overall L2 performance; nonetheless, it falls short in examining the interrelationship of languages, i.e., what linguistic property can be transferred and how.

Research on backward transfer has extended its scope to the domain of L4 acquisition. Through a sentence combination task, Llinàs-Grau and Mayenco (2016) identified the influence of L4 German on L3 English among L1 Catalan-L2 Spanish speakers regarding *that*-deletion. The complementizer *that* in an embedded clause is obligatory in Catalan and Spanish, whereas it can be omitted in English and German. In a sentence combination task, participants with German as L4 produced more *that*-deletion than those without German knowledge; they also produced more native-like instances. The researchers hence identified a positive influence of L4 on L3, and they attributed its occurrence to the typological proximity between German and English (see TPM in Section 2.2.2).

As for transfer from L3/*L<sub>n</sub>* to L1, specific studies are lacking. A logical assumption posits linguistic dominance as the primary factor. If L3 becomes the predominant and exclusive language and L1 is not used anymore due to lack of language contact, it is plausible to predict potential attrition in L1/L2.

In conclusion, the occurrence of backward transfer in multilingual contexts has been identified in various linguistic domains, especially those related to syntax. Like forward transfer, most of the available studies indicate that backward transfer is driven by specific contrasts in linguistic properties between two languages. In addition, typological proximity (e.g., Lammiman, 2010; Llinàs-Grau & Mayenco, 2016), metalinguistic awareness (e.g., Griessler, 2001; Tsang, 2015), L3 proficiency (e.g., Tsang, 2015), and language dominance of the source language (e.g., Rah, 2010) have been observed as competitive factors of reverse transfer. Except for the positive effect of enhancing metalinguistic awareness and neutralizing counter-influences from L1, backward transfer effects typically lean toward non-facilitative, at least for one's implicit language knowledge. The acquisition of additional language rules potentially interferes with users' perception of previously acquired grammar rules.

### **3 Research Objectives and Significance**

This section introduces the objectives and significance of the study. Specifically, three research questions are raised. By exploring the manifestations, the characteristics, and the mechanisms of backward transfer from L3, this study contributes to the database of this field.

#### **3.1 Research Objectives and Research Questions**

With the rise of multilingual education and the increasingly complex language contact situation, there has been a comprehensive exploration into the phenomenon of forward transfer, while the seemingly less pragmatic phenomenon of backward transfer has received significantly less attention. Nevertheless, given that multilingual acquisition involves a highly dynamic process influenced by multiple variables, such as interactions between features internal to languages, developments in language users' cognition, and changes in external factors beyond linguistics, this phenomenon should not be disregarded.

Empirical studies thus far have substantiated the proposition regarding the concept of transfer, acknowledging that the L1 part of the system may influence the L2 part, the L2 may influence the L1, the L3 may influence the L2, and so on for all the relationships (Cook, 2016a, p. 9). Even if individuals use the same languages, an  $L_n$  user's knowledge of any previously acquired languages is, in some respect, not the same as that of a person who does not have  $L_n$  in his repertoire. Also, this change of knowledge may extend beyond linguistic-specific dimensions, influencing the overall linguistic competence.

In turn, the central task of CLI studies, including those on backward transfer, is to discern whether and how linguistic features of a specific language alter one's learning and processing of other languages. Three core issues encompass the direction, characteristics, and mechanisms of transfer. However, formulating a one-size-fits-all prediction for the patterns of CLI is impossible. Instead, observing and summarizing



the characteristics of interrelationships across languages and developing paradigms as reference tools for future inquiries hold meaningful implications.

This study centers around the inquiries on backward syntactic transfer from L3 German to L2 English among native Chinese speakers. The first objective addresses the questions of *whether and what*. We aim to investigate the influence of German syntax, if any, on the speakers' implicit knowledge of word order in L2 English. The goal is to identify which syntactic properties exhibit transferability and which do not. Furthermore, as the study investigates backward transfer in the context of multilingualism, the interaction between L3 German and the native language, Chinese, will be examined. We will explore whether German neutralizes the potential forward transfer from L1 Chinese during English processing. The second objective pertains to the question of *how*. If backward transfer does occur, we will assess the nature and scope of the transfer effects: whether they are facilitative, neutral, or detrimental, and whether the transfer is all-encompassing or partial. Our final objective addresses the question of *why*, aiming to shed light on the mechanisms behind the phenomenon. We will analyze the CLI factors outlined in Section 2.1 and determine their role in explaining backward transfer.

Based on these objectives, we formulate three research questions, as follows:

- (1) **Manifestations:** For L1 Chinese speakers who have successfully acquired L2 English and L3 German, do the syntactic features of German influence the perception of word order in English? Which syntactic feature is transferred, and which is not? Does German syntax interact with that of L1 Chinese?
- (2) **Characteristics:** Is the transfer effect facilitative, neutral, or detrimental? Is backward transfer all-encompassing or partial? Does one syntactic property have a greater transferability than another?
- (3) **Mechanisms:** Why does backward transfer from L3 German to L2 English occur? What are the contributing factors? How can this phenomenon be explained?

Furthermore, we will closely examine the interaction between L3 German and L1 Chinese, considering the possibility of German grammar to neutralize the potential influence of Chinese. Particularly noteworthy are circumstances where Chinese and English share the same word order, but German deviates. In such cases, an indirect transfer effect of German may manifest, with Chinese facilitating the understanding of English word order while German diminishes the positive influence originating from Chinese.

Another important undertaking is to examine the applicability of the CLI models in the advanced stage of third or additional language acquisition. These models are initially proposed to account for forward transfer in the context of multilingual acquisition. A question then arises whether they are equally applicable to explaining the phenomenon of backward transfer, which likely occurs when the last acquired language becomes the dominant one. Assuming a proficient grasp of L3/ $L_n$  grammar with dominance in usage, it is reasonable to infer that knowledge of L3/ $L_n$  may influence those non-actively used foreign languages or those with lower proficiency. In fact, most participants in studies showcasing backward transfer have demonstrated a threshold of L3 proficiency. From this perspective, the *Cumulant-Enhancement Model* (Flynn et al., 2004) appears to provide a plausible explanation for the occurrence of reverse transfer.

From another angle, the *Typological Primacy Model* (Rothman, 2011) provides a logical interpretation of experiment results in studies where backward transfer occurred between two typologically closer languages, exemplified in the studies by Cheung et al. (2011, L1 Chinese, L2 English, L3 German), Tsang (2015, L1 Cantonese, L2 English, L3 French), and Llinàs-Grau and Mayenco (2016, L1 Catalan, L2 Spanish, L3 English, L4 German). So far, excluding the metalinguistic impact of L3/ $L_n$ , the reverse transfer has been demonstrated to occur property-by-property, aligning well with the propositions of the *Linguistic Proximity Model* (Westergaard et al., 2017) and the *Scalpel Model* (Slabakova, 2017). The salient syntactic feature of a successfully acquired L3 may be transferred to L2, particularly in terms of implicit perception. The

second issue regards the quality of the transfer, with only the CEM arguing against the non-facilitative effects of transfer.

Concerning the *Competition Model* (Bates & MacWhinney, 1989), while it offers practical methodology (e.g., the referent selection method) for examining both forward and backward transfer, its primary emphasis lies in CLI on semantics. Specifically, the model investigates how cue weights influence the acquisition process, i.e., it examines the potential changes in how individuals leverage different cues to interpret thematic roles. While this model is useful for specific inquiries and studies following it have provided valuable evidence for backward transfer in bilingualism, it is important to note that the current study focuses solely on transfer effects in syntax, without addressing semantic interpretation or CLI of other linguistic properties. Thus, the *Competition Model* will not be further discussed in the subsequent chapters.

In light of the insights gleaned from prior precursory studies on backward transfer and guided by the comprehensive framework provided by CLI models, this study examines three languages with different typological distances and specific linguistic features. The focus of our analysis is the characteristics of potential syntactic transfer from German to English across a spectrum of linguistic circumstances where particular properties of German word order might wield influence. To discern the relative influencing factors, we will consider factors including (dis)similarities in syntactic properties, salience of linguistic features, typological distance, and language dominance.

Hence, the inquiry unfolds on two fronts. First, an assessment of relations between word orders in each language, including contrasts, mismatches, and overlaps (Slabakova, 2017, p. 652). Given the established role of structural similarities and differences as key indicators of CLI, we posit that the degree of overlap and contrast will result in different patterns and degrees of transfer. Besides, we anticipate that salient syntactic features will wield a more pronounced influence. Second, we attempt to examine the impact of language proficiency and exposure in both the source and recipient languages, aiming to understand the cross-linguistic development beyond the initial stage of L3/L<sub>n</sub> acquisition. Through this, we hope to establish a correlation

between the transfer effect and the threshold of language dominance. Nevertheless, it is important to note that our emphasis does not involve comparing the impact across different levels of language dominance, such as directly involving low-proficiency and high-proficiency groups. Instead, our attention will be directed toward advanced users of L2 English and L3 German, examining the potential impact of German should it become the dominant foreign language.

Based on the research objectives, we first delve into the study of contrasts and similarities in word orders among English, German, and Chinese. Chapter 4 details four major linguistic scenarios, illustrating salient differences between German and English/Chinese. In Chapter 5, an acceptability judgment task is employed to evaluate the implicit English knowledge of advanced L2 English-L3 German speakers and compare their performance with that of Chinese-English bilinguals.

### **3.2 Significance of the Study**

This study investigates syntactic backward transfer from L3 to L2 in adults' language perception after the successful acquisition of two foreign languages. To address the research significance, two further issues will be addressed here.

*Why investigate backward transfer from German to English in a multilingual context?* In consideration of the current socioeconomic climate, it has become imperative to examine language transfer through a multilingual lens. We may initially inquire why Chinese, English, and German are chosen as the objects of research. The reason is straightforward: English is predominantly used as a foreign language in Germany, and there is increasing language contact among Chinese, German, and English. In Germany, English gained its current status as the dominant foreign language in the second half of the 20<sup>th</sup> century, with the greatest impact in the domain of business (Hilgendorf, 2007, p. 136). It serves not only as a means of communication with foreign firms but is also employed by parent companies to communicate with their overseas subsidiaries (p. 137). In the domain of science and research, English clearly “prevails as the dominant code” (p. 138).

In China, the sustainable development of foreign language education is promoted to cultivate sustainable citizens, integrate cultural values for sustainable development, and digitalize sustainable foreign language learning (Ge et al., 2023). This means multilingual acquisition takes on a more important role in Chinese society. Learning English is a mandated part of the curriculum in both secondary and higher education; meanwhile, learning an additional foreign language has become an intrinsic motivation for various reasons. According to a report by Li (2017), at the end of 2020, the number of German learners in China exceeded 145,000 (p. 2), with an increasing number of students choosing German as their second or third foreign language (p. 5). Chinese students constitute a significant portion of the international student population in Germany, where many degree programs are offered in German instead of English (p. 81).

Given this background, it is necessary to redirect our attention from a bilingual scenario to a multilingual one, where all actively used foreign languages play a role in influencing one's multilingual competence and language performance. We must consider the dynamic nature of multilingual acquisition and development, acknowledging the possibilities of changes in language dominance. Consider the following hypothetical scenario: an undergraduate Chinese student, whose default L2 is English, begins learning L3 German for educational purposes. He likely leverages the structural (dis)similarities, typological proximity, and lexical similarities between L2 English and L3 German to facilitate his L3 learning until he reaches a certain proficiency threshold. Before studying in Germany, his dominant foreign language had been English due to limited opportunities for practicing German. However, during his studies and residency in Germany, he has gained significant experience with L3 German, as it is the primary language for education and the environment language. In turn, his exposure to English in daily life decreases, and German has become the dominant foreign language of communication. In this scenario, it is plausible to consider a reverse influence from L3 German to L2 English. For instance, the unique syntax of German might interfere with how he perceives or produces English sentences because of the increased frequency of using German word order. Patterns used for

constructing a German sentence may slip out of the tongue while speaking English. Many similar situations likely exist, with each L1 Chinese-L2 English-L3 German user having individual experiences regarding foreign language exposure and language output, but in the end, a later-acquired foreign language becomes the dominant language. Although such a language constellation is not uncommon in Germany, there has been little CLI research on it. If backward influence is substantiated, we will provide further evidence for Cook's *multi-competence*, which emphasizes the dynamics of multilingual usage and posits that the quality of CLI changes whenever a linguistic factor comes into play, adjusting the dynamics of the ongoing continuum of multilingual development (see Section 2.3.2.2). Additionally, the premise for our CLI experimental design is a contrastive study that explores the structural similarities and disparities between the grammars of the languages involved. This contrastive study will serve as a foundation for future research and reference work for language pedagogy.

*Why examine syntactic transfer but not CLI in other domains?* This purposeful decision is rooted in the scarcity of empirical data, as highlighted by Jarvis & Pavlenko (2010): “[W]ith regard to both errors and non-errors, the literature has demonstrated that syntactic transfer occurs in both the forward and reverse directions. While we have not yet observed extensive evidence of lateral syntactic transfer... we presume that this is due to the limited research conducted on this topic thus far” (p. 102). To date, there has not been published research on backward syntactic transfer from L3 German to L2 English.

Moreover, skeptics have maintained that transfer matters much more for some subsystems than for others, with phonetics and phonology usually the systems where widespread transfer is conceded, in contrast to morphology and syntax (Odlin, 2003, p. 439). However, this proposition faces challenges. Syntax, the study of constructions, is inherently complex (Mathews, 1981, p. 29). A few studies on syntactic backward transfer have already substantiated the impact of syntactic contracts between languages on a user's language processing, each with its methodology. Most of them employ the *Competition Model* and investigate the syntactic influence on semantics, but not many directly explore how a specific syntactic feature of a later-learned language is

transferred to the implicit and explicit syntactic knowledge of an earlier-acquired one. Further evidence is hence necessary to support this linguistic domain.

In summary, this study contributes empirical data to the limited literature on backward transfer in syntax within a multilingual context. Its significance lies in providing further evidence and perspective for understanding the linguistic interactions at the later stage of multilingual development. We aim to fill the gap of backward syntactic transfer for the language constellation of L1 Chinese-L2 English-L3 German. Our findings serve to provide a dataset for future endeavors.

## 4 Word Order Contrasts in German, English, and Chinese

This chapter begins with an introduction to the most distinct syntactic rules governing word order in German, which immediately highlights the main contrast between German and English/Chinese (Section 4.1). This is followed by extensive presentations of the differences and similarities of word order among German, English, and Chinese in four specific scenarios: (1) inversion, (2) word order variation in transitive verb-particle constructions (VPCs), (3) placement of adverbial adjuncts in SV clauses, and (4) patterns for constructing ditransitive constructions (Sections 4.2 to 4.5). The similarities and contrasts among the three languages serve as the basis for the subsequent experimental design.

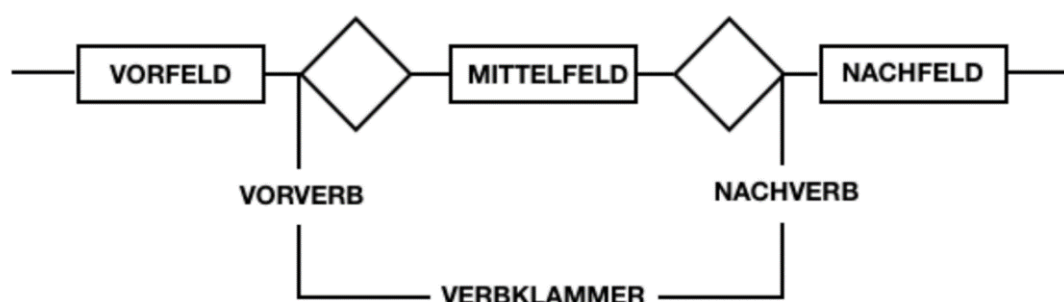
### 4.1 Syntactic Features in German Declarative Main Clauses

This section introduces foundational features for German main clauses: the bracket and field system. The V2 constraint, along with the rules governing word order alignments in different fields, leads to sharp contrasts between German and English/Chinese.

#### 4.1.1 The Verbal Bracket and Three Fields in German

To begin the contrastive study, it is essential to first understand the sentence structure of German declarative main clauses, as illustrated in Figure 2.

**Figure 2:** *German Bracket Fields in Duden Textgrammatik der Deutschen Sprache (Weinrich, 2003)*





A German main clause follows the structure of two verbal positions (*Vorverb* ‘foreverb’ and *Nachverb* ‘postverb’) and three sentence fields (*Vorfeld* ‘forefield’, *Mittelfeld* ‘middlefield’, and *Nachfeld* ‘postfield’). This structure is illustrated by many grammarians for the German language, such as Ulrich Engel (1971) in *Deutsche Grammatik*, Zifonun et al. (1997) in *Grammatik der Deutschen Sprache* (p. 1502), and Weinrich (2003) in *Duden Textgrammatik der deutschen Sprache* (p. 60).

The foreverb can be any finite form of a verb, including that of lexical verbs, auxiliaries, modals, and copulas, respectively exemplified in (1a) to (1d). As opposed to the foreverb, the postverb is a non-finite verb whose form is contingent upon the grammatical requirements of the foreverb (Weinrich, 2005, p. 37). It should be noticed that the postverb is not invariably required to be a verb, as in (1d) to (1g)—it can be words belonging to other classes<sup>11</sup> that serve to complete or give additional information to the foreverb (p. 33). Typical examples of non-verb postverbs are the particles<sup>12</sup> of particle verbs, as in (1g), the particle *mit* (‘with’) in *Frederick nimmt ein Buch mit* (‘Frederick takes a book with him’). A verbal bracket, in turn, is created by the cooperation of the foreverb and the postverb.

| (1) | FOREFIELD                          | FOREVERB<br>(V2) | MIDDLEFIELD | POSTVERB<br>(VF) |
|-----|------------------------------------|------------------|-------------|------------------|
| a.  | Frederick                          | <b>lernt</b>     | Englisch    | <b>Ø.</b>        |
|     | Frederick                          | learns           | English     | Ø                |
|     | ‘Frederick learns English.’        |                  |             |                  |
| b.  | Frederick                          | <b>hat</b>       | Englisch    | <b>gelernt.</b>  |
|     | Frederick                          | has              | English     | learned          |
|     | ‘Frederick (has) learned English.’ |                  |             |                  |

<sup>11</sup> The word classes of a postverb include prepositions, adverbs, nouns, adjectives, and verbs in their non-finite form (see Weinrich, 2005, p. 43).

<sup>12</sup> Particles refer to the separable prefixes (*abtrennbare Präfixe*) of a verb, called *Verbalzusätze* (lit. ‘verb additions’) (Engel, 2004, p.229). They can be prepositions or adverbs, such as in *mit|kommen* (‘come with’) and *weg|laufen* (‘run away’). The verb-particle construction (VPC) in German shares similarities with that in English and Chinese, and this will be detailed in Section 4.3.

| (1) | FOREFIELD                                                                            | FOREVERB<br>(V2)       | MIDDLEFIELD          | POSTVERB<br>(VF)          |
|-----|--------------------------------------------------------------------------------------|------------------------|----------------------|---------------------------|
| c.  | Frederick<br>Frederick                                                               | <b>kann</b><br>can     | Englisch<br>English  | <b>sprechen.</b><br>Speak |
|     | 'Frederick can speak English.'                                                       |                        |                      |                           |
| d.  | Frederick<br>Frederick                                                               | <b>wurde</b><br>turned | Ø<br>Ø               | <b>rot.</b><br>red        |
|     | 'Frederick blushed.'                                                                 |                        |                      |                           |
| e.  | Frederick<br>Frederick                                                               | <b>läuft</b><br>runs   | Ø<br>Ø               | <b>weg.</b><br>away       |
|     | 'Frederick runs away.'                                                               |                        |                      |                           |
| f.  | Frederick<br>Frederick                                                               | <b>ruft</b><br>calls   | mich jetzt<br>me now | <b>an.</b><br>PTCL        |
|     | 'Frederick is calling me now.'                                                       |                        |                      |                           |
| g.  | Frederick<br>Frederick                                                               | <b>nimmt</b><br>takes  | ein Buch<br>a book   | <b>mit.</b><br>with       |
|     | 'Frederick takes a book with him.'                                                   |                        |                      |                           |
|     |  |                        |                      |                           |
|     | VERBAL BRACKET                                                                       |                        |                      |                           |

The position of the foreverb and the postverb, in turn, draws clear boundaries of the three fields within a clause. The forefield is a position preceding the foreverb – the verb in the *verb-second position* (V2). The middlefield is embraced by the verbal bracket. The postfield follows the postverb – the verb in the *final position* (VF).

## 4.1.2 Word Order Constraints in German

### 4.1.2.1 The V2 Constraint

The position of the verb in German clauses is subject to the V2 constraint, meaning that in a declarative main clause, the finite verb must occupy the second position of the

clause and must not move to any other positions. As shown below, the word orders in (2c) to (2d) are ungrammatical due to a violation of the V2 constraint. The word order in (2b) is grammatically acceptable: the subject and the object switch position, while the finite verb remains at the V2 position. This word order is marked, but the sentence's meaning remains unchanged (cf. Eng. *\*The book reads the boy*), as the subject is recognized by the nominative determiner *der*.

(2) 'The boy reads a book.'

|    | FOREFIELD   | V2           | MIDDLEFIELD   |
|----|-------------|--------------|---------------|
| a. | Der Junge   | <b>liest</b> | ein Buch.     |
|    | the.NOM boy | reads        | a.ACC book    |
| b. | Ein Buch    | <b>liest</b> | der Junge.    |
|    | a.ACC book  | reads        | the.NOM boy   |
| c. | *Der Junge  | ein Buch     | <b>liest.</b> |
|    | the.NOM boy | a.ACC book   | reads         |
| d. | *Ein Buch   | der Junge    | <b>liest.</b> |
|    | a.ACC book  | the boy.NOM  | reads         |

(Brehmer & Usanova, 2015, pp. 164–165)

#### 4.1.2.2 Restriction for the Forefield

*“Im Vorfeld des Konstativsatzes befindet sich genau ein Folgeelement* ('There is exactly one sentence element in the forefield of a declarative sentence')” serves as a rule of thumb for the German forefield (Engel, 2004, p. 176). Instances where two types of constituents in the forefield juxtapose are ungrammatical. This clarifies why, above in (2b), the subject must move to a post-verbal position, namely, the middlefield, when

the object is fronted. (3a) to (3d) demonstrate instances where several types of non-subject constituents are placed in the forefield.

(3) a. *Indirect object fronted to the forefield*

| FOREFIELD                            | V2         | MIDDLEFIELD     | VF       |
|--------------------------------------|------------|-----------------|----------|
| <u>Dem Mädchen</u>                   | <b>hat</b> | er das Buch     | gegeben. |
| the.DAT girl                         | has        | he the.ACC book | given    |
| 'He has given the book to the girl.' |            |                 |          |

b. *Temporal adverbial fronted to the forefield*

| FOREFIELD                    | V2           | MIDDLEFIELD      |
|------------------------------|--------------|------------------|
| <u>Heute</u>                 | <b>gehen</b> | wir in-s Kino.   |
| today                        | go           | we in the cinema |
| 'Today we go to the cinema.' |              |                  |

c. *Manner adverbial fronted to the forefield*

| FOREFIELD              | V2          | MIDDLEFIELD | VF      |
|------------------------|-------------|-------------|---------|
| <u>Schnell</u>         | <b>fuhr</b> | der Zug     | vorbei. |
| quickly                | drove       | the train   | past    |
| 'The train sped past.' |             |             |         |

d. *Adverbial clause fronted to the forefield*

| FOREFIELD                                        | V2           | MIDDLEFIELD         |
|--------------------------------------------------|--------------|---------------------|
| <u>Auch wenn es regnet,</u>                      | <b>gehen</b> | wir zu der Probe.   |
| even if it rains                                 | go           | we to the rehearsal |
| 'Even if it rains, we will go to the rehearsal.' |              |                     |

It should be noted that temporal-spatial or spatial-temporal adverbials may co-occur in the forefield (Weinrich, 2005, p. 77), as in (3e).

- (3) e.    **FOREFIELD**                      **V2**                      **MIDDLEFIELD**    **VF**  
Heute in der Staatsoper    **wird**                      „*Rigoletto*“                      aufgeführt.  
 Today in the State Opera    AUX.PASS                      “*Rigoletto*”                      performed  
 ‘Today, *Rigoletto* will be performed in the State Opera.’

When there is only one constituent in the forefield, a V2 placement is guaranteed. Placing two different types of constituents in the forefield will result in a verb-third position (V3), a position not permitted by German grammar, as in (4a) to (4b). This forms a sharp contrast with English and Chinese, elaborated in the following section.

- (4) a.    *Adverbial and subject simultaneously in the forefield (ungrammatical)*

‘We go to the cinema today.’

| <b>FOREFIELD</b> |            | <b>V2</b>    | <b>MIDDLEFIELD</b> |       |
|------------------|------------|--------------|--------------------|-------|
| * <u>Heute</u>   | <u>wir</u> | <b>gehen</b> | ins Kino.          | (*V3) |
| today.ADV        | we.SUJ     | go           | to the cinema      |       |

but:    **FOREFIELD**                      **V2**                      **MIDDLEFIELD**                      **VF**

|              |  |              |            |               |      |
|--------------|--|--------------|------------|---------------|------|
| <u>Heute</u> |  | <b>gehen</b> | <u>wir</u> | ins Kino.     | (V2) |
| today.ADV    |  | go           | we.SUJ     | to the cinema |      |

- b.    *Prepositional object and subject simultaneously in the forefield (ungrammatical)*

‘I sent a letter to my brother.’

| <b>FOREFIELD</b>          |            | <b>V2</b>   | <b>MIDDLEFIELD</b> | <b>VF</b>  |       |
|---------------------------|------------|-------------|--------------------|------------|-------|
| * <u>An meinen Bruder</u> | <u>ich</u> | <b>habe</b> | einen Brief        | geschickt. | (*V3) |
| to my brother.OBJ.PP      | I.SUJ      | have        | a letter.DO        | sent       |       |

but:    **FOREFIELD**                      **V2**                      **MIDDLEFIELD**                      **VF**

|                         |             |            |             |            |      |
|-------------------------|-------------|------------|-------------|------------|------|
| <u>An meinen Bruder</u> | <b>habe</b> | <u>ich</u> | einen Brief | geschickt. | (V2) |
| to my brother.OBJ.PP    | have        | I.SUJ      | a letter.DO | sent       |      |

### 4.1.3 V2-V3 Contrast of German, English, and Chinese

Restricted by the “single constituent rule” of the German forefield, the subject must not occupy the pre-verbal position together with a non-subject element that is fronted to the clause’s initial. This constraint is not observed in English or Chinese, highlighting a distinctive feature of German syntax.

In modern English and Chinese, the SVX<sup>13</sup> word order is the default canonical order. The subject occupies the initial position of a clause, followed by the main verb or an auxiliary.<sup>14</sup> Another non-canonical V2 structure is the word order of X-V-S, commonly understood as *inversion*;<sup>15</sup> namely, a structure in which “the logical subject appears in post-verbal position while some other, canonically post-verbal, element appears in clause-initial position,” as in the following (Birner, 1996, p. 12). Examples in (5) show the X-V-S word order similarity in English and Chinese.

(5) a. *X-V-S in English*

| X            | V   | S            |
|--------------|-----|--------------|
| On the bench | sat | an old lady. |

b. *X-V-S in Chinese*

| X                                      | V            | S               |
|----------------------------------------|--------------|-----------------|
| 长椅上                                    | 坐 着          | 一 位 老 妇。        |
| Chángyǐ shàng                          | zuò zhe      | yí wèi lǎofù.   |
| on the bench                           | sit PTCL.DUR | one CL old lady |
| ‘On the bench is sitting an old lady.’ |              |                 |

<sup>13</sup> V stands for any finite verb; X stands for any non-subject constituent.

<sup>14</sup> In this study, the term *auxiliary* includes all tensed *have*, *be*, passive auxiliary *will*, and modal verbs. In standard Chinese, there are no corresponding auxiliaries for tensed *have* or *be*, but counterparts for modal auxiliaries and passive auxiliaries are used.

<sup>15</sup> See Section 4.2.1 for the definition of *inversion*.

The V2 word orders of S-V-X and X-V-S have equivalences in German, English, and Chinese, with the latter (inversion) being less productive in English and Chinese compared with German. This issue will be addressed in detail in Section 4.2.

The picture changes significantly when considering the V3 structure, which involves the fronting of a non-subject element X to the clause's initial position without moving the subject to a post-verbal position. First, it is necessary to clarify three related terms which to some extent overlap each other regarding V3 structure: *preposing*, *fronting*, and *topicalization*. All of them deal with the clause-initial position of a non-subject element.

*Preposing* is defined as “a construction in which a complement whose basic position is internal to the VP occurs in front position, preceding the nucleus of the clause” (Huddleston & Pullum, 2002, p. 1372). It does not result in an inversion of subject and verb, i.e., the verb or the auxiliary “remains to the right of the subject” (Birner, 1996, p. 16). The outcome of *preposing* is thus a V3 structure, as exemplified in (6a) and (6b). However, some elements may trigger an inversion when moved to the initial position, but this is not a result of preposing, as shown in the comparison between (6c) and (6d).

- (6) a. A: Do you have any muffins?  
       B: <A bran muffin> I **can** give you. (*preposing*, V3)  
(Huddleston & Pullum, 2002, p. 1373)
- b. <In New York> there is always something to do.  
(Huddleston & Pullum, 2002, p. 1372)
- c. <In the yard>, a lazy cat **is lying**. (*preposing*, V3)
- d. <In the yard> **is lying** a lazy cat. (*inversion*, V2)

The term *fronting* is defined by Quirk et al. (1985) as “the term we apply to the achievement of marked theme by moving into initial position an item which is otherwise unusual there” (p. 1377). Regarding the position of the verb, Garner (2007)

explicitly pointed out that “a full understanding is not possible without also considering variation in the order of the subject and the verb” (p. 906). That is to say, *fronting* can give rise to both V2 and V3 constructions, depending on the linguistic context; compare (7a) with (7b). *Inversion* is hence a result of *fronting*, but it is not an inherent outcome of *fronting*.

- (7) a. <Into the stifling smoke> we **plunged**. (*fronting*, V3)  
 b. <Into the stifling smoke> **plunged** the desperate mother. (*fronting*, *inversion*, V2)  
 (Quirk et al., 1985, p. 1379)

The third related term, *topicalization*, pertains to the phenomenon in which a noun phrase is moved to the front of the sentence (Emonds, 1976, p. 31). There is no uniformity among scholars in this case. Huddleston and Pullum (2002) employ the term *complement preposing*,<sup>16</sup> particularly the non-focus complement preposing, to refer to the same phenomenon (p. 1374).

In summary, the X-S-V word order (V3) results from *preposing* (incl. *topicalization*), and it can be an outcome of *fronting*. To ensure clarity, the terms *fronting* and *fronted* are employed in this study to denote the movement of a non-subject element to the clause-initial position that may lead to inversion; the terms *preposing* and *preposed* exclusively refer to a movement that leads to a V3 position. We refrain from using the term *topicalization* and *topicalized* when describing syntactic position.

While the V3 placement is strictly forbidden in German grammar, it is permitted in English and Chinese under formal and discourse restrictions. For example, the ungrammatical X-V-S word order for German in (4a) represents a canonical arrangement in English and Chinese, where the adverbial is a time adverb, but the same word order is less productive if applied in (4b), especially when a discourse context is missing; compare (4a') with (4b').

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<sup>16</sup> For a more detailed explanation of *complement preposing*, see Huddleston and Pullum (2002, pp. 1372–1376).



- (4) a'. *Adverbial and subject preceding the verb*

Eng. Today we **go** to the cinema.

Chn. 今天      我们      去      电影院。

Jīntiān    wǒmen    qù      diànyǐngyuàn.

today      we          go to      cinema

- (4) b'. *Prepositional object and subject preceding the verb*

Eng. ?To my brother I **sent** an email.

Chn. \*给我哥哥          我      发      了          一      封      电子邮件。

\*Gěi wǒ gēge      wǒ      fā      le          yì      fēng diànzǐ yóujiàn.

to my brother      I          send PTCL.PFV      one CL      email

To sum up, for each available V2 structure in English and Chinese, there is a grammatical German V2 counterpart; on the contrary, any German word-for-word equivalence for each grammatical V3 structure in English and Chinese is ungrammatical. V2 and V3 structures do not always lead to grammatical expression in English and Chinese.

## 4.2 Inversion

The first scenario where syntactic contrasts between German, English, and Chinese are seen is *subject-verb inversion*. This section discusses the rules in each language for constructing two types of inversion: *subject-auxiliary inversion* and *subject-simple verb inversion*.

### 4.2.1 Unifying Terminology

Upon reviewing the literature, there is no unanimous consensus on the definition of the term *inversion*. Given the different taxonomies of inversion proposed by different scholars, there is a necessity to unify the terminology and clarify its classification.

In the grammar of the languages under consideration, inversion in English stands out as the most intricate, both in terms of its classification and rules. In the comparison of relevant works, our focus is placed on (but limited to) the studies of Emonds (1970, 1976), Green (1980), Birner (1992), Dorgeloh (1997), Hawkins (1986), and Biber et al. (1999). These scholars have either extensively discussed the inversion phenomenon or conducted preliminary contrastive studies.

Traditional understanding defines the term *inversion* as the phenomenon in which the subject switches position with another sentence element, moving to the right side of the finite verb. This concept is articulated by Green (1980): “[inversion refers to] those declarative constructions where the subject follows the part or all of its verb phrase” (p. 583), and by Birner (1992): “[inversion occurs in] a sentence in which the logical subject appears in post-verbal position while some other, canonically post-verbal, element appears in clause-initial position” (p. 16).

Two major types of inversion are discussed in the literature: *subject-simple verb inversion* (Emonds, 1970, 1976) and *subject-auxiliary inversion* (Hawkins, 1986; Huddleston & Pullum, 2002). Both types have been labeled with different names. The first type is also referred to as *full-verb inversion* (Birner, 1992) and *subject-verb inversion* (Biber et al., 1999), and the second type as *subject-operator inversion* (Biber et al., 1999) and *partial inversion* (Dorgeloh, 1997).<sup>17</sup> In the current study, we adopt the terms *subject-simple verb inversion* and *subject-auxiliary inversion*. The former involves instances where the subject switches position with a tensed lexical verb or copula, and the latter features an inversion of the subject with tensed auxiliaries

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<sup>17</sup> For criteria for different types of inversion, see Quirk et al. (1985, pp. 1379–1384), Hawkins (1986, pp. 168–175), Biber et al. (1999, pp. 911–927), and Dorgeloh (1997, p. 23).

(including modals), as exemplified below. In these sentences, the verb occupies the V2 position.

(8) a. *Subject-simple verb inversion (X-V-S)*

<On the walls> **hangs** <a large portrait of a lady>.

<Nestled among the tall grasses> **is** <a family of rabbits>.

b. *Subject-auxiliary inversion (X-Aux-S)*

<Never> **have** <I> seen such a breathtaking view.

<Only when it rains> **can** <you> see the rainbow.

Notice that intonation, situated at the sentence-initial and usually set off by a comma, is not counted as an element occupying a clause position. As in (9), fronting a single element “not separated by a comma intonation from the rest of the sentence” still leads to a V2 position (Hawkins, 1986, p. 168).

(9) *However*, <never> **have** <I> read such a sad story.

*Look*, <on the bench> **is** sitting <an old lady>!

#### 4.2.2 Scope of Contrastive Study on Inversion

The contrastive analysis in this study unfolds in two main aspects. First, when taking V2-V3 constraints as a starting point, the fronting of any non-subject elements in German generates an inverted structure, whereas the occurrence of inversion in English and Chinese is significantly limited by the linguistic context. However, linguistic contexts allowing for inversion in English are more prevalent than in Chinese. Therefore, to effectively contrast the three languages, it is meaningful to first delineate specific circumstances (e.g., the semantic type of the fronted element) where inversion is permissible in English, and then compare them with German and Chinese. To highlight the distinctions of German from the other two languages, several examples

will be presented, demonstrating situations where inversion is grammatical in German but ungrammatical in English and/or Chinese.

Second, it should be noted that inversion can be optional in English and Chinese. The fronting of a non-subject element may lead to either a V2 or a V3 structure, both of which can be grammatical, as shown in (10) and (11).

(10) *Optional subject-verb inversion in English*

<Along the riverside> **runs** <a dog>. (inversion, V2)

<Along the riverside> a dog **runs**. (preposing, V3)

(11) *Optional subject-verb inversion in Chinese*

<前面> 站 着 <很多人>。 (inversion, V2)

<Qiánmiàn> zhàn zhe <hěnduō rén>.

in front stand PTCL.DUR many people

‘In front are standing many people.’ (Liu, 2007, p. 182)

<前面> 很多人 正 站 着。 (preposing V3/4)

<Qiánmiàn> hěnduō rén zhèng zhàn zhe.

in front many people right stand PTCL.DUR

‘In front are standing many people.’

We limit the scope of our study to subject-verb inversion in declarative affirmative main clauses and will not include other types of sentences in the discussion, even though an inversion occurs. The following circumstances are excluded from analysis: (i) structures involving the auxiliary *do*, (ii) interrogatives, (iii) highly restricted inverted forms, and (iv) NP inversion. For reference, we briefly outline several instances to illustrate inversion in these circumstances.

### (i) INVERSION WITH *DO* AUXILIARY

Given that the use of the auxiliary *do* in English lacks counterparts in both German and Chinese, inversions containing the dummy *do* will not be further discussed. Specific circumstances include (a) colloquial inversion following a negated verb, (Dorgeloh, 1997, pp. 21–22), (b) negative imperatives (Quirk et al. 1985, p. 831; Garner, 2007, p. 918), (c) inversion triggered by *pro*-forms like *so/neither/nor*, and (d) inversion after *so/such* + *adv/adj* (Hawkins, 1986, p. 169; Biber et al. 1999, p. 916; Dorgeloh, 1997, pp. 27-28), respectively exemplified in (12a) to (12d). The first two instances do not involve a V2 construction.

- (12) a. **Didn't** nobody tell me about it.  
b. **Don't** you say a word!  
c. Joseph went to the football game last Sunday, so **did** I.  
d. So effortlessly **do** they harmonize that their music is a delight to everyone's ears.

### (ii) INTERROGATIVES

Interrogatives are put under the rubric of inversion by many, including Birner (1992), Emonds (1970, 1976), Hawkins (1986), and Huddleston and Pullum (2002), to name a few. In this structure, the question word (except when questioning the subject) represents the sentence element and is moved to the initial position. However, differences in word orders in interrogative sentences among German, English, and Chinese extend beyond inversion.

First, as illustrated in (13), while English requires the dummy *do* for structural support, German simply switches the position of the finite verb and the subject, and Chinese directly replaces the element being questioned with the question word without changing the sequence of any sentence constituents.

- (13) Eng. <How often> **does** <he> visit his grandparents? (subject-auxiliary inversion)

Ger. <Wie oft> **besucht** <er> seine Großeltern? (subject-simple  
verb inversion)  
how often visits he his grandparents  
'How often does he visit his grandparents?'

(13) Chn. 他 多久 探望 一次 他的 祖父母? (null  
inversion)  
Tā duōjiǔ **tànwàng** yíci tā de zǔfùmǔ  
he how often visit once his grandparents  
'How often does he visit his grandparents?'

Second, in German, subject-auxiliary inversion occurs with tensed *have* or modal verbs, whereby the non-finite verb turns the postverb and moves to the clause's final position. In contrast, in English, it immediately follows the subject, as shown in (14). In this case, the difference between English and German lies not in the subject-auxiliary inversion, but in the position of the non-finite verb.

(14) Eng. <Where> **have** <you> *seen* the murderer?

|      |                  |             |      |                    |  |                        |
|------|------------------|-------------|------|--------------------|--|------------------------|
| Ger. | <b>FOREFIELD</b> | <b>V2</b>   |      | <b>MIDDLEFIELD</b> |  | <b>VF</b>              |
|      | <Wo>             | <b>hast</b> | <du> | den Mörder         |  | <b><i>gesehen?</i></b> |
|      | where            | have        | you  | the murderer       |  | seen                   |

### (iii) HIGHLY RESTRICTED INVERTED FORMS

Instances such as formulaic clauses with subjunctive verb forms, as in (15a) and (15b), as well as those opening with the auxiliary *may*, as in (15c), are excluded from the analysis. These structures are deemed "highly restricted and usually confined to more or less fixed collocations" (Biber et al., 1999, p. 918). Also, many such cases involve the verb-first position, which falls outside the scope of our research focus on the V2-V3 contrast.

(15) a. Long live the Queen!

- b. Be it for good or for ill, the life goes on.
- c. May the force be with you!

#### (iv) NP INVERSION

A more marginal case is the so-called *NP inversion*, which exclusively involves a copular verb, as seen in (16a) and (16b). NP inversion is considered marginal because it is hard to tell the logical subject. Based on syntactic grounds alone, it is difficult to ascertain whether the linear construction of NP-V-NP is regarded as inversion (Birner, 1992). Moreover, despite the semantic and functional difference it makes to swap the subject and the post-copular NP, the syntactic grammaticality is not affected. NP inversion also applies in German and Chinese, meaning the three languages fully overlap in the structure of NP-V-NP.

- (16) a. <Another major source of energy> **is** <the wind energy>.
- b. <The wind energy> **is** <another major source of energy>.

#### 4.2.3 Contrasts among German, English, and Chinese in Inversion

While the stringent V2 rule in German grammar determines the great productivity of subject-verb inversion in the language, inversion is less productive in English and Chinese. The V2 structures observed in modern English are evident historical remnants of an earlier, more productive V2 pattern, akin to the structure found in German (Hawkins, 1986, p. 168). Inversion in English is subject to several rules that are primarily contingent upon the features of the fronted element, the verb, and the subject. These rules, along with the idiosyncrasies under them, as documented by many scholars (Green, 1980; Hawkins, 1986; Birner, 1992; Dorgeloh, 1997; Biber, 1999; Huddleston & Pullum, 2002; among others). In Chinese, inversion hinges on the specific lexical semantics of the verb (Her, 2009; Liu & Chang, 2015) and the selection of temporal-aspect markers (Pan, 1996; Du, 1999; Liu, 2007). The type of the fronted element

appears to be less pivotal in Chinese, with locative inversion being the most commonly seen (Li & Thompson, 1981; Tang & Wang, 2000; Huang & Liao, 2007; Lin, 2008).

Our exploration commences by examining the linguistic contexts leading to subject-verb inversion in English. We first delve into the semantic features of the fronted element and its interaction with the properties of other sentence constituents in triggering inversion. Following this comparison, we contrast English with German and assess whether Chinese grammar aligns or differs in these instances. Please note that we will not furnish an exhaustive list of all circumstances leading to subject-verb inversion in three languages but rather offer a comparison of the most frequently occurring instances documented in the literature.

#### **4.2.3.1 Subject-Simple Verb Inversion**

Summarizing literature, subject-simple verb inversion manifests mainly in five circumstances in English: (i) after the fronting of a directional adverbial, (ii) after the fronting of a locative adverbial,<sup>18</sup> (iii) after the fronting of a few specific temporal adverbs, (iv) after the fronting of a direct quote, and (v) comparative substitution. Subject-simple verb inversion in English is not always obligatory, meaning that a corresponding V3 variant can also be grammatical.

##### **(i) INVERSION AFTER DIRECTIONAL ADVERBIALS**

Fronting a directional prepositional phrase (PP) results in subject-simple verb inversion in English, hereafter referred to as *directional inversion* (Green, 1980, p. 583; Hawkins, 1986, pp. 171–173; Birner, 1992, p. 35). Directional inversion is used for pragmatic reasons, serving to emphasize the direction and suggest the inevitability of the upcoming action (Green, 1980, p. 585; De Wit, 2016, p. 121), as shown in (17a). It is

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<sup>18</sup> I confine the term *locative adverbial* to those PPs that denote non-directional, locative meanings and from Birner's (1992) argument that it should also include spatial and temporal adverbials (see Birner, 1992, pp. 30–36).



also employed for stylistic purposes, such as shifting focus (referred to as “emphatic” function, as in Green, 1980, p. 594; Culicover, 1980; Coopmans, 1989), (17b).

- (17) a. <Down with the rebound> **comes** <Roan>. (Green, 1980, p. 585)  
 b. <Out of the barn> **ran** <a black horse.> (Coopmans, 1989, p. 732)  
 c. <Through the revolving doors> **swept** <Tom Pulsifer>.  
 (from *S. J. Perelma's short stories*, as cited in Green, 1980, p. 594)

These examples find their grammatical word-for-word counterparts both in German and Chinese, taking (17b) as an example:

- (17) b'. Ger. <Aus der Scheune> **lief** <ein schwarzes Pferd>. (V2)  
 out of the barn ran a black horse
- Chn. <从谷仓里> **跑-出来** <一匹黑马>。 (V2)  
 <Cóng gǔcāng lǐ> **pǎo-chūlái** <yì pǐ hēi mǎ>.  
 out of the barn ran-out-come<sup>19</sup> one CL black horse

However, the permissibility of subject-simple verb inversion with a fronted directional adverbial is conditional. The structure turns ungrammatical when the subject is a pronoun, as in (18a) and (18b), or when the verb is transitive, as in (18c). Instead, the V3 arrangement, though non-canonical, is grammatically acceptable.

- (18) a. \*<In> **came** <he>. (V2)  
 <In> he **came**. (V3) (Hawkins, 1986, p. 172)
- b. \*<Into the house> **ran** <they>. (V2)  
 <Into the house> they **ran**. (V3) (Hawkins, 1986, p. 181)

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<sup>19</sup> 出来 *chū-lái* (‘come-out’) is a verb compound that signals the direction in which the subject moves as the result of the displacement (Li & Thompson, 1989, p. 58).

- c. \*<Down the street> **walked** <the old nanny> her dog. (V2)

(Rochemont, 1978, as cited in Coopmans, 1989, p. 733)

<Down the street> the old nanny **walked** her dog. (V3)

These restrictions do not apply in German, as V2 is grammatical by default. The V3 arrangements as in (18a) to (18c) are grammatical neither in German (as a default) nor in Chinese, taking (18b) as an example, shown below.

(18) b'. Ger. <Ins Hause> **rannten** <sie>. (V2)

into the house ran they

\*<Ins Hause> sie **rannten**. (\*V3)

into the house they ran

Chn. \*<进 屋> 跑 了 <他们>. (\*V2)

\*<Jìn wū> **pǎo** le <tāmen>.

into house run PTCL.PFV they

\*<进 屋> 他们 跑 了. (\*V3)

\*<Jìn wū> tāmen **pǎo** le.

into house they run PTCL.PFV

## (ii) INVERSION AFTER LOCATIVE ADVERBIALS

The second circumstance prompting subject-simple verb inversion in English is *locative inversion*, an inversion type also seen in Chinese (for English, see e.g., Green, 1980; Hawkins, 1986; Broekhuis, 2005; Rizzi & Shlonsky, 2006; for Chinese, see e.g., Li & Thompson, 1981; Pan, 1996; Lin, 2008; Her, 2009; Salzman, 2011). Locative inversion is similar to directional inversion in its pragmatic and stylistic functions. They both share syntactic similarities involving the fronting of either an AdvP or a PP

denoting direction/location, as in the sentence *Outside stood a little angel* (Green, 1980, p. 594). Locative inversion frequently occurs with intransitive verbs in English and Chinese (Salzman, 2011, p. 184), as illustrated in (19).

- (19) a. Eng. <Next to the winning dog> **stood** <its owner>. (V2)

(adapted from Culicover & Levine, 2001, p. 290)

Chn. <赛犬 旁边>      站 着      <它的 主人>. (V2)  
 <Sàiquǎn pángbiān>    **zhàn zhe**      <tāde zhǔrén>.  
 race dog aside      stand PTCL.DUR      its      owner

- b. Eng. <On one long wall> **hung** <a row of oil paintings>. (V2)

(adapted from Biber et al., 1999, p. 912)

Chn. <长墙 上>      挂 了      <一 排 油画>. (V2)  
 <chángqiáng shàng>    **guà le**      <yì pái yóuhuà>.  
 long wall on      hang PTCL.PFV      a row oil painting

It should be noticed that the three languages have mismatches in how they use syntactic forms to convey tense and aspectual information. One distinctive feature of locative inversion in Chinese is that an aspect marker is required for the verb (Chen, 2015, p. 389), such as the imperfective marker 着 *zhe* and the perfective marker 了 *le*, which behave like verb suffices, as seen in the above examples. These particles are selected by the verbs: some intransitive verbs exclusively take 着 *zhe*, some only take 了 *le*, and some can occur with either suffix (Pan, 1996, p. 412). Omitting the particles will lead to ungrammatical expressions. Chinese hence contrasts with English and German in that the latter two languages do not use verb particles for expressing aspect and tense information.

A disparity between German and English is that German uses the simple present form for expressing the progressive aspect, but English does not (MacWhinney et al.,

1984, p. 139), as seen in (19a'). This mismatch does not emerge with the simple past form, (19b'). Despite this mismatch, the three languages align with each other in the overarching word order for locative inversion: locative phrase > lexical verb > subject (X<sub>LOC</sub>-V-S).

(19) a'. Ger. <Neben dem Siegerhunde> **steht** <der Besitzer>.  
 next to the winning dog stands the owner  
 'Next to the winning dog stands/is standing the owner.'

b'. <An einer langen Wand> **hing** <eine Reihe Ölgemälde>.  
 on a long wall hung a row oil paintings  
 'On a long wall hung a row of oil paintings.'

Similar to directional inversion, German contrasts with English and Chinese in that a locative inversion is not restricted by the form of the subject. In English, when an adverbial is fronted (referred to as *opening place adverbial* in Biber, 1999), subject-simple verb inversion is excluded when the subject is a light-weighted pronoun. In this case, the "ordinary subject-verb [V3] order is often possible" (p. 912). This restriction also applies to Chinese; compare three languages in (20).

(20) Eng. \*<On one long wall> **hung** <it>. (\*V2)

Ger. <An einer langen Wand> **hing** <es>. (V2)  
 on a long wall hung it

Chn. \*<一面长墙上> 挂 了 <它>. (\*V2)  
 \*<Yí miàn chángqiáng shàng> **guà** le <tā>.  
 one CL long wall on hang PTCL.PFV it

(21) Eng. \*<On each wall>     **hung**     <Bill>     a large picture. (\*V2)  
                                        <On each wall>     Bill         **hung**     a large picture. (V3)

(Hawkins, 1986, p. 175)

|      |                         |       |         |                      |
|------|-------------------------|-------|---------|----------------------|
| Chn. | *<每 面 墙 上>              | 挂     | <比尔>    | 一 张 大图。(*V2)         |
|      | *<Měi miàn qiáng shàng> | guà   | <Bǐ'ěr> | yì zhāng dàtú.       |
|      | each CL wall on         | hang  | Bill    | one CL large picture |
|      |                         |       |         |                      |
|      | <每 面 墙 上>               | 比尔    | 挂       | 一 张 大图。(V3)          |
|      | <Měi miàn qiáng shàng>  | Bǐ'ěr | guà     | yì zhāng dà tú.      |
|      | each CL wall on         | Bill  | hang    | one CL large picture |

(22) a. *Locative inversion with stance verbs*

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|      |            |                                 |                 |
|------|------------|---------------------------------|-----------------|
| Chn. | <树 下>      | 坐 着 / 站 着                       | <一 位 老妇>。(V2)   |
|      | <Shù xià>  | zuò zhe/ zhàn zhe               | <yí wèi lǎofù>. |
|      | tree under | sit PTCL.DUR/<br>stand PTCL.DUR | one CL old lady |

b. *Grammatically less acceptable locative inversion with non-stance verbs*

Eng. ?<Under the tree> **laughs/shouts** <an old lady>. (?V2)

Ger. <Unter dem Baum> **lacht/schreit** <eine ältere Dame>. (V2)

|      |            |                                   |                 |
|------|------------|-----------------------------------|-----------------|
| Chn. | *<树 下>     | 笑 着 / 叫 着                         | <一 位 老妇>。(*V2)  |
|      | <Shù xià>  | xiào zhe/ jiào zhe                | <yí wèi lǎofù>. |
|      | tree under | laugh PTCL.DUR/<br>shout PTCL.DUR | one CL old lady |

Moreover, when a locative phrase is fronted, the grammaticality of the V3 structure is contingent upon the verb in English. The grammaticality varies, using examples provided by Hawkins (1986, pp. 174–175, 182) and Quirk et al. (1985, p. 1379), as shown in (23).

- (23) a. \*<Among the guests> Mary **was/sat**. (\*V3)  
b. ?<On each wall> a large picture **hung**. (?V3)  
c. ?<In a distant grave> his beloved body **lies**. (?V3)  
d. <On the boat> he **decided**. (V3)

Also in Chinese does the V3 position exhibit limited productivity with the fronting of locative phrases, restricted by the verb choice; compare (24a) and (24b) with (24c) and (24d). In this case, Chinese and English share uniformity.

- (24) a. \*<在 客人 中> 玛丽 坐 着/了。 (\*V3)  
 \*<Zài kèren zhōng> Mǎlì **zuò** zhe/le.  
 at guest middle Mary sit PTCL.DUR/PTCL.PFV

cf. Eng. \*Among the guests Mary sits/is sitting/sat.

- b. \*<墙 上> 一 大 幅 画 挂 了。 (\*V3)  
 \*<Qiáng shàng> yí dà fú huà **guà** le.  
 On the wall one large CL painting hang PTCL.PFV

cf. Eng. ?On the wall a large painting hung.

- c. <在 船 上> 他 做 了 决定。 (V3)  
 <Zài chuán shàng> tā **zuò** le jué dìng.  
 be boat on he make PTCL.PFV decision

cf. Eng. On that boat he made a decision.

- d. <花园 里> 鲜花 盛开。 (V3)  
 <Huāyuán lǐ> xiānhuā **shèngkāi**.  
 garden in flowers bloom

cf. Eng. In the garden, flowers are blooming.

In examining the locative preposing in Chinese, either the aspect markers should be used, as in (24a) to (24c), or the aspectual information is directly delivered by the verb, as in (24d).

Finally, it should be noticed that the presence of stance verbs enhances the productivity of locative inversion in both English and Chinese when compared with the V3 structure; compare (24a') with (24a). Most examples provided by Chinese grammarians regarding locative fronting are presented in inversion rather than

adverbial phrase preposing (see Li & Thompson, 1981; Pan, 1996; Huang & Liao, 2007; Her, 2009; Liu & Chang, 2015).

- (24) a'. <在 客人 中> 坐 着 <玛丽>。(V2)  
 <Zài kèrén zhōng> zuò zhe <Mǎlǐ>.  
 at guest middle sit PTCL.DUR Mary  
 ‘Among the guests sits Mary.’

### (iii) INVERSION AFTER SPECIFIC TEMPORAL ADVERBS

The third circumstance where subject-simple verb inversion is observed is when specific temporal adverbs that denote sequences are fronted. The selection of these adverbs is constrained to non-locative and anaphoric adverbs, including *then*, *now*, *next*, *again*, and *first*<sup>20</sup> (Green, 1980, p. 583; Birner 1992, p. 35; Biber et al., 1999, p. 913). Here, an inversion is typically used for introducing a new event, such as in a play-by-play broadcast of sports events (Green, 1980, p. 584), fiction, and news, as in (25a) to (25c).

- (25) a. <Now> **comes** <the Friday’s story> in the (The New Yorker,  
 Times – the gist of which... (V2) John Cassidy, 2012)  
 b. <Again> **came** <the solemn communion of (BBC, *Lords of*  
 shining eyes> in the gloom. (V2) *the Flies*, 2012)  
 c. <Next> **came** <the middle-sized Billy Goat (Green, 1980, p. 583)  
 Gruff>. (V2)

Again, the productivity of inversion is related to the verb choice. The inversion is highly productive with the motion verbs, especially *come*, but not with other verbs; compare (25c) with (25c').

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<sup>20</sup> Besides, non-locative anaphoric adverbs like *thus* and *so* also belong to those frequent elements in inversions (Biber et al., 1999, p. 913).



- (25) c'. \*<Next> **works/dances/plays** <the middle-sized Billy Goat Gruff>. (\*V2)

An inversion in German is not restricted in verb choice due to the V2 constraint, whereas Chinese aligns with English. As shown in (26), when the verb is not a motion verb, the sentence is ungrammatical.

- (26) Ger. <Zuerst> **laß** sie das Buch, <dann> **schrieb** sie  
 first read she the book then wrote she  
 eine Zusammenfassung. (V2)  
 a summary

‘First, she read the book, and then she wrote a summary.’

Eng. \*<First> **read** she the book, <then> **wrote** she the summary. (\*V2)

but: <First>, she **read** the book; <then> she **wrote** a summary. (V3)

- Chn. \*<先> **读** <她> 书, <然后> **写**  
 \*<Xiān> **dú** <tā> shū, <ránhòu> **xiě**  
 first read she book then write

<她> 总结。 (\*V2)

<tā> zǒng jié.

she summary

- but: 她 <先> **读** 书, <然后> **写** 总结。 (V3)  
 Tā <xiān> **dú** shū, <ránhòu> **xiě** zǒng jié.  
 she first read book then write summary

‘She first read the book and then wrote a summary.’

#### (iv) AFTER A DIRECT QUOTE

A fourth circumstance where subject-simple verb inversion is possible is when a direct quote is fronted, which functions as the complement to the verb (Green 1980, p. 590-

594; Quirk et al., 1985, p. 1380; Hawkins, 1986, p. 172). Biber et al. (1999) summarize the linguistic context for this inversion as follows:

...such clauses containing some kind of reporting verb, either a straightforward verb of speaking/thinking (e.g., *say*, *think*) or a verb identifying the manner of speaking (e.g., *mutter*, *shriek*), the type of speech act (e.g., *offer*, *promise*), the phase of speaking (an aspectual verb such as *begin*, *continue*), etc. Such clauses frequently have inversion. (pp. 921–922)

In English, inversion after a direct quote is a common practice mostly when the subject is not a pronoun, yet it remains optional. In German, inversion is obligatory, whereas in Chinese, it is ungrammatical, exemplified in (27). Therefore, German and Chinese contrast each other, as the former always supports a V2 position, and the latter exclusively permits V3 in this case.

(27) Eng. <“Please show your ticket,”> **said** <the inspector>. (V2)

<“Please show your ticket,”> the inspector **said**. (V3)

Ger. <„Fahrkarte, bitte“,> **sagte** <der Kontrolleur>. (V2)

ticket please **said** the inspector

“Ticket, please,” said the inspector.’

Chn. \*<“请 出示 您的 车票。”> **说** <检票员>. (\*V2)

\*<“Qǐng chūshì nín de chēpiào.”> **shuō** <jiǎnpiaoyuán>.

please show your ticket say inspector

but: <“请 出示 您的 车票。”> 检票员 **说**. (V3)

<“Qǐng chūshì nín de chēpiào.”> jiǎnpiaoyuán **shuō**.

please show your ticket inspector say

“Please show your ticket,” the inspector said.’

Note that in English, inversion after a direct quote is less productive, and it is primarily found in news and fiction (Biber et al., 2021, p. 913). Nonetheless, inversion is grammatical, and it is occasionally seen in cases where the subject is a pronoun, as noted by Biber et al. (2021) with the example “‘*We may all be famous, then,*’ said **he**” (p. 914).

#### (v) COMPARATIVE SUBSTITUTION

The final circumstance for subject-simple verb inversion presented here is the *comparative substitution*, specifically concerning the fronting of an adjective phrase (also referred to as *AdjP inversion*, as noted in Birner, 1992, p. 35). The head of the predicate AdjP is compared using modifiers like *more*, *less*, *most*, *least*, or *as*, permuted with the subject noun phrase, and almost only the linking verb *be* is of interest here (Emonds, 1970, p. 28). In comparative substitution, German, English, and Chinese are consistent in the word order. All three languages strictly adhere to the V2 construction, as shown in (28).

(28) Eng. <The most beautiful> **is** <the resonance of the harp>. (V2)

\*<The most beautiful> the resonance of the harp **is**. (\*V3)

Ger. <Am Schönsten> **ist** <die Resonanz der Harfe>. (V2)

the most beautiful is the resonance DET.GEN harp

\*<Am Schönsten> die Resonanz der Harfe **ist**. (\*V3)

the most beautiful the resonance DET.GEN harp is

Chn. <最 美 的> **是** <竖琴 的 共鸣>。(V2)

<Zuì měi de> **shì** <shùqín de gòngmíng>.

most beautiful PTCL.ADJ is harp PTCL.GEN resonance

\*<最 美 的> 竖琴 的 共鸣 **是**。(V3)

\*<Zuì měi de> shùqín de gòngmíng **shì**

most beautiful PTCL.ADJ harp PTCL.GEN resonance is

➤ ***Contrasting subject-simple verb inversion in German, English, and Chinese***

Summarizing the contrastive grammar review, we see that under certain restrictions, subject-simple verb inversion (X-V-S) finds word-for-word equivalence in German, English, and Chinese in the circumstances (i) to (iv), except for (v) when a direct quote is fronted. It should be noted that although the three languages may share structural overlap in subject-simple verb inversion, the productivity of inversion varies across languages, and is related to verb choice inherent to each language. Inversion exhibits significant productivity in German because of the “single constituent rule” of the forefield, required by the V2 constraint. This syntactic parameter greatly distinguishes the language from English and Chinese, where subject-simple verb inversion is obligatory only under a few circumstances. Inversion does not occur in English and Chinese when other categories of sentence constituents are fronted. The contrast between German and English/Chinese is particularly sharp in cases where an adverbial relocates to the clause’s initial. While German supports the Adv-V-S word order, it is only grammatical when the adverbial denotes direction, location, and sequence, and the grammaticality is also contingent upon the linguistic context, such as the feature of the subject. Fronting an adverbial belonging to other semantic categories, such as non-sequential adverbials, manner adverbials, degree adverbials, and stance adverbials denoting probability or attitudes, does not lead to inversion (V2); instead, there exists the possibility for an Adv-S-V order (V3).

Another issue is the degree of productivity of inversion across languages. English and Chinese manifest divergences in the scope of verbs supporting subject-simple verb inversion. Taking directional and locative inversion as an example, in English, it typically occurs with certain stance verbs such as *be*, *stand*, and *lie*, or with very general motion verbs, such as *come*, *go*, and *fall* (Quirk et al., 1985, p. 1381). This is equally applicable to Chinese, as summarized in Li and Thompson (1981): typical verbs occurring in inverted structures are verbs of posture, such as 站 *zhàn* (‘to stand’) and 坐 *zuò* (‘to sit’) (similar to stance verbs), verbs of appearing such as 来 *lái* (‘to come’), 出现 *chūxiàn* (‘to appear’), 发生 *fāshēng* (‘to happen’) (similar to motion verbs), and

verbs of placement, such as 挂 *guà* ('to hang'), 种 *zhòng* ('to plant'), and 刻 *kè* ('to carve') (pp. 398–406). Compared with English, locative inversion in Chinese is supported by a broader range of verbs and involves canonical word order in many cases. For instance, inversion with a verb of appearing, 发生 *fāshēng* ('to happen'), is common in Chinese and German, but is ungrammatical in English, as exemplified in (29). If subject-simple verb inversion is disallowed with directional and locative fronting in Chinese, it is also likely to face restrictions in English, but not vice versa.

(29) Chn. <城 外> 发生 了 <一 件 大事>。(V2)  
 <Chéng wài> **fāshēng** le <yí jiàn dàshì>.  
 city outside happen PTCL.PFV one CL big event

<城 外> 一 件 大事 发生 了。(V3)  
 <Chéng wài> yí jiàn dàshì **fāshēng** le.  
 city outside one CL big event happen PTCL.PFV  
 'Outside the city, something big happened.'

Ger. <Außerhalb der Stadt> **passierte** <etwas Großes>。(V2)  
 outside DET.GEN city happened something big

\*<Außerhalb der Stadt> etwas Großes **passierte**。（\*V3）  
 outside DET.GEN city something big happened

Eng. \*<Outside of the city> **happened** <something big>。（\*V2）  
 <Outside of the city>, something big **happened**。（V3）

Finally, to better contrast the three languages, we list several semantic categories of adverbials that, when fronted, do not trigger inversion in English and Chinese but do so in German, as exemplified in (30) to (32).

(30) *Fronting of other types of temporal adverbials*

a. *Temporal adverbials (without denoting sequence)*

Eng. \*<Today> **works** <he> in the supermarket. (\*V2)

Ger. <Heute> **arbeitet** <er> im Supermarkt. (V2)

Chn. \*<今天> 工作 <他> 在 超市。(\*V2)

\*<Jīntiān> **gōngzuò** <tā> zài chāoshì.

today **work** he at supermarket

but: Eng. <Every Friday> he **works** in the supermarket. (V3)

Chn. <今天> 他 在 超市 工作。 (V4)

<Jīntiān> tā zài chāoshì **gōngzuò**.

today he at supermarket work

b. *Frequency adverbials*

Eng. \*<Twice a month> **goes** <Jim> to the opera house. (\*V2)

Ger. <Zweimal im Monat> **geht** <Jim> in die Oper. (V2)

Chn. \*<每月 (两次)> 去 <吉姆> 歌剧院 两次。(\*V2)

\*<Měiyuè (liǎngcì)> qù <Jímǔ> gējùyuàn liǎngcì.

every month (twice) go Jim opera house twice

but: Eng. <Twice a month>, Jim **goes** to the opera house. (V3)

Chn. <每月> 吉姆 去 歌剧院 两次。 (V3)

<Měiyuè> Jímǔ **qù** gējùyuàn liǎngcì.

every month Jim go opera house twice

c. *Duration adverbials*

Eng. \*<For many years> **worked** he from sunrise to sunset. (\*V2)

Ger. <Für Jahren> **arbeitet** <er> von Sonnenaufgang

for years                  works                  he                  from sunrise  
bis    Sonnenuntergang. (V2)  
until sunset

Chn.    \*〈多年来〉                  工作                  〈他〉                  夜以继日。 (\*V2)  
         \*〈Duō nián lái〉                  **gōngzuò**                  〈tā〉                  yè yǐ jì rì.  
         since years                  work                  he                  day and night

but.    Eng.    〈For many years〉, he **worked** he from sunrise to sunset. (V3)

Chn.    〈多年来〉,                  他    夜以继日    地                  工作。 (V3)  
         〈Duō nián lái〉,                  tā    yè yǐ jì rì    de                  **gōngzuò**.  
         since years                  he    day and night PTCL.ADV    work

(31) *Adverbials of manner*

Eng.    \*〈Beautifully〉 **dances** 〈the ballet dancer〉. (\*V2)

Ger.    〈Schön〉                  **tanzt**                  〈der Ballettänzer〉. (V2)

Chn.    \*〈优美地〉                  跳    着                  〈芭蕾 舞者〉. (\*V2)  
         \*〈yōuměi de〉                  **tiào**    zhe                  〈bālái wǔzhě〉.  
         beautifully                  dance PTCL.DUR                  ballet dancer

but:    Eng.    〈Beautifully〉, the ballet dancer **dances**. (V3)

Chn.    〈优美地〉,                  芭蕾 舞者                  跳-着-舞。 (V3)  
         〈yōuměi de〉,                  bālái wǔzhě                  **tiào-zhe-wǔ**.  
         beautifully                  ballet dancer                  dance.V-PTCL.DUR-dance.N

(32) *Adverbs of probability/attitude*

Eng.    \*〈Probably〉 **left** 〈she〉 her jacket in the fitting room. (\*V2)

Ger.    〈Wahrscheinlich/Leider〉                  **ließ**                  〈sie〉                  ihre Jacke  
         probably/unfortunately                  **left**                  she                  her jacket

in der Umkleidekabine. (V2)

in the fitting room

Chn. \*〈也许/可惜〉                      落    〈她〉    把    她的 夹克  
\*〈Yěxǔ/Kěxī〉                      là    〈tā〉    bǎ    tāde   jiākè  
probably/unfortunately    left    she    PTCL.DO her    jacket

在 了                      试衣间。 (\*V2)

zài le                      shìyījiān.

at    PTCL.PFV    fitting room

but: Eng. \*〈Probably〉 she **left** she her jacket in the fitting room. (\*V2)

Chn. \*〈也许/可惜〉                      〈她〉    把    她的 夹克  
\*〈Yěxǔ/Kěxī〉                      〈tā〉    bǎ    tāde   jiākè  
probably/unfortunately    she    PTCL.DO her    jacket

落    在 试衣间    了。 (V4)

là    zài shìyījiān    le.

left    at    fitting room    PTCL.PFV

Depending on the types of adverbial, the corresponding V3 variant of the above examples could be grammatical in both English and Chinese.<sup>21</sup> Notice that a comma is usually placed after the manner, attitude, or degree adverbial, as shown in (33a) and (33b). A common is not needed after probability adverbs, as in (33c). These V3 constructions do not find a grammatical word-for-word counterpart in German.

(33) a. Eng. 〈Basically〉, this plan **is** feasible. (V3)

Chn. 〈基本上〉,                      这个 计划    是    可行的。  
〈Jīběn shàng〉,                      zhège jìhuà    shì    kěxíngde.  
basically                      this    plan    is    feasible

<sup>21</sup> For Chinese, a V4 position is possible in the presence of a direct object, as in (32).



b. Eng. <Largely>, it **depends** on his decision. (V3)

Chn. <很 大 程度 上>, 这 **取决** 于 他的 决定。 (V3)  
 <Hěn dà chéngdù shàng>, zhè **qǔjué** yú tā de juéding.  
 to a large extent this depend on his decision

c. Eng. <Maybe> he **knows** the answer. (V3)

Chn. <也许> 他 **知道** 答案。 (V3)  
 <yěxǔ> tā **zhīdào** dá'àn.  
 maybe he know answer

In summary, when contrasting languages of their permissibility of subject-simple verb inversion, German stands out as significantly distinct. While similarities between Chinese and English might contribute positively to the acquisition of English inversion, German could potentially exert an interfering effect.

#### 4.2.3.2 Subject-Auxiliary Inversion

When an auxiliary appears in a declarative main clause, German differs from English and Chinese in that the lexical verb<sup>22</sup> shifts to the VF position of the verbal bracket. This structure is particularly salient, because the lexical verb does not move to the clause-final position in English or Chinese, as seen in (34) for the sentence *I must speak English*.

- (34) Eng. I **must**<sub>AUX</sub> speak<sub>V.NON-FIN</sub> English.  
 Chn. 我 **必须** 说 英文。  
 Wǒ **bìxū** shuō yīngwén.  
 I must speak English

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<sup>22</sup> The lexical verb is non-finite in English and German, whereas Chinese does not have an inflection system.

|      |     |             |          |                   |
|------|-----|-------------|----------|-------------------|
| Ger. | Ich | <b>muss</b> | Englisch | <u>sprechen</u> . |
|      | I   | must.AUX    | English  | speak.V.NON-FIN   |

While German and English use the tensed *have* (Ger. *haben*) to convey the aspectual information, standard Chinese uses post-verbal aspectual markers such as the durative marker 着 *zhe* and the perfective marker 了 *le*. The auxiliary *have* in English and German therefore has no direct equivalence in Chinese. The only auxiliaries used in Chinese grammar are the future tense marker and several modal verbs, such as 会 *huì* (‘will’), 能 *néng* (‘can’), 应该 *yīnggāi* (‘should’), and 必须 *bìxū* (‘must’).<sup>23</sup> These auxiliaries are compatible with the modal auxiliaries in English and German. Additionally, two types of particles serve auxiliary functions in Chinese: the progressive marker 在 *zài* and the passive marker 被 *bèi*. The former corresponds to the English *be* for progressive constructions,<sup>24</sup> and the latter is akin to *be* in English and *werden* in German for passive voice, as in (35).

(35) Eng. That man                      **was**.AUX.PASS    killed.V.NON-FIN.

Chn. 那 个 人                      被                      杀 了。

Nà gè rén                      **bèi**                      shā le.

that CL person    PTCL.PASS    kill    PTCL.PFV

Ger. Der Mann                      **wurde**                      getötet.

the man                      AUX.PASS                      killed.V.NON-FIN

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<sup>23</sup> For criteria of auxiliary in Chinese, see Li and Thompson (1981, pp. 172–183) or Huang and Liao (2007, pp. 10–11).

<sup>24</sup> In German, the simple present tense is used to express the progressive aspect. For example, *Ich koche* (lit. ‘I cook’) can be interpreted as ‘I cook’ or ‘I am cooking’. Progressives can also be conveyed through the *sein* + *am* + *V<sub>NOM</sub>* (‘be + at + V<sub>NOM</sub>’) structure, such as in the sentence *Ich bin am Kochen* (‘lit. I am at the cooking’), which translate to ‘I am cooking.’ However, this structure is not as commonly used as the simple present form. Due to the lack of structural correspondence between German and English for progressives, the related auxiliary structure will not be extensively discussed in our study.

We will discuss several instances where subject-auxiliary inversion is commonly seen in English: after the fronting of (i) locative phrases (locative inversion), (ii) pro-form *so*, *nor* and *neither*, (iii) *so* + *adv/adj*, and (iv) negative or restrictive adverbials, including subordinate clauses expressing condition or concession. Notice that our discussion is restricted to instances with only one auxiliary verb.

### (i) LOCATIVE INVERSION

Locative inversion can also manifest in conjunction with subject-auxiliary inversion, resulting in an X<sub>LOC</sub>-Aux-S-V word order (Green, 1980; Hawkins, 1986; Coopmans, 1989). The examples in (36) illustrate this inversion type respectively in future tense and passive construction. The linguistic contexts permitting locative subject-auxiliary inversion are similar to those for locative subject-simple verb inversion: the verbs are typically stance verbs, and the subject must not be a light-weighted pronoun.

- (36) a. <On this spot> **will** stand <a huge monument>. (V2)  
(Hawkins, 1986, p. 174)
- b. <On that table> **was** put <a valuable book>. (V2)  
(Coopmans, 1989, p. 729)

The sentence in (36a) finds its literal counterpart in Chinese, whereas in (36b), the Chinese verb for *put* does not necessitate the passive voice, as shown in (36a') and (36b'). So, languages do not always overlap each other when zooming into concrete instances, even if they do share an overarching structural representation.

- (36) a'. <此处> 将 矗立 起 <一 座 巨大的 纪念碑>。(V2)  
 <Cǐchù> **jiāng** chùlì qǐ <yí zuò jùdàde jìniànbēi>.  
 this place will.AUX stand up one CL huge monument  
 (subject-auxiliary inversion)

- b'. <桌子 上>      放 了      <一 本 珍本>。(V2)  
 <Zhuōzi shàng>    fàng le      <yì běn zhēnběn>.  
 table   on      put   PTCL.PFV      one CL      rare edition  
 (subject-simple verb inversion)

In German, the subject automatically moves to the middlefield when the locative phrase is fronted to the forefield, obligating subject-auxiliary inversion. While this is similar to English and Chinese, which also support inversion in this case, German differs in the placement of the non-finite lexical verb. In English and Chinese, the lexical verb immediately follows the auxiliary and precedes the subject, whereas in German, it occupies the VF position and follows the subject; compare (36a'') with (36a) and (36a'). Therefore, the structural outcome for locative inversion in German only partially overlaps with that of English and Chinese in X<sub>LOC</sub>-Aux-S.

- (36) a''. <An dieser Stelle>    **wird**    <ein riesiges Denkmal>    stehen. (V2)  
                                          on this spot                                           will                                           a huge monument                                           stand.V.NON-FIN

The restriction on the form of the subject does not apply to German; consider the sentence: *On this wall will hang the portrait of Duke Winston*. In English and Chinese, replacing the noun phrase with a pronoun will lead to an ungrammatical expression, but in German, it is grammatically acceptable, as shown in (37).

- (37) Eng. \*<On this wall> **will** hang <it>. (\*V2)

- Chn. \*<这 面 墙 上>      会      挂      <它>。(V2)  
       \*<Zhè miàn qiáng shàng>    huì      guà      <tā>.  
                                          this CL   wall on                                           will      hang      it

- Ger. <Auf dieser Wand>    **wird**    <es>    hängen. (V2)  
                                          on   this   wall                                           will      it      hang.V.NON-FIN

Fronted locative phrases are found in V2 or V3 order, depending on whether an inversion is obligatory (Hawkins, 1986, p. 181). The V3 variant, X<sub>LOC</sub>-S-Aux, is not productive in Chinese compared with the inverted variant. For instance, the V3 variant of *On this spot will stand a huge monument* is grammatically less acceptable in Chinese and is also not permitted in German, as seen in (38).

(38) Eng. <On this spot> a huge monument **will** stand. (V3)

(Hawkins, 1986, p. 181)

Chn. \*<此处> 一座巨大的纪念碑 **将** 矗立起。(\*V3)

\*<Cǐchù> yí zuò jùdàde jìniànbēi **jiāng** chùlì qǐ.

this place one CL huge monument will stand up

Ger. \*<An dieser Stelle> ein riesiges Denkmal **wird** stehen. (\*V3)

on this spot a huge monument will stand.V.NON-FIN

## (ii) INVERSION AFTER PRO-FORM *SO*

Subject-auxiliary inversion occurs when an entire predicate or a substantial part of it follows the *pro-forms*<sup>25</sup> *so*, *nor* and *either* (Hawkins, 1986, pp. 169–170; Biber et al., 1999, p. 917; Huddleston & Pullum 2002, p.1539; Dorgeloh, 1997, pp. 26–28), as exemplified in (39).

(39) a. I have been to Shanghai. <So> **have** <my parents>. (V2)

b. Lisa can't play the violin. <Nor/Neither> **can** <her sister>. (V2)

It should be noted that the V3 counterpart is not semantically equivalent to the V2 pattern. The meaning conveyed in (40a) differs from that in (40b), as the former adds parallel information to another subject for additive purposes, whereas the latter emphasizes the antecedent sentence to the same subject for emphatic purposes. This

<sup>25</sup> For *pro-form*, see Quirk et al. (1985, pp. 865–867).

means an inversion is obligatory only when there is a disjoint between the subjects of the two sentences (Hawkins, 1986, p. 169).

- (40) a. Felix<sub>i</sub> can play the piano very well. <So> **can** he<sub>j</sub>! (V2: *additive*)  
 b. Felix<sub>i</sub> can play the piano very well. <So> he<sub>i</sub> **can**! (V3: *emphatic*)

The pro-form of *nor* and *neither* does not support the V3 structure, as they serve only to add an extra piece of information to the preceding sentence (Biber et al., 1999, p. 917), as shown in (41).

- (41) a. Sandra had never been to Chicago. <Nor> **had** her brother. (V2)  
 b. Sandra had never been to Chicago. \*<Nor> her brother **had**. (\*V3)

Chinese does not use the pro-forms *so*, *nor*, or *either*. Instead, it uses the adverb 也 *yě* ('also, too') for additive function and 确实 *quèshí* ('indeed') for emphatic purposes, both leading to a V3 word order, (42).

- (42) a. 安娜<sub>i</sub> 会 说 德语。 莉莉/她<sub>i</sub> 也 会。 (additive)  
 Ān nà<sub>i</sub> huì shuō déyǔ. Lìlì/Tā<sub>j</sub> yě huì.  
 Anna can speak German Lilly/she also can  
 'Anna can speak German. So can Lilly/She.'  
 b. 安娜<sub>i</sub> 会 说 德语。 她<sub>i</sub> 确实 会。 (emphatic)  
 Ān nà<sub>i</sub> huì shuō déyǔ. Tā<sub>i</sub> quèshí huì.  
 Anna can speak German she indeed can  
 'Anna can speak German. So She can.'

German does not directly translate English pro-form *so* sentences using the same structure because the German equivalent *so* is used solely to denote manner. The structural counterpart in German, *So* + *aux.* + *subj.*, does not always align with the

English sentence in its reference. The literal translations in (43a) and (43b) are considered inappropriate, as the adverb *so* in German does not have a function of referring to the event of passing the exam. Instead, another structure is employed for emphatic purposes. The pro-form of the determinative *das* ('it') is used to substitute the action mentioned in the preceding sentences, placed at the sentence's initial, as in (43b'). This structure lacks a counterpart in English or Chinese. For providing additive information, like Chinese, German uses the adverb *auch* ('also, too'), as shown in (43a').

- (43) a. Jim wird den Test bestehen. \*<So> **wird** sein Bruder.  
           Jim will the test pass.V.NON-FIN so will his brother
- b. Jim<sub>i</sub> wird den Test bestehen. \*<So> er<sub>i</sub> **wird**.  
           Jim will the test pass.V.NON-FIN so he will
- a'. Jim wird den Test bestehen. Sein Bruder auch. (additive)  
       Jim will the test pass.V.NON-FIN his brother too  
       'Jim will pass the test. So will his brother.'
- b'. Jim wird den Test bestehen. Das wird er. (emphatic)  
       Jim will the test pass.NON-FIN that will he  
       'Jim will pass the test. So he will.'

Taken together, German and Chinese use distinct constructions for expressing the pro-form *so* inversion in English. Despite the formal overlap of the specific sentence structure of *So + aux. + subj.* between German and English, there are semantic mismatches between the two languages. Chinese exclusively utilizes the V3 construction of S-Adv-Aux for both emphatic and additive use, distinguishing itself from English and German.

### (iii) INVERSION AFTER *SO* + *ADV/ADJ*

The third type of subject-auxiliary inversion is triggered by the correlative construction<sup>26</sup> *so* + *adj/adv*, as exemplified in (44). This pattern features a degree expression at the clause-initial position, usually accompanied by a following comparative of the degree expression (Biber et al., 1999, pp. 916–917), followed by the auxiliary.<sup>27</sup> Notice that the *so* + *adj/adv* structure is more commonly seen in literature work rather than colloquial speech. The inversion in this case is obligatory (Huddleston & Pullum, 2002, p. 97).

- (44) a. <So greatly> **had** <he> suffered, and so far gone (Biber, 1999,  
was he, that the blows did not hurt much. (V2) p.916, FICT)  
  
\*<So greatly> he **had** suffered... (\*V3)
- b. <So badly> **was** <he> affected that he had to be (Biber, 1999,  
taught to speak again. (V2) p.916, NEWS)  
  
\*<So badly> he **was** affected... (\*V3)
- c. <So quickly> **has** <word> spread that some border watchers predict the  
US will see a new surge of illegal immigration... (V2)  
(COCA:<sup>28</sup> *Christian Science Monitor*, 2001; NEWS)  
  
\*<So quickly> word **has** spread ... (\*V3)

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<sup>26</sup> Correlative constructions are clauses written in correlative coordinators, e.g., *so...that*, *as...so*, *no sooner...than*, *the...the*, *no sooner...than*, etc. as well as subordinator plus optional conjunct, e.g. *although/even...yet*, *once/since/unless...*, *...therefore* (see Biber et al., 1999, pp. 999–1001).

<sup>27</sup> Quirk et al. (1985) argue that inversion involves the main verb rather than the auxiliary, as in (i), the lexical verb is fronted together with the auxiliary. However, subject-inversion still may occur in this case, as in (ii). The X-Aus-S-V word order is the relic of the older English, where subject-auxiliary inversion “occurred without a preceding negative and some instances continue to be used in very formal style,” e.g., *Often had she intended to speak of this* (p. 1383).

i. <So absurd> **had been** his manner

ii. <So absurd> **did** his manner **seem**.

<sup>28</sup> COCA: Abbreviation for Corpus of Contemporary American English.



The *so + adj/adv* construction must not be positioned at the sentence's initial in Chinese; instead, the canonical S-Aux-V word order is used. In this case, German and English share a commonality, adhering to the subject-auxiliary inversion, while Chinese forms a contrast, as illustrated in (45).

- (45) Chn. 问题 被 <如此> 完美地 解决了,  
Wèntí bèi <rúcǐ> wánměide jiějué le,  
problem PTCL.PASS so perfectly solve PTCL.PFV  
没有人 是 不满意的。(null inversion)  
méiyǒurén shì bùmǎnyide.  
nobody is unsatisfied

‘The problem was so perfectly solved that nobody is unsatisfied.’

- Ger. <So schnell> wurde <das Problem> gelöst, dass  
so quickly.ADV was the problem solved.V.NON-FIN that  
jeder zufrieden ist. (V2)  
everybody satisfied is

‘So quickly was the problem solved that everyone is satisfied.’

cf. Eng. <So quickly> **was** <the problem> solved that everyone is satisfied. (V2)

#### (iv) FRONTING OF NEGATIVE/RESTRICTIVE ADVERBIALS

Fronting an adverbial with a negative or restrictive meaning to the clause's initial leads to obligatory subject-auxiliary inversion (Hawkins, 1986, p. 170; Dorgeloh, 1997, p. 28; Biber et al., 1999, p. 915). Examples of such adverbials include *never*, *on no condition*, *hardly*, *no sooner*, *rarely*, *scarcely*, *seldom*, *little*, *less*, *only*, etc., as exemplified in (46). It should be noted that inversion applies only when the negative scope affects the whole clause; a sentence as in (47) must not be inverted, as the negative adverbial only denotes the attitude of the speaker (Biber et al., 1999, p. 915).

- (46) a. <Never> **have** <I> read such a beautiful poem. (V2)  
 b. <Rarely> **was** <this song> performed on stage. (V2)  
 c. <On no condition> **should** <civilians> use weapons without training. (V2)
- (47) a. \*<No doubt> **has** <he> been so depressed on those days. (\*V2)  
 b. <No doubt> he **has** been so depressed on those days. (V3)

In turn, inverting a sentence with the fronting of an adverbial without negative or restrictive meaning results in an ungrammatical (or non-canonical in old-fashioned, formal English) V2 structure. This stands in significant contrast to German, where the element in the forefield encompasses a wider scope of semantic and functional categories, as exemplified in (48b) to (48d).

(48) a. *Negative adverbials*

Eng. <Never> **had** <I> read such a beautiful poem. (V2)

Ger. <Nie> **hatte** <ich> so ein schönes Gedicht gelesen. (V2)  
 never had I such a beautiful poem read.V.NON-FIN

b. *Frequency adverbials*

Eng. \*<Again and again> **has** <he> made the same mistake. (\*V2)

Ger. <Immer wieder> **hat** <er> den selben Fehler gemacht. (V2)  
 again and again has he the same mistake made.V.NON-FIN

but: Eng. <Again and again> he **has** made the same mistake. (V3)

c. *Temporal adverbials*

Eng. \*<Yesterday at seven> **was** <the suspect> captured. (\*V2)

Ger. <Gestern um sieben> **wurde** <der Verdächtige> gefangen. (V2)  
 yesterday at seven was the suspect captured.V.NON-FIN

but: Eng. <Yesterday at seven>, the suspect **was** captured. (V3)

d. *Attitude/evaluation adverbs*

Eng. \*<Unfortunately> **was** <his wallet> stolen. (\*V2)

Ger. <Leider> **wurde** <sein Portemonnaie> gestohlen. (V2)  
 unfortunately was his wallet stolen.V.NON-FIN

but: Eng. <Unfortunately>, his wallet **was** stolen. (V3)

When constituents other than the fronted adverbial, subject, and verb are present, English and German do not fully overlap. For example, (48a) and (48b) involve the occurrence of a direct object. In German, the non-finite verb moves to the clause-final, and the sentence follows the Adv-Aux-S-DO-V order; in English, the verb immediately follows the auxiliary, and the sentence is arranged in the Adv-Aux-S-V-DO alignment. The two languages hence overlap only partially in Adv-S-Aux.

Fronting a restrictive/negative adverbial does not trigger inversion in Chinese. Chinese contrasts with the grammar rules in English and German in indicating condition: 只有...才 *zhǐyǒu ... cái* ('only if...then'). In this case, the sentence follows a V3 structure, as shown in (49a). A negative adverbial is not fronted in Chinese; instead, the canonical S-Adv<sub>NEG</sub>-Aux-V word order is employed, (49b).

(49) a. *Fronting a restrictive adverbial*

Chn. <只有 这样>, 他 才 能 得到 帮助。 (V4)  
 <Zhǐyǒu tā cái **néng** dédào bāngzhù.  
 zhèyàng>,  
 only like this he then can obtain help  
 'Only in this way can Lilly get help.'

Ger. <Nur so> **kann** <er> Hilfe bekommen. (V2)  
 only like this can he help get.V.NON-FIN

Eng. <Only in this way> **can** <he> receive help. (V2)

b. *Fronting a negative adverbial*

Chn. \*〈从来没〉 他 能 完成 任务。 (\*V3)  
 \*〈cónglái méi〉 tā néng wánchéng rènwù.  
 never he can complete task

but: 他 〈从来没〉 能 完成 任务。 (S-Adv-Aux)  
 tā 〈cónglái méi〉 néng wánchéng rènwù.  
 he never can complete task

‘He has never been able to complete the task.’/‘Never has he been able to complete the task.’

Subject-auxiliary inversion also applies when a negative or restrictive adverbial clause precedes the main clause. These adverbial clauses are introduced by negative or restrictive operators such as *only when*, *only after*, and *not until*. The corresponding V3 construction is ungrammatical. Again, German solely permits the V2 variants, and Chinese exclusively in the V3 structure, as exhibited in (50).

(50) a. *Adverbial clauses with restrictive meaning*

Eng. 〈Only when you finish the work〉 **are** 〈you〉 allowed to watch TV. (V2)

\*〈Only when you finish the work〉, you **are** allowed to watch TV. (\*V3)

Ger. 〈Nur wenn du deine Aufgaben erledigst〉, **darfst** 〈du〉 (V2)  
 only when you your tasks finish may you

Fernsehen schauen.

television watch.V.NON-FIN

Chn. <只有 做完 作业>, 你 才 可以 (V4)  
 <Zhǐyǒu zuòwán zuòyè>, nǐ cái kěyǐ  
 Only when finish homework you then may  
 看 电视。  
 kàn diànshì.  
 watch television

b. *Adverbial clauses without negative/restrictive meaning*

Eng. \*<Even if the chances are slim>, **should** <you> give a try. (\*V2)

Even if the chances are slim>, you **should** give a try. (V3)

Ger. <Auch wenn die Chancen gering sind>, **solltest** (V2)  
 even if the chances small are should  
 <du> es versuchen.  
 you it try.V.NON-FIN

Chn. <就算 几率 不 大>, 你 也 该 试一试。 (V4)  
 <Jiùsuàn jīlǜ bú dà> nǐ yě gāi shì yí shì  
 even if chance not big you also should give a try

The mapping between negative/restrictive meaning and form is not universal across languages. For instance, the specific English operator *not until* has no literal, word-for-word translation in German or Chinese. German employs a non-literal equivalence *erst wenn*, whereas Chinese adopts the construction of 直到...才 *zhídào...cái*. Example (51) shows the arrangements in German and Chinese for the sentence *Not until the sun sets will the concert begin*. The German sentence, though with a different expression, still conforms to the V2 structure and overlaps with English in the overarching Adv-Aux-S pattern.

(51) Ger. <Erst wenn die Sonne untergeht>, **wird** das Konzert (V2)  
 only when the sun goes down will the concert

beginnen.

begin.v.NON-FIN

lit. 'Only after the sun goes down will the concert begin.'

Chn. <直到 太阳 落山>, 音乐会 才 会 开始。 (V4)  
 <Zhídào tàiyáng luòshān>, yīnyuèhuì cái **huì** kāishǐ.  
 until sun set concert then will begin

lit. 'When the sun goes down, the concert will then begin.'

In summary, when a negative or restrictive adverbial is fronted, English and German share an identical word order. Even though a literal translation may not always be possible between English and German, the overarching syntactic structures remain consistent. However, Chinese diverges significantly, as it does not employ inversion in this case.

#### ➤ *Contrasting subject-auxiliary inversion in German, English, and Chinese*

In terms of subject-auxiliary inversion, the word orders in German, English, and Chinese exhibit correspondence under only one specific circumstance: locative fronting, where a shared X<sub>LOC</sub>-Aux-S sequence is observed. Regarding the fronting of the *so* + *adj./adj.* structure and restrictive/negative adverbials, only German and English share structural similarities in using the X-Aux-S word order, and inversion is not permitted in Chinese grammar in these cases. Meanwhile, it is important to note that the position of the lexical verb may differ in the German and English counterparts for the same expression: the non-finite verb must be placed at the VF position in German but normally immediately follows the auxiliary in English. This means English and German only share an overarching X-Aux-S word order when other constituents, such as direct objects or PP complements, emerge. A full overlap between English and

German occurs only when the clause consists of the subject, the auxiliary, the non-finite verb, and the fronted element: X-Aux-S-V. This sequence appears, for instance, when passive voice is involved. Moreover, Chinese does not always have structural similarities with the other two languages because it does not necessitate the auxiliary *have* to express perfective aspects. It finds counterparts in English and German only when the auxiliary is a modal verb or a particle for passive voice.

Lastly, we list several instances of ungrammatical subject-auxiliary inversion for contrastive purposes. Fronting adverbials belonging to semantic categories other than locative, negative, and restrictive ones leads to ungrammatical expressions in English and Chinese, but not in German. It is under these circumstances that the word order in German sharply contrasts with the other two languages, as exemplified in (52).

(52) a. *Fronting temporal adverbials*

Eng. \*<Last night> **was** <a bank> robbed. (\*V2)

Ger. <Letzte Nacht> **wurde** <eine Bank> ausgeraubt. (V2)  
last night was a bank robbed.<sub>V, NON-FIN</sub>

Chn. \*<昨天 晚上> 被 <一 家 银行> 抢 了。(\*V2)  
\*<Zuótiān wǎnshàng> **bèi** <yì jiā yínháng> qiǎng le.  
yesterday evening PTCL.PASS one CL bank rob PTCL.PFV  
lit. ‘Last night, (someone) was robbed by a bank.’

but: Eng. <Last night>, a bank was robbed. (V3)

Chn. <昨天 晚上>, 一 家 银行 被 抢 了。(V3)  
Zuótiān wǎnshàng, yì jiā yínháng **bèi** qiǎng le.  
yesterday evening one CL bank PTCL.PASS rob PTCL.PFV

b. *Fronting attitudinal adverbials*

Eng. \*<Unfortunately> **must** <he> leave. (\*V2)

Ger. <Leider> **muss** <er> gehen. (V2)  
 unfortunately must he leave

Chn. \*<很 不幸> 必须 <他> 离开。 (\*V2)  
 \*<Hěn bùxìng> **bìxū** <tā> líkāi.  
 very unfortunate must he leave

but: Eng. <Unfortunately>, he must leave. (V3)

Chn. <很 不幸>, 他 必须 离开。 (V3)  
 <Hěn bùxìng>, tā **bìxū** líkāi.  
 very unfortunate he must leave

c. *Fronting adverbials of possibility*

Eng. \*<Perhaps> **will** <he> go to the fair. (\*V2)

Ger. <Vielleicht> **wird** <er> zu-r Messe gehen. (V2)  
 perhaps will he to-the fair go.V.NON-FIN

Chn. \*<可能> 会 <他> 去 展会。 (\*V2)  
 \*<Kěnéng> **huì** <tā> qù zhǎnhuì.  
 perhaps will he go fair

but: Eng. <Perhaps> he **will** go to the fair. (V3)

Chn. <可能> 他 会 去 展会。 (V3)  
 <Kěnéng> tā **huì** qù zhǎnhuì.  
 perhaps he will go fair



d. *Fronting directional phrase*

Eng. \*<Into the house> **must** <he> run. (Hawkins, 1986, p. 172) (\*V2)

Ger. <In-s Haus> **muss** <er> laufen. (V2)  
 into-the house must he run.V.NON-FIN

Chn. \*<进 屋> **必须** 他 跑。 (V3)  
 \*< jìn wū > bìxū tā pǎo.  
 into house must he run

but: Eng. He must run into the house. (S-V-Adv)

Chn. 他 **必须** 跑 进 屋。 (S-V-Adv)  
 tā bìxū pǎo jìn wū.  
 he must run into house

### 4.3 Verb-Particle Construction

A typical construction in Germanic languages is the combination of a verb and a particle (normally a preposition), such as *wake up* and *call off* in English or *auf|stehen* and *ab|sagen* in German. Similar constructions are also found in Chinese, such as 跑开 *pǎo-kāi* (‘to run away’) and 扔掉 *rēng-diào* (‘to throw away’). There are several terms to choose from in describing such a construction: *verb-particle construction* (Fraser, 1965, p. 5), *multi-word lexical verb* (Biber et al., 1999, p. 407), *phrasal verb* (Biber et al., 1999, p. 407; Huddleston & Pullum, 2002, p. 274), *particle verb* (Dehé et al., 2002, p. 1; Booij, 2002, p. 21), *verb-particle phrase* (Lohse et al., 2004, p. 238), *trennbare Verb* (‘separable verb’) (Hentschel & Vogel, 2009, p. 441), and *verb compound* (Li & Thompson, 1981, p. 54).

The choice of terminology is indicative of the linguistic features inherent to the language itself and aligns with the preferences of the theoretical framework. For instance, the term *phrasal verb* is “rarely ever used except with respect to English,

where it is sometimes applied not only to phrasal verbs... but also to other verbal constructs, most notably prepositional verbs” (Thim, 2012, p. 2).<sup>29</sup> They can behave like lexical units (Booij, 2002, p. 25). The term *verb compound* emphasizes the morphosyntactic features of such construction in Chinese, as one can freely create new verb compounds if given the appropriate verb (Li & Thompson, 1981, p. 54). To emphasize formal features, the terms we choose to use in this study are *verb-particle construction* (hereafter: VPC) and *particle verb*, indicating that an adverbial particle is added to the main verb, providing additional information to the verb or completely changing its meaning. Despite the abundant parallels across languages in using this construction, one cannot simply put an equal sign between these terms. Even when particle verbs share significant similarities in form and meaning, they exhibit different features in each language. As described in Section 4.1.1, the best evidence is that a preposition not only serves as the suffix of the verb but also stands independently as the postverb (hence the name *separable verb*). This characteristic is absent in English. Subsequently, the discussion will explicate the syntactic similarities and disparities of VPCs in German, English, and Chinese.

#### 4.3.1 Verb-Particle Constructions in German

A prevalent morphological process in the German language involves the combination of a *root verb* (*‘Basis’*) with a *separable prefix* (*‘abtrennbares Präfix’*), also referred to as *verb supplement* (*‘Verbzusatz’*). This combination forms what is known as a *separable verb* (*‘trennbares Verb’*). Most of these separable prefixes are prepositions, called *prepositional verb particle* (*‘präpositionale Verbpartikel’*, as noted in Eisenberg, 2020b, p. 274).

Each particle has its own meaning, significantly affecting the meaning of the root verb (Engel, 1988, p. 439; 2009, p. 229). For example, the root verb *machen* signifies ‘to make’, and when combined with the prepositional particle *zu*, meaning ‘closed’, the

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<sup>29</sup> For a historic review of the term *phrasal verb*, see Thim (2012, pp. 2–3).

particle verb *zu|machen* translates to ‘to close’. Or consider the verb *fassen* (‘to grasp, to understand’), paired with the particle *zusammen* (‘together’), the resulting word *zusammen|fassen* conveys the specific meaning of ‘to summarize’.

As German allows for a broad range of possibilities for combining various particles with verbs, there is an extensive inventory of particle verbs in the language. While many of them find direct equivalents in English, not all of them do. For instance, words like *zu|machen* and *zusammen|fassen* lack structural counterparts in English. Particle verbs that share equivalents in English and German typically include words that indicate direction and convey aspectual information; a very few of them also form idiomatic constructions, as listed in Table 1.

**Table 1:** *VPCs in German and English with Similar Semantic Functions*

| <i>Indicating Direction</i> | <i>Indicating Aspect</i> | <i>Idiomatic Constructions</i> |
|-----------------------------|--------------------------|--------------------------------|
| ein steigen – get on        | weiter gehen – go on     | auf geben – give up            |
| aus schüttern – pour out    | auf essen – eat up       | aus flippen – freak out        |
| um drehen – turn around     | los fahren – drive off   | nach schlagen – look up        |
| rein bringen – bring in     | aus trinken – drink up   |                                |

In a German clause, when the root verb occupies the V2 position, the prefix separates from the verb and shifts to the VF position of the verbal bracket (Weinrich, 2003, p. 61). The prefix then becomes the postverb. The middlefield can be occupied by various types of information. When the middlefield is empty, the VPC remains a continuous construction (V-Ptcl) on the surface structure, as in (53).

- (53) a.
- | FOREFIELD | V2          | MIDDLEFIELD | VF          |
|-----------|-------------|-------------|-------------|
| Der Mond  | <b>geht</b> | Ø           | <b>auf.</b> |
| the moon  | goes        | Ø           | up          |
- ‘The moon is rising.’

|    |                               |                |   |                |
|----|-------------------------------|----------------|---|----------------|
| b. | Die Soldaten                  | <b>kämpfen</b> | Ø | <b>weiter.</b> |
|    | the soldiers                  | fight          | Ø | further        |
|    | ‘The soldiers keep fighting.’ |                |   |                |

When the middlefield is filled with other information, such as an object or an adverbial adjunct, a discontinuous order (V-X-Ptcl) emerges, (54).

|      |    |                                         |               |                    |            |
|------|----|-----------------------------------------|---------------|--------------------|------------|
| (54) | a. | <b>FOREFIELD</b>                        | <b>V2</b>     | <b>MIDDLEFIELD</b> | <b>VF</b>  |
|      |    | Der Gärtner                             | <b>fällte</b> | die toten Bäume    | <b>ab.</b> |
|      |    | the gardener                            | cut           | the dead trees     | off        |
|      |    | ‘The gardener cut down the dead trees.’ |               |                    |            |

|    |                          |              |         |                |
|----|--------------------------|--------------|---------|----------------|
| b. | Der Zug                  | <b>fährt</b> | schnell | <b>vorbei.</b> |
|    | the train                | drives       | quickly | past           |
|    | ‘The train speeds past.’ |              |         |                |

The particle must not be relocated to the middlefield, such as to the position left to the object or the adverbial adjunct, as in (55).

|      |    |                  |               |                              |                |
|------|----|------------------|---------------|------------------------------|----------------|
| (55) | a. | <b>FOREFIELD</b> | <b>V2</b>     | <b>MIDDLEFIELD</b>           | <b>VF</b>      |
|      |    | Der Gärtner      | <b>fällte</b> | <b>*ab</b>   die toten Bäume | <b>ab.</b>     |
|      |    | the gardener     | cut           | off   the dead trees         |                |
|      | b. | Der Zug          | <b>fährt</b>  | <b>*vorbei</b>   schnell     | <b>vorbei.</b> |
|      |    | the train        | drives        | past   quickly               |                |

It is ungrammatical to simultaneously fill the forefield with both the subject and the adverbial, as in (56).

|      |                  |          |              |                |
|------|------------------|----------|--------------|----------------|
| (56) | <b>FOREFIELD</b> |          | <b>V2</b>    | <b>VF</b>      |
|      | Der Zug          | *schnell | <b>fährt</b> | <b>vorbei.</b> |
|      | the train        | *quickly | drives       | past           |

Depending on the syntactic complexity of the object, it is possible to place it in the middlefield or employ a relative clause in the postfield to modify the object, as illustrated in (57).

|      |    |                  |               |                              |            |                  |
|------|----|------------------|---------------|------------------------------|------------|------------------|
| (57) | a. | <b>FOREFIELD</b> | <b>V2</b>     | <b>MIDDLEFIELD</b>           | <b>VF</b>  | <b>POSTFIELD</b> |
|      |    | Der Gärtner      | <b>fällte</b> | <u>die toten Bäume im</u>    | <b>ab.</b> | Ø                |
|      |    |                  |               | <u>Garten der alten Dame</u> |            |                  |
|      |    | the gardener     | cut           | the dead trees in the        | off        | Ø                |
|      |    |                  |               | garden of the old lady       |            |                  |

‘The gardener cut down the dead trees in the garden of the old lady.’

|    |                  |               |                    |            |                                |
|----|------------------|---------------|--------------------|------------|--------------------------------|
| b. | <b>FOREFIELD</b> | <b>V2</b>     | <b>MIDDLEFIELD</b> | <b>VF</b>  | <b>POSTFIELD</b>               |
|    | Der Gärtner      | <b>fällte</b> | die toten Bäume    | <b>ab,</b> | <u>die im Garten der alten</u> |
|    |                  |               |                    |            | <u>Dame waren.</u>             |
|    | the gardener     | cut           | the dead trees     | off,       | which were in the              |
|    |                  |               |                    |            | garden of the old lady         |

‘The gardener cut down the dead trees which were in the garden of the old lady.’

Thus, the word order constraint imposed by the German field system has determined the frequent occurrence of the discontinuous VPCs when constituents other than the subject and the predicate are present. The continuous word order is a result of the empty middlefield. This contrasts with word orders in English sentences featuring VPCs, elaborated in the following section.

### 4.3.2 Verb-Particle Constructions in English

Semantically, VPCs in English fall into two categories: *compositional VPCs* and *idiomatic VPCs*, with the former further categorized into VPCs with *directional particles* and VPCs with *aspectual particles* (see Jackendoff, 2002, pp. 69–80 and Thim, 2012, pp. 13–30 for extensive discussions), exemplified in Table 2.

**Table 2:** *Semantic Categories of VPCs in English*

| <b>COMPOSITIONAL VPCs</b>                                             |                                                                       | <b>IDIOMATIC VPCs</b>                                          |
|-----------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------|
| <b><i>Directional Particles</i></b>                                   | <b><i>Aspectual Particles</i></b>                                     | freak out, give up, look up,<br>shut up, throw up, bring up... |
| bring in, go away,<br>walk around, come out,<br>take off, sit down... | eat up, finish off,<br>go on, sing through,<br>sleep away, run out... |                                                                |

The prepositions *out* and *up* in *freak out* (‘to be in a heightened emotional state like fear’) and *throw up* (‘to vomit’) exhibit idiomatic characteristics as they “have (at least partly) lost their noncompositional meanings” and are necessary to be listed in the lexicon as complete units (Jackendoff, 2002, p. 73). In contrast, the preposition in *take out* (‘to move something out of something else’) suggests the direction of a movement, and that in *sing through* (‘to sing from the beginning until the end’) reflects the aspectual information, namely, the completion of the action. The meaning of compositional VPCs is thus more predictable than that of idiomatic ones.

From a syntactical perspective, one important aspect to consider is transitivity. VPCs in English may manifest as either transitive or intransitive, with only a limited number displaying characteristics of both (Biber et al., 1999, p. 410). Transitivity does not necessarily hinge on the semantic category and should be analyzed individually. In certain instances, the transitivity of a VPC may be contingent upon the specific particle involved. Table 3 furnishes a comprehensive overview of the transitivity patterns observed in various VPCs across different categories.

**Table 3:** *Transitivity of VPCs in each Semantic Category*

|                                       | <i>IDIOMATIC VPCs</i>                 | <i>COMPOSITIONAL VPCs</i>         |                                   |
|---------------------------------------|---------------------------------------|-----------------------------------|-----------------------------------|
|                                       |                                       | <i>Directional Particles</i>      | <i>Aspectual Particles</i>        |
| <b>Transitive</b>                     | <i>gross out,<br/>knock out</i>       | <i>throw away,<br/>bring back</i> | <i>drink up,<br/>read through</i> |
| <b>Intransitive</b>                   | <i>chicken out,<br/>throw up</i>      | <i>go forward,<br/>come back</i>  | <i>fade away,<br/>talk away</i>   |
| <b>Transitive or<br/>intransitive</b> | <i>freak out,<br/>let up, give up</i> |                                   |                                   |

An essential consideration is examining the particle's position to the direct object in transitive VPCs. For English, the option exists to place the particle on either side of the object, denoted as the *continuous order* (also called the *right-hand position*) and the *discontinuous order* (also called the *left-hand position*). This flexibility is observed in VPCs of all semantic types, as shown in (58).

- (58) a. *Idiomatic VPC*
- The clown **freaked** the kids **out**. (discontinuous order)
- The clown **freaked out** the kids. (continuous order)
- b. *Compositional VPC with directional particle*
- He **throws** the trash **away**. (discontinuous order)
- He **throws away** the trash. (continuous order)
- c. *Compositional VPC with aspectual particle*
- I will **read** this article **through**. (discontinuous order)
- I will **read through** this article. (continuous order)

However, the continuous order is not permitted when the object is a non-stressed pronoun (Fraser, 1965, p. 133; Bolinger, 1971, as reviewed in Fraser, 1974, p. 571; Dehé, 2001, p. 168; Olson, 2013, p. 24; among others); compare (59b) with (59a).

- (59) a. I've already **figured out** the answer. (continuous order)  
 I've already **figured** the answer **out**. (discontinuous order)
- b. \*I've already **figured out** it. (\*continuous order)  
 I've already **figured** it **out**. (discontinuous order)

The discontinuous order is much less accepted when the object is a heavy noun phrase or when it has a greater syntactic complexity (Fraser, 1965, p. 134; Hunter & Prideaux, 1983, p. 11; Dehé, 2001, p. 168), as shown in (60).

- (60) a. I've already **figured out** the answer to this very difficult problem.  
(continuous order)
- b. ?I've already **figured** the answer to this very difficult problem **out**.  
(?discontinuous order)

In the presence of adverbials, Huddleston and Pullum (2002) highlight the potential of placing an adjunct, such as a manner adverb, before the directional or aspectual particle. Nonetheless, this possibility is greatly limited in the case of idiomatic VPCs, as shown through the examples provided by the scholars, (61). Meanwhile, they note that the V-Ptcl sequence generally inhibits the separation of the particle from the verb and that “the further the meaning is from that of a literal combination the less likely it is that such inversion will be acceptable” (p. 285).

- (61) a. She **climbed** *slowly up*.  
           \*She **gave** *slowly up*.  
       b. She **led** him *triumphantly out*.  
           \*She **knocked** him *triumphantly out*.



### ✧ *Contrasting English and German*

Up to this point, we see that VPCs in German and English exhibit great semantic and morphosyntactic similarities. Semantically, both languages have identical compositional and idiomatic VPCs. Syntactically speaking, two types of word order emerge: the *discontinuous order*, i.e., the verb and its particle are separated by another constituent (V-X-Ptcl), and the *continuous order*, i.e., the verb and the particle are not interrupted (V-Ptcl-X). Contrasts between English and German are observed under three circumstances: first, the particle's position to the direct object in transitive VPCs; second, when the object is a heavy, complex noun phrase; and third, adjunct assertion in intransitive VPCs.

In German grammar, the continuous word order is strictly prohibited when a direct object is present, whereas English permits both word orders. In English, the continuous word order becomes ungrammatical only when the object is a light-weighted pronoun. Therefore, a conclusion can be drawn: for every discontinuous VPC (V-DO-Ptcl) in English, there exists a grammatical counterpart in German with the same word order; on the contrary, all grammatical transitive VPCs arranged in continuous word order (V-Ptcl-DO) in English lack a grammatical structural counterpart in German, as exemplified in (62).

- (62) a. Eng. The gardener **cut the trees off.** (discontinuous, V-DO-Ptcl)  
Ger. Der Gärtner **fällte die Bäume ab.** (discontinuous, V-DO-Ptcl)
- b. Eng. The gardener **cut off the trees.** (continuous, V-Ptcl-DO)  
Ger. \*Der Gärtner **fällte ab die Bäume.** (\*continuous, V-Ptcl-DO)

English and German contrast each other when the object is heavy, as in (63a). Although German grammar avoids an extremely heavy object intervening between the verb and its particle, such an arrangement is still grammatically acceptable. English, on the contrary, prefers the continuous word order, which is not permitted by German syntax

for transitive VPCs. The two languages align with each other when the object is a pronoun, in this case, only the discontinuous word order is allowed, (63b).

- (63) a. Eng. The gardener **cut down** the dead apple trees in the garden of the duke. (V-Ptcl-DO)
- ?The gardener **cut** the dead apple trees in the garden of the duke **down**. (V-DO-Ptcl)
- Ger. \*Der Gärtner **fällte ab** die toten Apfelbäume im Garten des Herzogs. (\*V-Ptcl-DO)
- but: Der Gärtner **fiel** die toten Apfelbäume im Garten des Herzogs **ab**. (V-DO-Ptcl)
- b. Eng. The gardener **cut** them **down**. (V-DO<sub>PRON</sub>-Ptcl)
- \*The gardener **cut down** them. (V-Ptcl-DO<sub>PRON</sub>)
- Ger. Der Gärtner **fällte** sie **ab**. (V-DO<sub>PRON</sub>-Ptcl)
- \*Der Gärtner **fällte ab** sie. (\*V-Ptcl-DO<sub>PRON</sub>)

The second point of contrast pertains to the productivity of the discontinuous order regarding adverbial adjunct placement. While adverbials are consistently allowed to intervene between the verb and its particle in German, they canonically precede the verb or after the entire clause in English. Only very few types of adverbials may directly follow the verb in English.<sup>30</sup>

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<sup>30</sup> Adverbials that may intervene between the verb and its direct object in English will be further introduced in Section 4.4.4.2.

### 4.3.3 Verb-Particle Constructions in Chinese

The Chinese counterparts of VPCs are *resultative verbal compounds* (hereafter: RVCs). This section compares the construction, semantic features, and syntactic position of Chinese RVCs with those of VPCs in English and German.

The components of RVCs are very close to those of VPCs. It consists of a lexical verb and an “equivalent” to a particle, such as in 拿出 *ná-chū* (‘to take out’) and 放-入 *fang-rù* (‘to put inside’), with the first verb being the root and the second component giving additional information. This construction is important in Mandarin Chinese as it is widely used in both colloquial and written languages. According to the taxonomy of Li and Thompson (1981), RVCs can be further classified into four semantic categories: *cause RVCs*, *achievement RVCs*, *directional RVCs*,<sup>31</sup> and “*phase*” *RVCs*,<sup>32</sup> as shown in Table 4.

**Table 4:** *Semantic Categories of RVC in Chinese in Li and Thompson (1981)*

| <b><i>Cause RVCs</i></b>                  | <b><i>Achievement RVCs</i></b>                 |
|-------------------------------------------|------------------------------------------------|
| 打-破 <i>dǎ-pò</i> (‘to break’)             | 买-到 <i>mǎi-dào</i> (‘to manage to buy’)        |
| 打-开 <i>dǎ-kāi</i> (‘to open, to open up’) | 看-懂 <i>kàn-dǒng</i> (‘to read and understand’) |
| 关-上 <i>guān-shàng</i> (‘to close’)        | 弄-明白 <i>nòng-míngbái</i> (‘to figure out’)     |
|                                           | 说-清楚 <i>shuō-qīngchǔ</i> (‘to make clear’)     |
| <b><i>Directional RVCs</i></b>            | <b><i>“Phase” RVCs</i></b>                     |
| 取-出 <i>qǔ-chū</i> (‘to take out’)         | 关-掉 <i>guān-diào</i> (‘to turn off’)           |
| 送-来 <i>sòng-lái</i> (‘to bring over’)     | 用-光 <i>yòng-guāng</i> (‘to use up’)            |
| 放-下 <i>fàng-xià</i> (‘to put down’)       | 吃-完 <i>chī-wán</i> (‘to eat up’)               |
| 拖-出去 <i>tuō-chū-qù</i> (‘to drag out’)    | 写-好 <i>xiě-hǎo</i> (‘to finish writing’)       |
| 跳-过去 <i>tiào-guò-qù</i> (‘to jump over’)  |                                                |
| 带-进来 <i>dài-jìn-lái</i> (‘to bring in’)   |                                                |

<sup>31</sup> Some consider directional RVCs as a separate category of verbal compounds, such as Lu (1977) and Zou (1995).

<sup>32</sup> For a comprehensive discussion of semantic categories of RVCs in Mandarin Chinese, see Li and Thompson (1981, pp. 54–58).

In Chinese RVCs, the second component (equivalence to “particle”) is not restricted to being a preposition. It can be a verb denoting the direction, as in 送-来 *sòng-lái*, literally translated as ‘send-come’ and meaning ‘to bring over.’ It can also be an adjective, as in 说-清楚 *shuō-qīngchǔ* (lit. ‘say-clear’ > ‘to make clear’) and 想-明白 *xiǎng-míngbái* (lit. ‘think-clear’ > ‘to figure out’).

The second component of RVCs can be a compound of two particles. This occurs in the presence of two specific particles: 来 *lái* (‘to come’) and 去 *qù* (‘to go’), which are originally verbs. They can be combined with other particles suggesting direction,<sup>33</sup> as in 拖-出-去 *tuō-chū-qù* (lit. ‘drag-exit-go’ > ‘to drag out’) and 带-进-来 *dài-jìn-lái* (lit. ‘bring-enter-come’ > ‘to bring in’). Such a structure is frequently observed in directional RVCs, with the verb suggesting the displacement, the first particle showing the general direction, and the second particle indicating the direction of the motion concerning the speaker (Li & Thompson, 1981, p. 61; Zou, 1995, p. 254).

There exist semantical correspondences between RVCs in Chinese and VPCs in English and German. The directional RVCs share similarities with compositional VPCs featuring directional particles, while achievement and “phase” RVCs convey aspectual information, corresponding to the compositional VPCs with aspectual particles. However, idiomatic VPCs appear to have limited equivalence in Chinese.

Syntactically, what is of particular interest here is the word order in the presence of a direct object. First, Chinese stands out as distinct as it employs the *bǎ*-construction to form a transitive structure, where the direct object is marked by the coverb 把 *bǎ*. Sentences written in this construction follow an SOV word order, as shown in (64).

|      |    |                             |           |                |                       |
|------|----|-----------------------------|-----------|----------------|-----------------------|
| (64) | a. | <b>S</b>                    | <b>DO</b> | <b>V</b>       | <b>Ptcl</b>           |
|      |    | 安娜                          | 把         | 台灯             | 关 -掉了。                |
|      |    | Ān nà                       | <i>bǎ</i> | <u>táidēng</u> | <b>guān -diào</b> le. |
|      |    | Anna                        | PTCL.DO   | lamp           | close off PTCL.PFV    |
|      |    | ‘Anna turned off the lamp.’ |           |                |                       |

<sup>33</sup> For lists of directional particles in RVC, see Li and Thompson (1981, p. 59) or Ross and Ma (2014, p. 114).



- c.    **S**    **Adv**                      **V-Ptcl**                      **DO**
- 他    立马                      想-出            了            问题    的            答案。
- Tā    lǐmǎ                      xiǎng-chū    le            wèntí    de            dá'àn.
- he    immediately   figure-out   PTCL.PFV    question PTCL.GEN answer
- ‘He immediately figured out the question to the answer.’

While the continuous order is commonly used in Chinese, the productivity of the discontinuous word order is greatly restricted. It is employed only in RVCs with the directional particles 来 *lái* (‘to come’) and 去 *qù* (‘to go’) (Li & Thompson, 1981, pp. 62–63; Tang and Wang, 2000, p. 193). In the presence of these particles, there are two word orders to choose from: (i) V-DO-Ptcl-(Ptcl), as in (66a) and (66b), and (ii) V-Ptcl-DO-Ptcl, which occurs when the second particle is 来 *lái*, as in (66c).

- (66) a.    **S**    **V**                      **DO**                      **Ptcl**
- 她    拿            了            一    瓶    水            -来。
- Tā    ná            le            yì    píng    shuǐ            -lái.
- she    take    PTCL.PFV    one bottle water    come
- ‘She brought a bottle of water.
- 
- b.    **S**    **V**                      **DO**                      **Ptcl-Ptcl**
- 她    拿            了            一    瓶    水            -出-来。
- Tā    ná            le            yì    píng    shuǐ            -chū-lái.
- she    take    PTCL.PFV    one bottle water    out-come
- ‘She took out a bottle of water.
- 
- c.    **S**    **V-Ptcl**                      **DO**                      **Ptcl**
- 她    拿-出            了            一    瓶    水            -来。
- Tā    ná-chū            le            yì    píng    shuǐ            -lái.
- she    take-out    PTCL.PFV    one bottle water    come
- ‘She took out a bottle of water.

The discontinuous order is not permitted in other cases. As shown in (67), in instances with aspectual RVCs or directional RVCs without 来 *lái* and 去 *qù* as particles, the direct object must not intervene between the verb and its particle, (67). This forms a contrast with English and German.

- (67) a. \*她 拿 了 一 瓶 水 -出。  
           \*Tā ná le yì píng shuǐ -chū.  
           she take PTCL.PFV one bottle water out

cf. Eng. ‘She took a bottle of water out.’

- b. \*园丁 剪 了 一些 枯枝 -掉。  
      \*Yuándīng jiǎn le yìxiē kūzhī -diào.  
      gardener cut PTCL.PFV some dead branches off

cf. Eng. ‘The gardener cut some dead branches off.’

- c. \*他 立马 想 了 答案 -出。  
      \*Tā lì mǎ xiǎng le dá’àn -chū.  
      he immediately figure PTCL.PFV answer out

cf. Eng. ‘He has immediately figured the answer out.’

The word order in Chinese is closely tied to the specific particles used, rather than being influenced by the length of the direct object. For example, the sentence in (68) features a heavily weighted object and can be formed in both continuous and discontinuous orders without affecting the grammaticality. The possibility of using the discontinuous order here is afforded by the particle 来 *lái*. This characteristic contrasts the word order arrangement of Chinese RVCs with English.

(68) a. *Discontinuous order featuring a heavy direct object*

|     |             |           |          |       |           |      |          |           |
|-----|-------------|-----------|----------|-------|-----------|------|----------|-----------|
| 她   | 从           | 冰箱        | 里        | 拿     | 了         | 一    | 瓶        | 昨天        |
| Tā  | cóng        | bīngxiāng | lǐ       | ná    | le        | yì   | píng     | zuótiān   |
| she | from        | fridge    | inside   | take  | PTCL.PFV  | one  | bottle   | yesterday |
|     |             |           |          |       |           |      |          |           |
| 在   | 超市          | 买         | 的        | 水     | -出-来,     | 给    | 了        | 我。        |
| zài | chāoshì     | mǎi       | de       | shuǐ  | -chū-lái, | gěi  | le       | wǒ.       |
| at  | supermarket | buy       | PTCL.GEN | water | out-come  | give | PTCL.PFV | me        |

b. *Continuous order featuring a heavy direct object*

|     |             |           |          |       |          |          |        |           |
|-----|-------------|-----------|----------|-------|----------|----------|--------|-----------|
| 她   | 从           | 冰箱        | 里        | 拿     | -出-来     | 一        | 瓶      | 昨天        |
| Tā  | cóng        | bīngxiāng | lǐ       | ná    | -chū-lái | yì       | píng   | zuótiān   |
| she | from        | fridge    | inside   | take  | out-come | one      | bottle | yesterday |
|     |             |           |          |       |          |          |        |           |
| 在   | 超市          | 买         | 的        | 水,    | 给        | 了        | 我。     |           |
| zài | chāoshì     | mǎi       | de       | shuǐ, | gěi      | le       | wǒ.    |           |
| at  | supermarket | buy       | PTCL.GEN | water | give     | PTCL.PFV | me     |           |

cf. Eng. lit ‘She took out a bottle of yesterday at the supermarket bought water from the fridge (out) and gave it to me.’

> She took out a bottle of water from the fridge, which she bought at the supermarket yesterday.

When the direct object is a light-weighted pronoun, the discontinuous word order is not always permitted, even the RVC features the particle 来 *lái*. The grammaticality is related to the verb choice and should be analyzed individually; compare (69a) and (69b). Different from English and German, which exclusively permit the discontinuous word in this case, aspectual RVCs in Chinese do not allow for such an arrangement, (69c).

- (69) a. 我 现在 就 带 她 (-过)-来。  
 Wǒ xiànzài jiù dài tā (-guò)-lái.  
 I now right away take her (over)-come

cf. Eng. ‘I’m taking her here right now.’



- b. ?我 现在 去 拿 它 (-过)-来。  
 ?Wǒ xiànzài qù ná tā (-guò)-lái.  
 I now go take it (over)-come  
 cf. Eng. 'I'm bringing it over right now.'
- c. \*园丁 剪 它 -掉。  
 \*Yuándīng jiǎn tā -diào.  
 gardener cut it off  
 cf. Eng. 'The gardener cut it off.'

Grammaticality in (69b) requires the *bǎ*-construction, whereas (69c) allows either the continuous order S-V-Ptcl-DO or the *bǎ*-construction. To sum up, when the object is a light-weighted pronoun, the largest contrast between Chinese and English/German is the applicability of the discontinuous order.

#### ✧ *Contrasting Chinese with English and German*

Summarizing the grammar rules introduced above regarding VPCs, it becomes clear that in Chinese, the continuous word order is the most productive one, whereas the discontinuous variant is greatly restricted by the choice of the particle and the individual context of the sentence. A widely used construction is the *bǎ*-construction, where the direct object precedes the entire RVC. This pattern also reflects a continuous arrangement, as the particle immediately follows the verb.

In conclusion, when the object is not a pronoun, Chinese and German form a sharp contrast, as the latter strictly prohibits the continuous variant for transitive VPCs. It shares similarities with English in using the continuous word order.

#### 4.4 Placement of Adverbial Adjuncts in SV Clauses

The third scenario where notable contrasts between German, English, and Chinese are seen is how the languages place the adverbial adjuncts in clauses featuring the canonical SV order.

As highlighted at the beginning of Section 4.1, the middlefield is the main carrier of information in German declarative main clauses. When the subject occupies the forefield, other constituents, including complements (Ger. *Ergänzungen*) and adjuncts (Ger. *Angaben*) of various types, are placed in the middlefield after the finite verb. A question arises: when multiple constituents appear, which takes precedence, and which one comes last? This question is not unique to German and is also relevant to English and Chinese. Our initial focus is directed toward drawing the distinctions in the three languages in word order when placing two constituents at the post-verbal position of an SV clause with simple tenses.

The distinctive syntactic features of German clause fields significantly influence the positioning of each type of sentence element. Setting aside numerous idiosyncratic differences between the languages, we have identified four sub-scenarios where German, English, and Chinese exhibit notable contrasts (along with several similarities) in placing an adverbial adjunct in a simple SV main clause: (i) in sentences with a direct object, (ii) in the presence of an intransitive verb-particle construction, (iii) in the presence of a transitive verb-particle construction, and (iv) in sentences with a PP complement.

##### 4.4.1 Unifying Terms in German, English, and Chinese

As linguists for each language employ different terms to describe comparable items, it is necessary to unify the terminology before conducting the contrastive analysis. We will summarize the terms employed in the primary works used as references for the current study, rather than providing an exhaustive list of terms referred to for the same linguistic entity.

✧ *Correspondence in denoting the German “Objekt” across languages*

The first term requiring clarification is the *object complement* or *object* of the verb. In German, object complements fall into two main categories: *Kasusobjekt* (‘case object’) and *Adverbialobjekt* (‘adverbial object’), as noted by Engel (1970b, pp. 374–376; 1973, p. 174).

The former is further categorized into *Akkusativobjekt* (‘accusative object’) and *Dativobjekt* (‘dative object’). In this study, these correspond to the *direct object* and *indirect object* in English, and 直接宾语 *zhíjiē bīnyǔ* (‘direct object’) and 间接宾语 *jiànjiē bīnyǔ* (‘indirect object’) in Chinese, respectively.

Based on semantic criteria, *Adverbialobjekte*<sup>34</sup> are further classified as *Situativobjekt* (‘situational object’) and *Direktivobjekt* (‘directional object’). Both these subcategories correspond to *adverbial complements* in English grammar, as in (70). In Chinese, *adverbial complements/Adverbialobjekte* are referred to as 趋向补语 *qūxiàng bǔyǔ* (‘complement of direction’) and 时地补语 *shí-dì bǔyǔ* (‘complement of time and location’). The concepts of “object” and “adverbial complement” are separately treated (Huang & Liao, 2007, pp. 71, 73–74).

| (70) | a.   | S      | V     | AdvCOMP (situational, PP) |
|------|------|--------|-------|---------------------------|
|      | Ger. | Hans   | wohnt | in Berlin.                |
|      | Eng. | Hans   | lives | in Berlin.                |
|      | Chn. | 汉斯     | 住     | 在柏林。                      |
|      |      | Hàn sī | zhù   | zài Bólín.                |

<sup>34</sup> In reference works for German grammar, other terms used to denote the concept of “*Adverbialobjekte*” include *directional complement* and *situational complement* (‘*Direktivergänzung*’ and ‘*Situativergänzung*’, Engel, 1972, p. 19), *object of direction* (‘*Richtungsobjekt*’, Engel, 1971, pp. 152, 195; 1972, p. 177), *prepositional adverbial* (‘*präpositionale Adverbiale*’, Eisenberg, 2020a, p. 326), and *situational complement* (‘*Situativkomplement*’, Zifonun et al., 1997, pp. 1075–1076). These lay a focus on the formal representation, semantic function, or syntactic function. Engel’s categorization of adverbial complement into the rubric of “object” stands out as distinct. See Engel (1994, pp. 149–150) for a comparison of terminology used in the most influential grammar reference works regarding the topic.

|      |        |              |                                       |
|------|--------|--------------|---------------------------------------|
| b.   | S      | V            | Adv <sub>COMP</sub> (directional, PP) |
| Ger. | Hans   | fährt        | nach Berlin.                          |
| Eng. | Hans   | drives       | to Berlin.                            |
| Chn. | 汉斯     | 开车           | 去 柏林。                                 |
|      | Hàn sī | kāichē       | qù Bólin.                             |
| c.   | S      | V            | Adv <sub>COMP</sub> (AdvP)            |
| Ger. | Hans   | wohnt/fährt  | dort/dorthin.                         |
| Eng. | Hans   | lives/drives | there.                                |
| Chn. | 汉斯     | 住/开车         | 在/去那里。                                |
|      | Hàn sī | zhù/kāichē   | zài/qù nàlǐ.                          |

➤ ***The term “PP complement” in the current study***

The term *PP complement* in our study refers to *prepositional adverbial complement* and *prepositional object*.

As shown in (70a) and (70b), when an adverbial complement is introduced by a preposition, it takes the form of a PP complement, referred to as a *prepositional adverbial complement*. In both German and English, the PP can be replaced by an adverb or an adverbial phrase, as in (70c). In this case, a mismatch between Chinese and German/English emerges, as Chinese typically employs a *coverb*, functioning akin to a preposition. In the above example, the coverb 在 *zài* (‘in/at’) and 去 *qù* (‘to/toward’) respectively show the location and direction. The adverbial complements in (70c) for Chinese hence maintain the form of a prepositional adverbial complement.

A second type of PP complement involved in this study is the *prepositional object*,<sup>35</sup> as shown in (71), wherein the object immediately follows the preposition.

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<sup>35</sup> In German grammar, different terms are used to denote the concept of *prepositional object*. Engel (1972) uses the term *prepositional complement* (‘*Präpositionalergänzung*’, p. 19). Eisenberg (2020a) uses the same term as in English (‘*Präpositionalobjekt*’, p. 326). Zifonun et al. (1997) employ the term *prepositional complement* (‘*Präpositivkomplement*’, p. 1075), which focuses more on syntactic realization and should be differentiated from the term *situational complement* (‘*Situativkomplement*’) for denoting adverbial complement.

Such a construction is sometimes referred to as a *prepositional verb* (e.g., Biber et al, 1999). The form is also found in Chinese grammar.

|      |           |       |                   |
|------|-----------|-------|-------------------|
| (71) | S         | V     | O <sub>PREP</sub> |
|      | Ger. Hans | denkt | an Anna.          |
|      | Eng. Hans | think | of Anna.          |
|      | Chn. 汉斯   | 想     | 起 安娜。             |
|      | Hàn sī    | xiǎng | qǐ Ān nà.         |

A prepositional object differs from a prepositional adverbial complement mainly in that the preposition is determined by the verb and usually does not carry a meaning (Engel, 1970a, p. 110). In phrases, *an ... denken* in German, *think about ...* in English, and 想起... (*xiǎng qǐ...*) in Chinese, changing the preposition may alter the meaning or change the grammaticality of the phrase. It is important to note that a one-to-one word match for prepositional verbs does not always exist across the three languages. For example, the concept of “thinking of someone” is represented in German, English, and Chinese through a V-PP structure, whereas that of “searching for something” is conveyed in German and Chinese using transitive verbs (Ger. *suchen*; Chn. 寻找 *xúnzhǎo*) instead of a prepositional object.

In this study, we focus on the syntactic form of the constituent and hereafter refer to both *prepositional adverbial complement* and *prepositional object* as *PP complement*.

#### ✧ *Adverbial adjuncts and adverbial complements*

Another necessity is to distinguish concepts of *adverbial complement* and *adverbial adjunct*. One conventional way to differentiate them is that the former is obligatory, and the latter is optional (e.g., Quirk et al., 1985, p. 505; Huddleston & Pullum 2002, p. 680). An adverbial complement is required by the verb to make it grammatically acceptable and to complete the clause without changing the meaning of the verb, whereas an adverbial adjunct is relatively peripheral since its presence does not affect the grammaticality of the clause (Hasselgård, 2010, p. 46). If omitting the complement,

the meaning of the verb will be changed, (72a), or the sentence turns ungrammatical, (72b); compare (72a) and (72b) with (72c).

- (72) a. Anna lives *in Hamburg*. (complement)  
           Anna lives.
- b. Anna is *in Hamburg*. (complement)  
           \*Anna is.
- c. Anna leaves *for Hamburg*. (adjunct)  
           Anna leaves.

Nevertheless, the difference between the two concepts cannot solely be attributed to the distinction between “necessity” and “optionality.” In some cases, the adverbial can be omitted without affecting the grammaticality of the sentence or the meaning of the verb (Engel, 1970a, p. 114; 1973, p. 174); consider the sentence *I drive to the beach*. In German grammar, such adverbials are explicitly defined as complements (e.g., *Richtungsobjekt* ‘object of direction’ in Engel, 1971, 1972).

Terminology in English grammar also does not exhibit absolute consensus. Some explicitly define adverbials such as in *Here lots of people go to the beach every weekend* as *complements* (e.g., Buysschaert, 1987, p. 104; Huddleston & Pullum, 2002, p. 682). Some employ other terms to denote it: Quirk et al. (1985) use the term *obligatory adjunct* (p. 505); Biber et al. (1999) mention the difference between *obligatory adverbials* and *optional adverbials* (pp. 151, 763, 812); Somers (1984) delineates between *obligatory complements*, *optional complements*, and *(always optional) adjuncts*. Huddleson and Pullum (2002) explicitly point out that there is “a parallel between complements and obligatory adverbials” (p. 55).

To mitigate terminological ambiguity, the term *adverbial* in this section exclusively refers to the concept of *optional adverbial adjunct* and does not encompass any obligatory adverbial complements such as those in (70). It denotes constituents that provide additional information to the sentence and can be omitted without affecting the

grammatical correctness or changing the meaning of the verb and is interchangeably used with *adverbial adjunct*. The corresponding terms in German and Chinese are, respectively, *Angaben* and 状语 *zhuàngyǔ*.

#### ✧ *Coverbs and coverb phrases in Chinese*

Chinese employs the term *coverb phrase* to describe constructions resembling prepositional phrases in English and German. Some scholars may alternatively refer to these constructions as “prepositional phrases” (介词短语 *jiècí duǎnyǔ*) (e.g., Huang & Liao, 2007; Ross & Ma, 2014), as their morphosyntactic and semantic features parallel with the familiar prepositional phrases.<sup>36</sup> Li and Thompson (1981, pp. 356–360) define coverb as a class of morphemes which includes words such as 跟 *gēn* (‘with’), 从 *cóng* (‘from’), 朝 *cháo* (‘facing’), as well as forms integral to specific grammatical constructions, such as 在 *zài* (‘at’), a marker for locative constructions, and 给 *gěi* (‘to/for’), a marker for benefactive and indirect object constructions.

Like a preposition, a coverb introduces a noun phrase. It forms a coverb phrase that generally precedes the main verb and follows the subject but can also occupy other clausal positions. Coverb phrases exhibit striking similarities to the prepositional phrases in English and German not only in their form but also in their function: they modify or add meaning to the predicates (Huang & Liao, 2007, p. 28). In examples (73a) and (73b), the coverb phrases act as the adverbial adjuncts of the sentences, and the one in (73c) functions as a prepositional adverbial complement.

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<sup>36</sup> Coverbs in Chinese are essentially prepositions. They are not labeled as prepositions because “the class of coverbs contains words that are partly like verbs and partly like prepositions,” with “some of them ... more like verbs, and some ... more like prepositions” (Li & Thompson, 1981, p. 360). For example, the coverb 跟 *gēn* (‘with’) can also be used as a verb, meaning ‘to follow’; however, the coverb 和 *hé* (‘with’) does not function as a verb.

- (73) a. 安娜 和 她 同学 聊天。  
 Ān nà hé tā tóngxué liáotiān.  
 Anna with her classmate chat  
 ‘Anna chats with her classmate.’
- b. 安娜 在 书店 看书。  
 Ān nà zài shūdiàn kànshū.  
 Anna at bookstore read book  
 ‘Anna is reading at the bookstore.’
- c. 安娜 从 德国 来。  
 Ān nà cóng déguó lái.  
 Anna from Germany come  
 ‘Anna comes from Germany.’

For clarity in contrasting the three languages, the unified term *prepositional phrase* (PP) is employed to refer to Chinese coverb phrases in the current study.

In examining the linearization of the direct objects, indirect objects, PP complements, and adverbial adjuncts in German, English, and Chinese, the placement of adverbial adjuncts emerges as the most flexible. Nevertheless, its relative positioning to the complement varies across languages. In the following, we expound upon the major contrasts in German, English, and Chinese in the placement of the adverbial in non-clause-initial positions<sup>37</sup> within a simple main clause, elucidating the four sub-scenarios listed at the beginning of this section. We will not discuss the clause-initial placement of the adverbial, as this position leads to subject-verb inversion in German, as already discussed in Section 4.2.3.

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<sup>37</sup> For word order contrasts when an adverbial occupies the initial position, please see Section 4.2: Inversion.



## 4.4.2 Adverbial Placement in V-DO Construction

### 4.4.2.1 German

While the position of verbs and conjunctions in German is strictly fixed, the word order possibilities within the middlefield are rather opaque (Höhle, 2018, p. 107). It is often challenging to draw a definitive conclusion of word order rules, as elements in the middlefield offer more flexibility. However, this flexibility is not unrestricted; rather, it is constrained by factors such as, among others, communicative dynamism/information structure (*theme-rheme*, Lenerz, 1977, p. 86), syntactic-semantic structure (Engel, 1970a, p. 45; 1972, pp. 51–52), markedness and emphasis (Engel, 1972, p. 56; Eisenberg, 2020a, p. 237), length of constituents (Behaghel, 1930, p. 31).

A frequently discussed topic is the concept of *Normalabfolge* (lit. ‘normal sequence’, hereafter: basic word order), which contrasts with the non-canonical position or marked placement of certain sentence elements. It should be noted that some word orders may be impossible under a “normal” reading but become feasible under a “contrastive” or “emphatic” reading (Höhle, 2018, p. 108). In the following, we focus on the basic word order in linearizing elements in the German middlefield and some tendencies in facilitating a word order alternation.

**Table 5:** *Basic Word Order in German Middlefield by Engel (1970)*

| O <sub>PRON</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Adv (type III 1~3)<br>O <sub>DEF</sub> | Adv (type II)<br>Adv (type I) | Adv (type III<br>4~10) | Adv (type IV) | O <sub>IND</sub> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------|------------------------|---------------|------------------|
| <b>Adverbial type I:</b> 1. <i>causal/conditional/consecutive</i> ; 2. <i>temporal</i> ; 3. <i>locative</i> ; 4. <i>instrumental/finality</i> ; 5. <i>comitative</i> ; 6. <i>evaluative/attitudinal</i> ; 7. <i>frequency</i> ( <i>immer, wieder, manchmal...</i> )<br><b>Adverbial type II:</b> <i>wahrscheinlich, wirklich</i><br><b>Adverbial type III:</b> 1. <i>den, ja</i> ; 2. <i>aber, also, doch</i> ; 3. <i>eben, nur, nicht, wohl</i> ; 4. <i>sogar</i> ; 5. <i>doch, schon</i> ; 6. <i>auch</i> ; 7. <i>nur</i> ; 8. <i>nicht</i> ; 9. <i>schnell</i> ; 10. <i>so</i><br><b>Adverbial type IV:</b> <i>manner adverbial</i> ( <i>‘freie Comparabilia’</i> ) |                                        |                               |                        |               |                  |

(adapted from Engel, 1970a, pp. 45, 48–55; 1970b, p. 116)

In his work *Regeln zur Wortstellung* (1970a), Engels summarizes the basic word order of different types of complements and adverbials, adapted as in Table 5. The adverbial adjunct (type I, II, IV) canonically follows the definite nominal object and precedes the indefinite one,<sup>38</sup> respectively presented in (74) and (75).

(74) *Adverbial following a definite DO*

|    | FOREFIELD                                  | V2        | MIDDLEFIELD       |                          | type of<br>adverbial |
|----|--------------------------------------------|-----------|-------------------|--------------------------|----------------------|
|    |                                            |           | DO <sub>DEF</sub> | > Adv                    |                      |
| a. | Felix                                      | spielt    | <u>das cello</u>  | <i>laut.</i>             | <i>manner</i>        |
|    | Felix                                      | plays     | the cello         | loudly.                  |                      |
|    | 'Felix is playing the cello loudly.'       |           |                   |                          |                      |
| b. | Ich                                        | lese      | <u>das Buch</u>   | <i>in der Schule.</i>    | <i>locative</i>      |
|    | I                                          | read      | the book          | in the school.           |                      |
|    | 'I read the book in the school.'           |           |                   |                          |                      |
| c. | Er                                         | schneidet | <u>das Karton</u> | <i>mit Schere.</i>       | <i>instrumental</i>  |
|    | he                                         | cuts      | the carton        | with scissors.           |                      |
|    | 'He is cutting the carton with scissors.'  |           |                   |                          |                      |
| d. | Sie                                        | guckt     | <u>den Film</u>   | <i>mit ihrer Tocher.</i> | <i>comitative</i>    |
|    | she                                        | watches   | the movie         | with her daughter.       |                      |
|    | 'She watches the movie with her daughter.' |           |                   |                          |                      |

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<sup>38</sup> Other grammatic works do not consider the role of definiteness of the direct object. In Lenerz's (1977) review of literature, he notes that the widely recognized unmarked linear order is *temporal adverbial* > *indirect object* > *direct object* > *locative adverbial* > *prepositional object* (p. 85). Similarly, in *Grundzüge einer deutschen Grammatik* in Heidolph et al. (1984), adverbials, except for those denoting direction, precede the objects; however, the discussion of word order in the middlefield did not include the definiteness (p. 704).

(75) *Adverbial preceding an indefinite DO*

|    | FOREFIELD                       | V2    | MIDDLEFIELD           |   |                     | <i>type of<br/>adverbial</i> |
|----|---------------------------------|-------|-----------------------|---|---------------------|------------------------------|
|    |                                 |       | DO <sub>IND</sub>     | > | Adv                 |                              |
| a. | Er                              | singt | <i>laut</i>           |   | <u>ein Lied</u> .   | <i>manner</i>                |
|    | he                              | sings | loudly                |   | a song.             |                              |
|    | 'He is singing a song loudly.'  |       |                       |   |                     |                              |
| b. | Andrea                          | backt | <i>zu Hause</i>       |   | <u>Kuchen</u> .     | <i>locative</i>              |
|    | Andrea                          | reads | at home               |   | cakes.              |                              |
|    | 'Andrea bakes cakes at home.'   |       |                       |   |                     |                              |
| c. | Sie                             | hasst | <i>wahrscheinlich</i> |   | <u>Schnecken</u> .  | <i>evaluative</i>            |
|    | she                             | hates | probably              |   | snails              |                              |
|    | 'She probably hates snails.'    |       |                       |   |                     |                              |
| d. | Henry                           | macht | <i>mit Anne</i>       |   | <u>eine Reise</u> . | <i>comitative</i>            |
|    | Henry                           | makes | with Anne             |   | a trip              |                              |
|    | 'Henry takes a trip with Anne.' |       |                       |   |                     |                              |

Yet the position of the object and the adverbial is also related to the semantic type of the adverbial. In his early work, Engel (1970b) first noted that type I adverbial adjuncts, which he termed *situative Adverbialia/Angaben*,<sup>39</sup> may move to other positions within the middlefield, for example, to the left of the definite object (p. 116). In his later publication, *Syntax der deutschen Gegenwartssprache*, Engel (1994) introduced modifications to this earlier formulation. He pointed out that when complements and adjuncts were simultaneously present, situational and attitudinal adjuncts more or less

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<sup>39</sup> In Engel's taxonomy of adverbial adjuncts, the term *situative Adverbialia/Angaben* ('situational adjuncts') serves as the overarching category including temporal, local, comitative, restrictive, and instrumental adverbials (1994, pp. 174–178). The term *existimatorische Angaben* ('attitudinal adjuncts') encompasses adverbials denoting cause, attitude, evaluation, sequential expressions, etc.

had the same position as the definite complements and that modificative adjuncts (typically manner adverbials) might follow the indefinite complements; in principle, they preceded other types of complements (p. 190). These are exemplified in (76) and (77).

(76) *Situational adverbial preceding a definite DO*

| a. | FOREFIELD | V2   | MIDDLEFIELD    |                  | VF       | <i>type of<br/>adverbial</i> |
|----|-----------|------|----------------|------------------|----------|------------------------------|
|    | Ich       | habe | <i>gestern</i> | <i>dein Buch</i> | gelesen. | <i>temporal</i>              |
|    | I         | have | yesterday      | your book        | read     |                              |

(adapted from Engel, 1970b, p. 116)

|    |                  |           |                     |                         |  |                  |
|----|------------------|-----------|---------------------|-------------------------|--|------------------|
| b. | <b>FOREFIELD</b> | <b>V2</b> | <b>MIDDLEFIELD</b>  |                         |  |                  |
|    | Er               | gießt     | <i>jeden Morgen</i> | <u>die Hortensien</u> . |  | <i>frequency</i> |
|    | he               | waters    | every morning       | the hydrangeas          |  |                  |

(77) *Modificative adverbial following an indefinite DO*

| FOREFIELD | V2  | MIDDLEFIELD     |                   | VF            | <i>type of<br/>adverbial</i> |
|-----------|-----|-----------------|-------------------|---------------|------------------------------|
| Alicia    | hat | <u>ein Huhn</u> | <i>vorsichtig</i> | gestreichelt. | <i>manner</i>                |
| Alicia    | has | a chicken       | carefully         | stroked       |                              |

‘Alicia carefully stroked a chicken.’ (Eckardt, 2003, as cited in Schäfer, 2019, p. 278)

While the basic word order is typically governed by the syntactic-semantic characteristics of clause constituents (Hoberg, 1977, p. 14), word order variations are not uncommon. These variations are influenced by several linguistic tendencies, among which one well-recognized principle is the placement of the theme before the rheme (old information before new information). For example, Lenerz (1977) discussed instances where a locative adverbial preceded a definite direct object, serving as the focal point (rheme) of the sentence (p. 86), as shown in (78).

(78) *Was hast du in Berlin gekauft?* ('What did you buy in Berlin?')

| FOREFIELD                       | V2   | MIDDLEFIELD      | VF                          |
|---------------------------------|------|------------------|-----------------------------|
| Ich                             | habe | <i>in Berlin</i> | <u>dieses Buch</u> gekauft. |
| I                               | have | in Berlin        | this book bought            |
| 'I bought this book in Berlin.' |      |                  | (Lenerz, 1977, p. 86)       |

This observation is coupled with another tendency wherein more important and emphasized information is positioned further from the finite verb and toward the end-position of the middlefield (Engel, 1968, p. 87; 1971, p. 198; Eisenberg, 2020a, p. 415). In (79a), moving the temporal adverb to the rightmost position indicates an emphasized reading, signaling that the visit is specifically for today, not for tomorrow or any other day, as opposed to the unmarked order in (79b).

- (79) a. 

| FOREFIELD                        | V2      | MIDDLEFIELD                    |
|----------------------------------|---------|--------------------------------|
| Ich                              | besuche | <u>meine Großeltern</u> heute. |
| I                                | visit   | my grandparents today          |
| 'I visit my grandparents TODAY.' |         |                                |
- b. 

| FOREFIELD                                   | V2      | MIDDLEFIELD                     |
|---------------------------------------------|---------|---------------------------------|
| Ich                                         | besuche | heute <u>meine Großeltern</u> . |
| I                                           | visit   | today my grandparents           |
| 'I'm going to visit my grandparents today.' |         |                                 |

Lastly, we would like to outline the basic positions of various semantic categories of adverbials summarized in the literature: a manner adverb typically precedes the direct object when the context necessitates an event interpretation, while it follows the object for a process interpretation or manner-reading (Schäfer, 2019, pp. 273–274; see Pittner, 2004, pp. 260–264 for discussion). Instrumental or comitative adverbials are conventionally placed to the left of the object (Pittner, 2004, p. 264). While temporal

adverbials usually precede the direct object in canonical form, locative adverbials often follow it (Lenerz, 1977, p. 85).

Despite these principles and tendencies that may influence the basic word order, leading to varied interpretations and nuances in sentence accent, from a purely syntactic standpoint, two prevailing orders emerge in German grammar: S-V-Adv-DO and S-V-DO-Adv. The former stands in stark contrast to English grammar, where an adverbial is disallowed to appear between the verb and its direct object in most cases, elaborated in the following section.

#### 4.4.2.2 English

In English, the *Principle of Elegance* favors the placement of adverbs before the main verb rather than between the verb and its object, as noted by Follett (1966) in the *Modern American Usage: A Guide*: “In English, the adverb should come before the verb whenever possible” (p. 54). In most cases, placing an adverbial between the verb and its direct object will lead to either grammatically unacceptable instances, as in (80a) to (80e), or uncanonical, marked expressions, as in (80f).

- (80) a. \*Helga reads *always* / *once a week* The Times. (frequency adverbial)  
 b. \*The man plays *slowly* / *beautifully* the piano. (manner adverbials)  
 c. \*She watches *in the evening* / *on Sunday* films. (temporal adverbial)  
 d. \*Andrea bakes *at home* / *in the kitchen* cakes. (locative adverbial)  
 e. \*Helen hates *maybe* / *perhaps* rats. (adverbial of probability)  
 f. \*\*Helen hates *probably* rats. (focusing adverb)

In English, placement of an adverbial between the verb and a light direct object is permitted in only two circumstances, both licensing only a narrow set of adverbs. The first, noted by Cinque (1999), involves the use of “focusing adverbs,” such as *probably*, *even*, and *only* (pp. 30–31); the second, per Huddleston and Pullum (2002, p. 587), involves certain “restrictive modifiers,” such as *only*, *mainly*, and *just*. Examples are

shown in (81) and (82).

(81) *Focusing adverbs*

- a. He hates *probably* everybody.
- b. He has drunk already seven beers.

\*He forgot *often* his name.

(Cinque, 1999, p. 31)

(82) *Restrictive modifiers*

- a. He found *only/just* one mistake.
- b. He *only/just* found one mistake.

Irrelevant to the presence of the direct object, but pertinent to the study is the possibility of the S-Adv-V-DO (V3) word order. While the simultaneous occurrence of the subject and adverbial in the forefield is strictly prohibited in German, such a placement is not uncommon in English. Short adverbs denoting frequency, manner, extent, and degree, as well as many stance adverbials specifying probability and attitude, may directly precede the main verb (Biber et al., 1999, pp. 772, 872; 2021, p. 798), as in (83).

(83) a. Helga *always/sometimes/never* reads The Times.

b. He *probably/\*maybe* likes her.

c. Lydia *quickly/reluctantly* baked a cake and brought it to Mary.

Note that the position of adverbials is related not only to the semantic category but also to the syntactic realization.<sup>40</sup> The length of the adverbial, for instance, plays a significant role. The realization of a single word or phrase containing more words may have a bearing on the positional flexibility of the adverbial (Hasselgård, 2010, p. 37). In general, the weight principle disallows heavy elements to intervene between the

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<sup>40</sup> See Biber et al. (1999/2021, §10) for corpus findings about frequencies of positions of adverbials.

subject and verb in VO languages (Ernst, 2001, p. 20). Longer AdvPs denoting frequency and manner thus move to the sentence-final, as in (83a') and (83b').

(83) a'. \*Helga *once a week* reads *The Times*.

but: Helga reads *The Times* *once a week*.

b'. \*Lydia *with great efficiency* baked a cake.

but: Lydia baked a cake *with great efficiency*.

Furthermore, the placement of adverbials in English is closely linked to their semantic categories and should be examined individually. While frequency adverbs often find their place immediately before the verb (Hasselgård, 2010, p. 36), placing instrument, and locative adverbs<sup>41</sup> between the subject and verb is uncommon (Biber et al., 1999, p. 802), as in (85).

(85) a. \*Jan *with a knife* opened the can.

b. \*Hermann *there* witnessed the crime.

Up to this point, we have observed a sharp contrast in the placement of adverbial within transitive constructions between English and German. The most significant distinction is that German allows the adverbial to be positioned between the subject and the direct object, a flexibility that is notably restricted in English. Additionally, English permits certain classes of adverbs to precede the verb, but such a word order is prohibited in German.

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<sup>41</sup> See Quirk et al. (1985, pp. 490–500) for an extensive discussion of the position of adverbs.



#### 4.4.2.3 Chinese

In Chinese, adverbials in SVO clauses can appear in three positions: at the clause-initial (Adv-S-V-DO), between the subject and the main verb (S-Adv-V-DO, pre-verbal position), and clause-final (S-DO-V-Adv). The second option is the most widely applicable and employed one. In the current section, we focus on two positions: the pre-verbal position and the clause-final position. The former leads to the V3 position and the latter to V2.

Adverbials, including adverbs and AdvPs of more than one word, typically occur after the subject (or the topic) and before the main verb (Li & Thompson, 1981, pp. 319, 409; Huang & Liao, 2007, p. 68; Ross & Ma, 2014, pp. 18–19, 68). As exemplified in (86), Chinese grammar supports a wide scope of semantical categories of adverbials to be placed pre-verbally, including but not limited to temporal, locative, manner, probability, comitative, and restrictive adverbials.

| (86) | S                                              | Adv            | V    | DO               | <i>type of<br/>adverbial</i> |
|------|------------------------------------------------|----------------|------|------------------|------------------------------|
| a.   | 赫尔加                                            | 慢慢地            | 读    | 泰晤士报。            | <i>manner</i>                |
|      | Hè'ěrxīa                                       | mànmànde       | dú   | Tàiwùshì Bào.    |                              |
|      | Helga                                          | slowly         | read | <i>The Times</i> |                              |
|      | 'Helga reads <i>The Times</i> slowly.'         |                |      |                  |                              |
| b.   | 赫尔加                                            | 可能             | 读    | 泰晤士报。            | <i>probability</i>           |
|      | Hè'ěrxīa                                       | kěnéng         | dú   | Tàiwùshì Bào.    |                              |
|      | Helga                                          | probably       | read | <i>The Times</i> |                              |
|      | 'Helga probably reads <i>The Times</i> .'      |                |      |                  |                              |
| c.   | 赫尔加                                            | 晚上             | 读    | 泰晤士报。            | <i>temporal</i>              |
|      | Hè'ěrxīa                                       | wǎnshàng       | dú   | Tàiwùshì Bào.    |                              |
|      | Helga                                          | in the evening | read | <i>The Times</i> |                              |
|      | 'Helga reads <i>The Times</i> in the evening.' |                |      |                  |                              |

| (86) | S                                                                 | Adv                              | V    | DO               | <i>type of adverbial</i> |
|------|-------------------------------------------------------------------|----------------------------------|------|------------------|--------------------------|
| d.   | 赫尔加                                                               | 在 外面                             | 读    | 泰晤士报。            | <i>locative</i>          |
|      | Hè'ěrxīa                                                          | zài wàimian                      | dú   | Tàiwùshì Bào.    |                          |
|      | Helga                                                             | outside                          | read | <i>The Times</i> |                          |
|      | 'Helga reads <i>The Times</i> outside.'                           |                                  |      |                  |                          |
| e.   | 赫尔加                                                               | 和 弟弟 一起                          | 读    | 泰晤士报。            | <i>comitative</i>        |
|      | Hè'ěrxīa                                                          | hé dìdì yìqǐ                     | dú   | Tàiwùshì Bào.    |                          |
|      | Helga                                                             | together with<br>younger brother | read | <i>The Times</i> |                          |
|      | 'Helga reads <i>The Times</i> together with her younger brother.' |                                  |      |                  |                          |
| f.   | 赫尔加                                                               | 只                                | 读    | 泰晤士报。            | <i>restrictive</i>       |
|      | Hè'ěrxīa                                                          | zhǐ                              | dú   | Tàiwùshì Bào.    |                          |
|      | Helga                                                             | only                             | read | <i>The Times</i> |                          |
|      | 'Helga only reads (only) <i>The Times</i> .'                      |                                  |      |                  |                          |

These adverbials are exclusively pre-verbal. They should neither be placed at the clause-final position nor between the verb and the direct object, even if they have a restrictive or focusing function like in the English sentence *Helga reads only The Times*. Heavy adverbials or adverbial clusters can always be placed per-verbally in Chinese, as in (87).

|      |          |               |             |                |              |         |
|------|----------|---------------|-------------|----------------|--------------|---------|
| (87) | 我        | 今天            | 在 学校        | 和 同学           | 成功地          | 表演      |
|      | Wǒ       | jīntiān       | zài xuéxiào | hé tóngxué     | chénggōngde  | biǎoyǎn |
|      | I        | today         | at school   | with classmate | successfully | perform |
|      | 了        | 一 出 话剧。       |             |                |              |         |
|      | le       | yì chū huàjù. |             |                |              |         |
|      | PTCL.PFV | one CL        | play        |                |              |         |

'Today, I successfully performed a play with my classmates at school.'

While most adverbials in Chinese appear either at the clause's initial or after the topic or subject, a few may occur after the verb (Li & Thompson, 1981, p. 320). The post-verbal placement of adverbial occurs in two circumstances. First, degree and manner adverbials, introduced by the complement marker 得 *de*, may appear at the clause's final, following the structure of S-DO-V-de-AdjP.

In this structure, the direct object becomes the topic and must be relocated immediately after the subject and before the verb. In Chinese, the particle 得 *de* serves as a marker for degree/modal complement (Tang & Wang, 2000, p. 226; Huang & Liao, 2007, p. 71), yet the *de* + *AdjP* phrase operates similarly to an adverbial adjunct in English and German, as in (88). The word order of S-DO-V-de-AdjP finds no full structural counterpart in either German or English.

- (88)
- |    | S                                       | DO           | V     | de   | AdjP                |
|----|-----------------------------------------|--------------|-------|------|---------------------|
| a. | 他                                       | <u>作业</u>    | 写     | 得    | 很 认真。               |
|    | Tā                                      | <u>zuòyè</u> | xiě   | de   | <i>hěn rènzhēn.</i> |
|    | he                                      | homework     | write | PTCL | very attentional    |
|    | 'He does homework with full attention.' |              |       |      |                     |
| b. | 他                                       | <u>游戏</u>    | 打     | 得    | 很 频繁。               |
|    | Tā                                      | <u>yóuxì</u> | dǎ    | de   | <i>hěn rènzhēn.</i> |
|    | he                                      | video game   | play  | PTCL | very frequent       |
|    | 'He plays video games very frequently.' |              |       |      |                     |

The other circumstance where the adverbial occupies the post-verbal position is the occurrence of a *quantity adverbial phrases*,<sup>42</sup> signifying frequency or duration (Li & Thomson, 1981, pp. 352–353; Ross & Ma, 2014, p. 19), as shown in (89). However, the quantity AdvP in (89a) behaves rather as an attribute or a quantifier of the direct

<sup>42</sup> In Chinese, a quantity adverbial phrase consists of a number, a classifier (if needed), and a noun, refer to Li & Thompson (1981, p. 352) for more examples.

object 电影 *diànyǐng* ('movie') than a durative adverbial, interpreted as 'one hour of movie.' It should be noted that Chinese does not find a structural counterpart for frequency AdvPs like *twice a week* or *once a month* as in English. The S-V-Adv-DO word order in (89a) does not apply to situations described in (89b). For such expressions, Chinese uses two separate adverbials, and the S-V-Adv-DO structure will lead to illogic; compare (89b') with (89a) and (89b). Moreover, unlike English, placing the entire frequency AdvP 每周两次 *měizhōu liǎngcì* at the clause-final position in this case will lead to ungrammaticality, (89c).

- (89) a. 他 已经 看 了 一 小时 电影。  
 Tā yǐjīng kàn le yì xiǎoshí diànyǐng.  
 he already watch PTCL.PFV one hour movie  
 'He has already watched one hour of movies.'

- b. 她 每周 看望 爷爷 两次。  
 Tā *měizhōu* kànwàng yéye *liǎngcì*.  
 she every week visit grandpa twice  
 'Every week, she visits her grandpa two times.'

- b'. \*她 看望 每周 两次 爷爷。  
 \*Tā kànwàng *měizhōu liǎngcì* yéye.  
 she visit every week twice grandpa  
 lit. ?'She visits twice of her grandpa per week.'

- c. \*她 看望 爷爷 每周 两次。  
 \*Tā kànwàng yéye *měizhōu liǎngcì*.  
 she visit grandpa every week twice

cf. Eng. 'She visits her grandpa **twice a week**.'

In examining adverbial placement in a clause with a direct object, Chinese exhibits distinct word order arrangements from German and English. The canonical S-Adv-V-

DO sequence in Chinese finds no structural equivalence in German, as the latter prohibits the V3 position in an SV clause. The commonly used S-V-Adv-DO structure in German only finds correspondence in extremely few cases in Chinese, and most of the time, this structure is not applicable. Chinese does not entirely align with English. Although both languages support the pre-verbal position of adverbials, this position is starkly restricted by the types of adverbials in English but not Chinese. Moreover, the only grammatical clause-final position of adverbial in Chinese, the S-DO-V-de-AdjP order, does not find structural counterparts in English or German.

### 4.4.3 Adverbial Placement in Intransitive VPCs

#### 4.4.3.1 German

As detailed in Section 4.3.1, an intransitive VPC in German follows the S-V-Ptcl word order in a main clause with simple tenses, with the finite verb occupying the V2 and the particle functioning as postverb. An adverbial, if not too long, is either bracketed in the middlefield by the verb and its particle or placed in the postfield. Placing the adverbial in the postfield indicates a marked reading or when the adverbial comes as belated information in discourse (Engel, 1973, p. 182). The canonical alignment is therefore S-V-Adv-Ptcl. The possible word orders are exemplified in (90).

| (90) | FOREFIELD                     | V2           | MIDDLEFIELD         | VF          | POSTFIELD            |
|------|-------------------------------|--------------|---------------------|-------------|----------------------|
|      | S                             | V            | Adv                 | Ptcl        | (Adv)                |
| a.   | Hans                          | <b>steht</b> | <i>um sechs Uhr</i> | <b>auf.</b> |                      |
|      | Hans                          | gets         | at six o'clock      | up          |                      |
| a'.  | Hans                          | <b>steht</b> |                     | <b>auf</b>  | <i>um sechs Uhr.</i> |
|      | Hans                          | gets         |                     | up          | at six o'clock       |
|      | 'Hans gets up at six o'clock. |              |                     |             |                      |

|      |                              |             |                    |             |                  |
|------|------------------------------|-------------|--------------------|-------------|------------------|
| (90) | <b>FOREFIELD</b>             | <b>V2</b>   | <b>MIDDLEFIELD</b> | <b>VF</b>   | <b>POSTFIELD</b> |
|      | <b>S</b>                     | <b>V</b>    | <b>Adv</b>         | <b>Ptcl</b> | <b>(Adv)</b>     |
| b.   | Die Sonne                    | <b>geht</b> | <i>im Osten</i>    | <b>auf.</b> |                  |
|      | the sun                      | goes        | in the east        | up          |                  |
| b'.  | Die Sonne                    | <b>geht</b> |                    | <b>auf</b>  | <i>im Osten.</i> |
|      | the sun                      | goes        |                    | up          | in the east      |
|      | ‘The sun rises in the east.’ |             |                    |             |                  |

As mentioned earlier, placing the adverbial in the forefield together with the subject leads to an ungrammatical V3 expression: *\*Hans um sechs Uhr steht auf./\*Die Sonne im Osten geht auf* (lit. ‘Hans at six o’clock gets up’ and ‘The sun in the east goes up’).

Moreover, the German middlefield allows multiple adverbials to occur between the verb and its particle, as in (91).

|      |                                                     |              |                  |                  |                     |             |
|------|-----------------------------------------------------|--------------|------------------|------------------|---------------------|-------------|
| (91) | Hans                                                | <b>steht</b> | <i>jeden Tag</i> | <i>pünktlich</i> | <i>um sechs Uhr</i> | <b>auf.</b> |
|      | Hans                                                | gets         | every day        | punctually       | at six o’clock      | up          |
|      | ‘Hans gets up every day punctually at six o’clock.’ |              |                  |                  |                     |             |

#### 4.4.3.2 English

To compare English with German, our initial examination focuses on the possibility and productivity of placing an adverbial between the verb and the particle of a VPC. An intransitive idiomatic VPC comprises a verb and an adverb particle that functions as an adjunct typically inseparable from its lexical verb (Quirk et al., 1985, p. 1152). However, limited possibilities exist, particularly for compositional VPCs, where the verb acts as an independent intransitive verb and the particle carries its own meaning.<sup>43</sup>

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<sup>43</sup> Such phrasal verbs are hence classified by Quirk et al. (1985) as free combinations. The verb-particle combinations in idiomatic VPCs are fixed. The particle has lost its original meaning, and one cannot predict the meaning of idiomatic VPCs based on the meaning of the particle (cf. Quirk et al., 1985, p. 1152).

The modifying adverbs *right* and *straight* may intervene between the verb and the compositional particle, whereas this possibility does not apply to idiomatic VPCs; compare (92a) and (92b).

- (92) a. Tom **went** *right/straight* **on** and saw a brook ahead of him.  
 b. \*Tom **passed** *right/straight* **out**. (passed out = ‘fainted’)

Most other adverbials do not appear between the verb and the particle, as exemplified in (93).

- (93) a. \*Mary **got** *immediately* **up** upon hearing the alarm.  
 b. \*The price **went** *finally* **down**.  
 c. \*My grandma **woke** *at six o'clock* **up**.  
 d. \*He **came** *with panic* **back**.

For these expressions, the adverbial immediately follows or precedes the entire VPC. Some may also move to the clause-initial for marked purposes, for example, the evaluative adverb *finally* in (93b').

- (93) a'. Mary **got up** *immediately* upon hearing the alarm.  
 b'. *Finally*, the price (*finally*) **went down**.  
 c'. My grandma **woke up** *at six o'clock*.  
 d'. He **came back** *with panic*.

Intransitive VPCs, especially those idiomatic ones, behave very much like single intransitive verbs. The rules governing adverbial placement are also applicable in these instances. Specifically, following the weight principle, a longer, heavy adverbial must not occur to the left of the main verb and should move to the clause-final position, (94).

- |      |                                                             |                                                      |
|------|-------------------------------------------------------------|------------------------------------------------------|
| (94) | <i>Preceding the VPC</i>                                    | <i>Following the VPC</i>                             |
| a.   | AdvP: *Hans <i>at six o'clock</i> <b>gets up</b> .          | Hans <b>gets up</b> <i>at six o'clock</i> .          |
|      | Adverb: Hans <i>immediately</i> <b>got up</b> .             | Hans <b>got up</b> <i>immediately</i> .              |
| b.   | AdvP: *The plane <i>in the heavy rain</i> <b>took off</b> . | The plane <b>took off</b> <i>in the heavy rain</i> . |
|      | Adverb: The plane <i>stably</i> <b>took off</b> .           | The plane <b>took off</b> <i>stably</i> .            |

To summarize, English starkly contrasts with German in that it disallows adverbials to intervene between the verb and its particle, except in the cases of *right/straight* for some compositional VPCs. While the position preceding or following the entire VPC is the default for adverbials in English, in German, adverbials are strictly prohibited before the VPC, and their placement after the VPC is less canonical. In short, the sharpest contrast between English and German is the productivity of the S-V-Adv-Ptcl word order.

#### 4.4.3.3 Chinese

Intransitive RVCs in Chinese typically convey directional and aspectual information, akin to the concept of compositional particle verbs in English, as presented in Section 4.3.3. Illustrated in (95) are some examples for reference.

- (95) a. 他 跑-远 了。  
Tā pǎo-yuǎn le.  
he run-away PTCL.PFV  
‘He ran away.’
- b. 杯子 掉-下-去, 摔 碎 了。  
Bēizi diào-xià-qù, shuāi suì le.  
cup drop-down-go drop broken PTCL.PFV  
‘The cup dropped and broke.’



- c. 鸟儿 飞-过-去 了。  
 Niǎo'er **fēi-guò-qù** le.  
 bird fly-across-go PTCL.PFV  
 'The bird flew over.'

As introduced in Section 4.4.2.3, adverbials in Chinese may appear directly before the verb after the subject. This position is irrelevant to the form of the verb, whether a single verb or an RVC, as seen in (96a) and (96b). The weight of the adverbial does not play a significant role, (96c); the adverbial cluster can be placed before the verb, without affecting the grammaticality of the word order, an alignment disallowed in English.

- (96) a. 他 迅速地 跑-远 了。  
 Tā *xùnsùde* **pǎo-yuǎn** le.  
 he quickly run-away PTCL.PFV  
 'He quickly ran away.'
- b. 杯子 突然 掉-下-去, 摔 碎 了。  
 Bēizi *tūrán* **diào-xià-qù**, shuāi suì le.  
 cup suddenly drop-down-go drop broken PTCL.PFV  
 'The cup suddenly dropped and broke.'
- c. 鸟儿 刚刚 很快 从 低空 飞了 -过-去。  
 Niǎo'er *gānggāng* *hěnkuaì* *cóng dīkōng* **fēi le** **-guò-qù**.  
 bird just now quickly from lower sky fly PTCL.PFV across-go  
 'The bird has just flown quickly past at a low altitude.'

The literature does not explicitly address the interruption of RVCs by adverbials, but by summarizing examples provided in reference works, it becomes clear that RVCs are not to be separated by adverbials. Only quantity AdvPs can yield the post-verbal S-V-Adv structure (Li & Thompson, 1981, p. 352, as discussed in Section 4.4.2.3). Therefore, we proceed to examine the grammaticality of the clause when such adverbials intervene between the verb and the particle. In the subsequent analysis, we

test the position of quantity AdvPs in two aspectual RVCs and two directional RVCs. Only the continuous order is grammatical, where the adverbial modifies the events described by the entire RVC, as presented in (97) and (98).

(97) *Aspectual RVCs*

- a. 蜡烛 已经 熄-灭 了 两次。  
 Làzhú yǐjīng xī-miè le liǎng cì.  
 candle already extinguish-out PTCL.PFV two times  
 ‘The candle has already gone out twice.’
- b. 这 家 工厂 已经 关-闭 三 年 了。  
 Zhè jiā gōngchǎng yǐjīng guān-bì sān nián le.  
 this CL factory already close-off three year PTCL.PFV  
 ‘This factory has been closed for a three years.’

(98) *Directional RVCs*

- a. 他 一连 过-来 了 三 趟, 但 主任  
 Tā yīlián guò-lái le sān tàng, dàn zhǔrèn  
 he in a row over-come PTCL.PFV two times but director  
 还是 不 在。  
 hái shì bú zài.  
 still not zài.  
 ‘He’s been here three times in a row, but the director is still not here.’
- b. 风 太 大, 扫把 倒-下去 好 几 次 了。  
 Fēng tài dà, sàobǎ dǎo-xiàqù hǎo jǐ cì le.  
 wind too strong broom fell-down several times PTCL.PFV  
 ‘The wind is too strong; the broom has fallen down several times.’

In turn, interrupting RVCs with an adverbial will result in an ungrammatical expression; compare (97a') with (97a).

- (97) a'. \*蜡烛 已经 熄 两次 -灭 了。  
           \*Làzhú yǐjīng xī liǎng cì -miè le.  
           candle already extinguish two times out PTCL.PFV

To sum up, Chinese aligns with English in restricting adverbials to interrupt the verb-particle. This contrasts with the syntactic feature of German in this sub-scenario, where the V-Adv-Ptcl is obligatory in most cases due to the constraint of its verbal bracket.

#### 4.4.4 Adverbial Placement in Transitive VPCs

##### 4.4.4.1 German

A transitive VPC involves the presence of a direct object. The particle of the verb phrase must be placed in the VF position, functioning as postverb, and its position is irrelevant to the placement of the adverbial adjunct. The ordering of the adverbial and the direct object adheres to the basic word order introduced in Section 4.4.2.1. An adverbial typically follows a definite object and precedes an indefinite one, as shown in (99a) and (99b). In cases involving situational adverbials (e.g., temporal, locative, comitative, instrumental, restrictive adverbials) and attitudinal adverbials, the positioning of the adverbial and the definite object is relatively free, (99c). Manner adverbials may appear after an indefinite object (Engel, 1994, p. 190), as in (99d).

- (99) a.  $DO_{DEF} > Adv$

| FOREFIELD | V2             | MIDDLEFIELD                            | VF          |
|-----------|----------------|----------------------------------------|-------------|
| Sie       | <b>machten</b> | <u>das Feuer</u> <i>schnell/sofort</i> | <b>aus.</b> |
| They      | put            | the fire quickly/immediately           | out         |

‘They put out the fire quickly/immediately.’

b. *Adv > DO<sub>IND</sub>*

| FOREFIELD | V2            | MIDDLEFIELD                                | VF         |
|-----------|---------------|--------------------------------------------|------------|
| Katja     | <b>zündet</b> | <i>jede Nacht/gerade</i> <u>eine Kerze</u> | <b>an.</b> |
| Katja     | lights        | every night/now a candle                   | up         |

‘Katja lights up a candle every night.’/‘Katja is lighting up a candle now.’

c. *Adv > DO<sub>DEF</sub>*

| FOREFIELD | V2              | MIDDLEFIELD                         | VF          |
|-----------|-----------------|-------------------------------------|-------------|
| Hermann   | <b>schmeißt</b> | <i>jetzt gerade</i> <u>den Müll</u> | <b>weg.</b> |
| Hermann   | throws          | right now the garbage               | away        |

‘Hermann is throwing away the garbage right now.’

d. *DO<sub>IND</sub> > Adv (manner)*

| FOREFIELD | V2           | MIDDLEFIELD                                 | VF          |
|-----------|--------------|---------------------------------------------|-------------|
| Jan       | <b>liest</b> | <i>jetzt</i> <u>ein Gedicht</u> <b>laut</b> | <b>vor.</b> |
| Jan       | reads        | now a poem loudly                           | PTCL        |

‘Jan is now reading a poem aloud.’

As mentioned earlier, the placement of the adverbial is relevant to multiple factors, including the information structure, the speaker’s emphasis and intonation, the modifying capacity of the adverbial, and the length of the element (Rehbein, 1992, p. 532; Kindt, 1994, p. 532; Eisenberg, 2020a, pp. 415–416). From the pure perspective of syntax, both the linear orders of S-V-Adv-DO-Ptcl and S-V-DO-Adv-Ptcl can be grammatical. To what extent a certain alignment is acceptable depends on the semantic restriction of the adverbial and specific discourse context. Ungrammatical in German is the V3 position and the continuous word order for a transitive particle verb, as in (100). This forms a sharp contrast with English and Chinese.

(100) *Ungrammatical S-Adv-V-Ptcl-DO order in German*

| Ger. | FOREFIELD           | V2             | MIDDLEFIELD              |
|------|---------------------|----------------|--------------------------|
|      | *Sie <i>schnell</i> | <b>tranken</b> | *aus <u>das Wasser</u> . |
|      | They      quickly   | drank          | up      the water        |

cf. Eng. They **quickly** drank **up** the water.

|      |                        |                   |          |               |
|------|------------------------|-------------------|----------|---------------|
| Chn. | 他们      很快             | 喝-光               | 了        | 水。            |
|      | Tāmen <i>hěn kuài</i>  | <b>hē-guāng</b>   | le       | <u>shuǐ</u> . |
|      | they      very quickly | drink-finish.PTCL | PTCL.PFV | water         |

#### 4.4.4.2 English

In English, introducing an adverbial into simple SV clauses featuring a transitive VPC adds to the complexity due to two factors: first, the direct object may come between the verb and the particle, or immediately follow the entire particle verb; second, the adverbial can be positioned before, within, or after the VPC. This leads to a total of eight possible word order combinations. Table 6 (next page) exhibits the possibilities of arranging an SVO sentence with the following elements: the subject at the clause's initial, the verb *put* with its particle *out*, the object, and the adverbial. We assess the grammaticality of these word orders using two adverbials: a short manner adverb, *quickly*, and a longer PP, *with an extinguisher*. Note that our investigations are confined to instances with nominal objects.

First, the rule that most VPCs should not be interrupted by an adverbial (except for *right* and *straight* for several compositional VPCs) also applies to the placement of adverbials in transitive VPCs. Hence, instances where the adverbial intervenes between the verb and its particle, such as in (c), (d), and (f), are grammatically unacceptable.

Second, a nominal object may precede the particle or be placed after the entire VPC. The short adverb *quickly* may either precede the VPC or after it, making word orders in (a), (b), (e), and (h) grammatically acceptable. Nevertheless, the grammaticality of

the pre-verbal placement consistently hinges on the weight of the adverbial. Replacing the adverb *quickly* with longer PPs, such as *with an extinguisher* or *with the help of their neighbors*, the word orders in (a) and (b) become grammatically less acceptable.

**Table 6:** Possibilities of Word Order Arrangement in Transitive VPCs with an Adverbial

| Short Adverb as Adverbial                                        | Longer PP as Adverbial                                                    |
|------------------------------------------------------------------|---------------------------------------------------------------------------|
| (a) They <i>quickly</i> <b>put</b> <u>the fire</u> <b>out</b> .  | *They <i>with an extinguisher</i> <b>put</b> <u>the fire</u> <b>out</b> . |
| (b) They <i>quickly</i> <b>put out</b> <u>the fire</u> .         | *They <i>with an extinguisher</i> <b>put out</b> <u>the fire</u> .        |
| (c) *They <b>put</b> <i>quickly</i> <u>the fire</u> <b>out</b> . | *They <b>put</b> <i>with an extinguisher</i> <u>the fire</u> <b>out</b> . |
| (d) *They <b>put</b> <u>the fire</u> <i>quickly</i> <b>out</b> . | *They <b>put</b> <u>the fire</u> <i>with an extinguisher</i> <b>out</b> . |
| (e) They <b>put</b> <u>the fire</u> <b>out</b> <i>quickly</i> .  | They <b>put</b> <u>the fire</u> <b>out</b> <i>with an extinguisher</i> .  |
| (f) *They <b>put</b> <i>quickly</i> <b>out</b> <u>the fire</u> . | *They <b>put</b> <i>with an extinguisher</i> <b>out</b> <u>the fire</u> . |
| (g) *They <b>put out</b> <i>quickly</i> <u>the fire</u> .        | *They <b>put out</b> <i>with an extinguisher</i> <u>the fire</u> .        |
| (h) They <b>put out</b> <u>the fire</u> <i>quickly</i> .         | They <b>put out</b> <u>the fire</u> <i>with an extinguisher</i> .         |

As for the grammaticality of the V-Ptcl-Adv-DO word order, as in (g), the VPC behaves akin to a transitive verb and hence should not be separated from its object by the adverbial, unless it involves the use of focusing or restrictive modifiers or focusing adverbs (see Section 4.4.2.2).

At this juncture, it is meaningful to compare English and German. The most notable contrast lies in that German allows an adverbial to be placed between the verb and the particle of the VPC, whereas English permits certain types of adverbs to occur immediately to the left of the verb. Word orders in (99) lack grammatical word-for-word counterparts in English, regardless of the object's position.

- (101) a. \*They **put** the fire *quickly/immediately* **out**.  
b. \*Katja **lights** *every night* a candle **up**.  
c. \*Hermann is throwing *now* the garbage **away**.

A point of convergence between English and German arises only under one specific circumstance: intensifiers such as *completely* or *right* may precede the particle if it follows the object (Jackendoff, 2002, p. 71). Nonetheless, in this case, the adverbs function as intensifiers of the particle rather than an adverbial (Quirk et al., 1985, p. 1154). Exhibited in (102) are examples provided by the scholars.

- (102) Eng. a. We **shut** the gas *completely* **off**. (Jackendoff, 2002, p. 71)  
b. She **brought** the girls *right* **up**. (Quirk et al., 1985, p. 1154)
- Ger. a. Wir **stellen** das Gas *komplett* **ab**.  
b. Sie **brachte** die Mädchen *gerade* **hoch**.

However, such correspondence is rare, as most adverbs do not serve the function of an intensifier.

#### 4.4.4.3 Chinese

Neither exist similarities between Chinese and German concerning adverbial placement within transitive VPCs. We examine the positioning of those structures where a direct object can be placed within the RVC, specifically, when the particle verb involves the use of directional particles 来 *lái* ('come') and 去 *qù* ('go'). Only in such expressions does Chinese have structural correspondence with German, (103).

(103) *Correspondence between Chinese and German in the S-V-DO-Ptcl order*

|      | S   | V     | DO           | Ptcl  |
|------|-----|-------|--------------|-------|
| Chn. | 她   | 带     | <u>食物</u>    | -来。   |
|      | Tā  | dài   | <u>shíwù</u> | -lái. |
|      | she | bring | food         | Come  |

| Ger.               | FOREFIELD | V2            | MIDDLEFIELD      | VF          |
|--------------------|-----------|---------------|------------------|-------------|
| Sie                |           | <b>bringt</b> | <u>das Essen</u> | <b>mit.</b> |
| she                |           | brings        | food             | with        |
| 'She brings food.' |           |               |                  |             |

However, the word order immediately turns ungrammatical when an adverbial is inserted between the verb and the particle. As exemplified in (104), the ungrammaticality does not arise from the adverbial's position relative to the object, but from its interruption of the RVC.

|       |      |     |       |           |       |       |
|-------|------|-----|-------|-----------|-------|-------|
| (104) | Chn. | *她  | 带     | 经常        | 食物    | -来。   |
|       |      | *Tā | dài   | jīngcháng | shíwù | -lái. |
|       |      | she | bring | often     | food  | come  |

| Ger.                         | FOREFIELD | V2            | MIDDLEFIELD             | VF          |
|------------------------------|-----------|---------------|-------------------------|-------------|
| Sie                          |           | <b>bringt</b> | <i>oft</i> <u>Essen</u> | <b>mit.</b> |
| she                          |           | brings        | <u>often</u> food       | with        |
| 'She often brings the food.' |           |               |                         |             |

In line with the rules detailed in the previous sections, an adverbial adjunct in Chinese commonly appears before the verb, forming an S-Adv-V-DO-Ptcl or S-Adv-V-Ptcl-DO order. This position is irrelevant to the structure of the VPC, the type of the particle, the semantic category of the adverbial, or the weight of the adverbial, as shown in (105) and (106).

(105) *Directional RVCs*

|                                             |     |                |       |             |       |
|---------------------------------------------|-----|----------------|-------|-------------|-------|
| a.                                          | 她   | 每隔几天           | 带     | 一些食物        | -来。   |
|                                             | Tā  | měi gé jǐtiān  | dài   | yìxiē shíwù | -lái. |
|                                             | she | every few days | bring | some food   | come  |
| 'She brings over some food every few days.' |     |                |       |             |       |



- b. 她 昨天 带 了 很多 唱片 -过-来。  
 Tā zuótiān dài le hěnduō chàngpiān -guò-lái.  
 she yesterday bring PTCL.PFV many CD over-come  
 ‘She brought over many CDs yesterday.’

(106) *Aspectual RVCs*

- a. 消防员 很 快 扑-灭 了 火。  
 Xiāofángyuán hěn kuài pū-miè le huǒ.  
 firefighter very quickly put out PTCL.PFV fire  
 ‘The firefighters quickly put out the fire.’
- b. 消防员 用 灭火器 扑-灭 了 火。  
 Xiāofángyuán yòng mièhuǒqì pū-miè le huǒ.  
 firefighter use fire extinguisher put out PTCL.PFV fire  
 ‘The firefighters put out the fire with an extinguisher.’

The pre-verbal adverbial placement, once again, bears similarities to English. This rule also applies the *bǎ*-construction (SOV order), as demonstrated in (107). The alignment for the entire clause, though, has no complete equivalence in either English or German.

(107) *Bǎ-construction in Chinese: S-Adv-bǎ-DO-V*

- 消防员 很 快 把 火 扑-灭 了。  
 Xiāofángyuán hěn kuài bǎ huǒ pū-miè le.  
 firefighter very quickly PTCL.DO fire put out PTCL.PFV  
 ‘The firefighters quickly put out the fire.’

## 4.4.5 Adverbial Placement in SV Clauses with a PP Complement

### 4.4.5.1 German

The last sub-scenario discussed in this study is SV clauses with a PP complement. This complement can be either a prepositional object or a prepositional adverbial complement. In German, a PP complement is conventionally placed at the final slot of the middlefield if several elements co-occur (Engel, 1973, p. 180). In turn, an adverbial adjunct precedes the PP complement when put in the middlefield, as shown in (108a) and (109a). An adverbial may come after the PP complement for a marked reading (Eisenberg, 2020a, p. 415), as in (108b) and (109b).

#### (108) *Prepositional object after adverbial adjunct*

|    | FOREFIELD                    | V2    | MIDDLEFIELD                       |
|----|------------------------------|-------|-----------------------------------|
| a. | Ich                          | denke | <i>jeden Tag</i> <u>an Lisa</u> . |
|    | I                            | think | every day PREP Lisa               |
|    | 'I think of Lisa every day.' |       |                                   |

|    | FOREFIELD                                    | V2    | MIDDLEFIELD                                        |
|----|----------------------------------------------|-------|----------------------------------------------------|
| b. | Ich                                          | denke | <u>an Lisa</u> <i>jeden Tag</i> , nicht nur heute. |
|    | I                                            | think | PREP Lisa every day not only today                 |
|    | 'I think of Lisa every day, not only today.' |       |                                                    |

#### (109) *Prepositional adverbial complement after adverbial adjunct*

|    | FOREFIELD                             | V2   | MIDDLEFIELD                             |
|----|---------------------------------------|------|-----------------------------------------|
| a. | Lisa                                  | geht | <i>um sechs Uhr</i> <u>zur Schule</u> . |
|    | Lisa                                  | goes | at six o'clock to the school            |
|    | 'Lisa goes to school at six o'clock.' |      |                                         |

|    |                  |           |                                                           |
|----|------------------|-----------|-----------------------------------------------------------|
| b. | <b>FOREFIELD</b> | <b>V2</b> | <b>MIDDLEFIELD</b>                                        |
|    | Lisa             | geht      | <u>zu-r Schule</u> <i>um sechs Uhr</i> ,    nicht sieben. |
|    | Lisa             | goes      | to-the school    at six o'clock    not at seven           |

‘Lisa goes to school at six o’clock, not seven.’

Two syntactic conventions influence the relative order of the PP complement and the adverbial. First, shorter constituents precede longer ones (Eisenberg, 2020a, p. 416). The productivity of the “PP complement preceding adverbial adjunct” pattern reduces when the adverbial is lighter-weighted. In (110a), the adverbial is a prepositional phrase, which has a similar weight to the PP complement, and the word order is not uncommonly seen. In contrast, if replacing the PP adverbial adjunct with a short manner adverb, the sentence becomes grammatically less acceptable, (110b).

|       |                                                      |           |                     |                   |
|-------|------------------------------------------------------|-----------|---------------------|-------------------|
| (110) | <b>FOREFIELD</b>                                     | <b>V2</b> | <b>MIDDLEFIELD</b>  |                   |
| a.    | Julian                                               | fährt     | <u>nach Hamburg</u> | <i>jeden Tag.</i> |
|       | Julian                                               | drives    | to    Hamburg       | every day         |
|       | cf. Eng. Julian drives to Hamburg <u>every day</u> . |           |                     |                   |
|       | <b>FOREFIELD</b>                                     | <b>V2</b> | <b>MIDDLEFIELD</b>  | <b>FOREFIELD</b>  |
| b.    | ?Julian                                              | fährt     | <u>nach Hamburg</u> | <i>schnell.</i>   |
|       | Julian                                               | drives    | to    Hamburg       | quickly           |
|       | cf. Eng. Julian drives to Hamburg <u>quickly</u> .   |           |                     |                   |

Second, conventionally, German follows a hierarchy of *instrument* > *time* > *place* (Engel, 1973, pp. 177–181, Eisenberg, 2020a, p. 416), as exemplified in (111) and (112).

(111) *Time before place*

- a. Wir wollen **heute** hier an euch denken.  
we want    today    here    of you    think.V.NON-FIN

(Eisenberg, 2020a, p. 416)

cf. Eng. We want to think of you here *today*.

b. Nico geht immer *um elf* ins Bett.

Nico goes always at eleven to bed

cf. Eng. Nico always goes to bed *at eleven*.

(112) *Instrument before place*

Kilian wird *mit dem ersten Zug* nach Würzburg fahren.

Kilian will with the first train to Würzburg drive.V.NON-FIN

(Engel, 1973, p. 180)

cf. Eng. Kilian will go to Würzburg *on the first train*.

#### 4.4.5.2 English

In an SV clause with simple tense in English, adverbial adjuncts have three positions: the *initial position* (before the subject), the *medial position* (between the subject and the verb), and the *end position* (after the verb). Their distributional frequency is contingent upon the syntactic weight and semantic category (Biber et al., 1999, pp. 802, 807; Huddleston & Pullum, 2002, pp. 779–784). Within the category of circumstance adverbials,<sup>44</sup> the tendency shown by corpus studies is that short, single adverbs frequently appear in the medial position, and longer PPs commonly occupy the clause-final position (Buysschaert, 1987, p. 112). Placing heavy PP adverbials in the medial position leads to awkward expression, as shown in (113).

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<sup>44</sup> Biber et al. (1999) categorize adverbials into three categories: circumstance adverbials, stance adverbials, and linking adverbials. Each category has a different frequency of distribution in syntactic realization (pp. 763–765). The current section focuses on the placement of circumstance adverbials, including the following semantic categories: instrument, agent, place, means, contingency, manner (incl. comitative), time, extent/degree, and additive/restrictive adverbials (p. 202).

- (113) a. \*She *every Sunday morning* goes to church.  
but: She goes to church *every Sunday morning*.
- b. \*Allen paid *at the front desk* for the accommodation.  
but: Allen paid for the accommodation *at the front desk*.

b. \*Allen paid *at the front desk* for the accommodation.

but: Allen paid for the accommodation *at the front desk*.

Another possible placement is what Quirk et al. (1985, p. 499) term the *initial end position*, where an adverbial follows the verb but precedes an obligatory clause element (see also Buysschaert, 1987, p. 113). This word order is more productive when the sentence element is an adverbial complement or a direct object (usually a clause), as in (114).

- (114) a. John has spoken *carefully* about the subject. (Frey, 2000, p. 117)  
 b. Gina aimed *carefully* at the tiger. (Buysschaert, 1987, p. 113)  
 c. He paid *immediately* for the book. (Quirk et al., 1985, p. 500)

(Buysschaert, 1987, p. 113)

c. He paid *immediately* for the book. (Quirk et al., 1985, p. 500)

(Quirk et al., 1985, p. 500)

Nonetheless, corpus analyses show that the initial end position occurs infrequently in both spoken and written English; the canonical way of placing an adverbial is the clause-final position (Quirk et al., 1999, p. 501; Biber et al., 1999, p. 807). This tendency occurs not without ground: PP complements usually appear adjacent to the verb as they are more closely integrated with the meaning of the verb (Biber et al., 1999, p. 812). They are inherently suggested by the verb and behave like the objects of the verb (Buysschaert, 1987, p. 104). For instance, motion verbs like *go*, *drive*, or *run* require a directional PP complement, as illustrated by *go to the cinema* in (115a) and *drive to the beach* in (115b). The initial end position, as in (115a') and (115b'), forms a marked position for prosodic purposes.

- (115) a. Ed drives to the beach *with his friends*. (final position)  
b. I *often* think about my grandparents. (medial position)

- a'. Ed drives *with his friends* to the beach. (initial end position)  
 b'. I think *often* about my grandparents. (initial end position)

A related issue is the convention of “place before time.” As noted above, the relation between the (motion) verb and the adverbial complement denoting direction is closer than that with the adverbial of other semantic types. In this case, English word order forms a mirrored image with that in German (König & Gast, 2012, p. 205), as shown in (116).

- (116) Eng. Mina goes to the cinema *every Thursday*.  
 Ger. Mina geht *jeden Donnerstag* ins Kino.  
 Mina goes every Thursday to the cinema

#### 4.4.5.3 Chinese

Chinese has structures with PP complements that are identical to those in English and German, in which the intransitive verb or the verb phrase may contain an AdvP or a PP as its complement (Li & Thompson, 1981, pp. 155–156; Huang & Liao, 2007, pp. 71–72). The examples in (117) are instances of prepositional adverbial complements introduced by a coverb, which delivers locative or directional information. These phrases follow the main verb and function as PP complements of the verb. The adverbial follows the same rules introduced in the previous sections: preceding the main verb and after the subject.

- (117)      **S**            **Adv**                      **V**            **PP<sub>COMP</sub>**  
 a. 他们      安静地                      坐      在 船 上。  
      Tāmen    ānjìngde                      zuò      zài chuán shàng.  
      they     quietly                      sit        at boat on  
      ‘They sit / are sitting on the boat quietly.’

- b. 我        和 我的 家人        开车        去 公园。  
 Wǒ        hé wǒde jiārén        kāichē        qù gōngyuán.  
 I           with my family        drive        go to park  
 ‘I drive to the park with my family.’

- (117)        S        Adv        V        PP<sub>COMP</sub>  
 c. 我        今天        读        到 第三页。  
 Wǒ        jīntiān        dú        dào dìsānyè.  
 I           today        read        until third page  
 ‘I’ve read until the third page today.’

The position of the adverbial is irrelevant to the structure of the VP, thus also applying to instances where the PP complement is a prepositional object, as in (118).

- (118)        S        Adv        V        O<sub>PREP</sub>  
 a. 这        很 大 程度上        取决        于 你的 决定。  
 Zhè        hěn dà chéngdùshàng        qǔjué        yú nǐde juédìng.  
 this        to a large extent        depend        PREP your        decision  
 ‘This largely depends on your decision.’  
 b. 她        经常        想        起 她的 祖父母。  
 Tā        jīngcháng        xiǎng        qǐ tāde zǔfùmǔ.  
 She        often        think        PREP her        grandparents  
 ‘She often thinks of his grandparents.’

In Chinese, it is ungrammatical to place the adverbial directly after the verb, at the clause’s final, or between the verb and its PP complement. This contrasts with English and German, as the former supports the clause-final position of the adverbial, and the latter prohibits the co-occurrence of subject and adverbial in the forefield.

Finally, note that the correspondence of the V-PP<sub>COMP</sub> structure is not always seen in all three languages. For instance, expressions such as *agree with someone*, *pay for*

*something*, or *look for somebody* do not exist in Chinese; instead, they are realized by single transitive verbs.

#### 4.4.6 Summary

The bracket system of German determines the distinctive way of placing adverbial adjuncts in this language. Across the four sub-scenarios, the placement of adverbials differs most notably among German, English, and Chinese in one key respect: in German, adverbials may interrupt the main verb and its complement, including the direct object, the particle, and the PP complement. The possibility of such an arrangement is significantly restricted in English and is nearly always grammatically unacceptable in Chinese, as summarized in Table 7.

**Table 7:** *Contrasting Adverbial Placement in German, English, and Chinese in SV Clauses with Simple Tense*

| <b>Sub-Scenarios</b>       |           | <b>German</b>                                          | <b>English</b>                                                                       | <b>Chinese*</b>                                   |
|----------------------------|-----------|--------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------|
| <b>V-DO</b>                | <b>V2</b> | <b>S-V-Adv-DO</b>                                      | <b>S-V-Adv-DO</b><br>(focusing/restrictive adverbs:<br><i>only, just, probably</i> ) |                                                   |
|                            | <b>V3</b> |                                                        | <b>S-Adv-V-DO</b> (certain adverbs)                                                  | <b>S-Adv-V-DO</b>                                 |
| <b>Intransitive VPC</b>    | <b>V2</b> | <b>S-V-Adv-Ptcl</b>                                    | <b>S-V-Adv-Ptcl</b><br>( <i>right/straight</i> in compositional VPCs)                |                                                   |
|                            | <b>V3</b> |                                                        | <b>S-Adv-V-Ptcl</b> (certain adverbs)                                                | <b>S-Adv-V-Ptcl</b>                               |
| <b>Transitive VPC</b>      | <b>V2</b> | <b>S-V-Adv-DO-Ptcl</b><br>or<br><b>S-V-DO-Adv-Ptcl</b> | <b>S-V-DO-Adv-Ptcl</b><br>(intensifiers: <i>completely/right</i> )                   | <b>S-Adv-V-DO-Ptcl</b><br>(directional particles) |
|                            | <b>V3</b> |                                                        | <b>S-Adv-V-Ptcl-DO</b><br>(certain adverbs)                                          | <b>S-Adv-V-Ptcl-DO</b>                            |
| <b>V-PP<sub>COMP</sub></b> | <b>V2</b> | <b>S-V-Adv-PP</b><br>(time > place)                    | <b>S-V-Adv-PP</b> (initial end position with motion verbs)                           |                                                   |
|                            | <b>V3</b> |                                                        | <b>S-V-Adv-PP</b> (certain adverbs)<br>(place > time)                                | <b>S-V-Adv-PP</b><br>(place > time)               |

\*Chinese contrasts German and English in that it supports the SOV word order using *bǎ*-construction.



The other notable divergence is that German strictly prohibits the pre-verbal placement of adverbials, leading to a V3 position. This feature accounts for the ungrammaticality of the German literal translation of all those cases in English and Chinese where the adverbial can be placed between the subject and the verb.

As for the choice between the clause-final position of the adverbial, it depends greatly on the syntactic and semantic features of the adverbial as well as the intention of the speaker. Also, the grammaticality of this position varies across languages. In English, apart from the clause-initial position, short adverbs of several semantic categories may precede the main verb in most cases, whereas longer adverbials such as PP adjuncts appear at the clause-final. In Chinese, the clause-final placement is limited to adverbials denoting frequency or duration, or the S-DO-V-de-Adv construction.

Finally, not every clause finds a structural equivalent in other languages; for instance, not every VPC in English corresponds to the same construction in Chinese or German. Despite the general trend summarized in this section, conducting individual contrastive analyses for specific cases is necessary.

#### 4.5 Patterns for Ditransitive Constructions

The last scenario where German, English, and Chinese contrast each other is how they construct ditransitive constructions,<sup>45 46</sup> which typically involve a ditransitive verb, a direct object, and an indirect recipient or beneficiary.

English and Chinese, lacking an explicit, developed case system, rely more on the syntactic structure to express the semantic relationship between the subject and the objects. Firbas (1966), for example, concludes that the word order of English is

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<sup>45</sup> The term *ditransitive construction* is restricted by Huddleston and Pullum (2002, pp. 248–249) to the SVOO structure, as in *I gave him some books*. Expressions involving prepositional paraphrasing, such as *I gave some books to him*, are referred to as *monotransitive*.

<sup>46</sup> This study solely discusses ditransitive constructions in which the indirect object takes on the role of recipient or beneficiary, such as in the sentence *I give you a book* (Quirk et al., 1985, p. 741). Cases where the indirect object functions as an affective role, such as *I give him a push*, will not be analyzed as the affective indirect object and are not paraphrasable by a prepositional phrase (p. 753).

primarily determined by the purely grammatical (i.e., surface-syntactic) functions of subject and predicate (as cited in Lenerz, 1977, p. 15). In contrast, in German, the direct object (hereafter: DO) is marked by the accusative case, and the indirect object (hereafter: IO) by the dative. Their positioning follows several hierarchical patterns (Bader, 2020, p. 1059), determined by linguistic contexts including, among others, information structure (e.g., theme-rheme relation, see Lenerz, 1977, pp. 42–46; Eisenberg, 2020a, p. 418), definiteness (Lenerz, 1977, pp. 50–55; Aissen, 2003, p. 47), and length (Lenerz, 1977, p. 63; Biber et al., 2021, p. 919). Given the flexible nature of the ordering of objects in German, a thorough investigation into the frequency of distribution and prevailing patterns for ditransitive word order becomes pertinent. For this purpose, we utilize Audehm’s (2006) summary of patterns for ditransitive structures in spoken corpora, revealing the interplay between the above-mentioned variables and the occurrence of distinct word order patterns in spoken German.

Upon reviewing the literature, a salient observation arises: the form of the object significantly influences the positioning of objects. The positional freedom of sentence constituents is restricted if one or more of them are personal pronouns (Hentschel & Weydt, 2003, p. 437), as opposed to clauses featuring two nominal objects. Considering criteria including form and definiteness, Engel (1972) has arrived at the following conclusion regarding the linear order of objects in the German middlefield:

$$\mathbf{DO_{PERS.PRON} - IO_{PERS.PRON} - IO_{NOM} (DEF/MKD) - DO_{NOM} (DEF/MKD) - IO_{NOM} (IND) - DO_{NOM} (IND)}$$

(adapted from Engel, 1972, p. 20)

In the following sections, we extensively discuss the specifics of object placement in German, English, and Chinese. Our comparison covers four sub-scenarios: (i) when both objects are nominal; (ii) when the DO is nominal and the IO is pronominal;<sup>47</sup> (iii) when the DO is pronominal and the IO is nominal; and (iv) when both DO and IO are pronominal.

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<sup>47</sup> In the current study, the discussion regarding the form of the pronominalized object is limited to personal pronouns and does not extend to other forms, such as demonstrative pronouns, reflexive pronouns, and indefinite pronouns.

## 4.5.1 Nominal DO, Nominal IO

### 4.5.1.1 German

When both objects are nominal, the word order arrangement is relatively free. A widely recognized default, unmarked word order is the IO preceding the DO (Haftka, 1996, p. 136; Heidolph et al., 1984; Lenerz, 1977, p. 39; among others), as for example noted in *Grundzüge einer deutschen Grammatik*: “Das indirekte Objekt erscheint in der Grundreihenfolge unmittelbar vor dem direkten Objekt”<sup>48</sup> (Heidolph et al., 1984, p. 712). Placing the DO before the IO leads to a marked reading, as denoted by Engel (1970a): “[N]un [wird] das Dativobjekt hervorgehoben, und zwar eher etwas starker als zuvor das Akkusativobjekt—offenbar, weil hier gegen eine wirklich normale ‚Abfolge‘ verstoßen und damit ein kontrastiver Effekt erzielt wird”<sup>49</sup> (p. 61); compare (119a) and (119b). Despite a change in the word order, the grammaticality of the sentence remains unaffected.

- (119)    a.    S                    V            IO                    DO
- Der Lehrer    gab        dem Schüler    das Buch.
- the teacher    gave        the student    the book
- ‘The teacher gave the book TO THE STUDENT.’
- b.    S                    V            DO                    IO<sub>MKD</sub>
- Der Lehrer    gab        das Buch        dem Schüler.
- the teacher    gave        the book        the student
- ‘The teacher gave THE BOOK to the student.’

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<sup>48</sup> English Translation: in the basic sequence, the indirect object appears immediately before the direct object.

<sup>49</sup> English translation: now the dative object is emphasized, and rather more strongly than the accusative object before—apparently because a normal “sequence” is violated here, and thus a contrastive effect is achieved.

A point of disputation regards the grammaticality of the DO-IO sequence when the DO is indefinite. Initially, the relation between word order restriction and definiteness is discussed in Lenerz's (1977) theoretical work: the first nominal object must be definite (*Definitheitsbedingung* 'definiteness condition'), as shown in his example in (120).

(120) *Wem hast du ein Buch geschenkt?* ('Who did you give a book to?')

a. Ich habe dem Schüler ein Buch geschenkt.

I have the student.IO.DEF a book.DO.IND given gifts

'I gave the student a book as a present.'

b. ?Ich habe ein Buch dem Schüler geschenkt.

I have a book.DO.IND the student.IO.DEF given gifts

'I gave a book to the student as a present.' (Lenerz, 1977, p. 54)

The definiteness constraint, however, is later pointed out by Lenerz (2002) himself as being of too much restriction (as cited in Røreng, 2011, p. 45). The grammatical productivity depends on the discourse context, and counter-examples do exist, as seen in the response to the question in (121).

(121) *Wem würdest du ein Buch schenken?* ('Who would you give a book to?')

a. Ich würde dem Schüler ein Buch schenken.

I would the student.IO.DEF a book.DO.IND give gifts

'I would give the student a book as a present.'

b. Ich würde ein Buch dem Schüler schenken.

I would a book.DO.IND the student.IO.DEF give gifts

'I would give a book to the student as a present.' (Büring, 2001, p. 64)

In short, while the default word order typically places the IO before the DO, instances of a reversed pattern still manifest in discourse and are determined by the specific context.

Alternatively, the IO can be paraphrased by a prepositional phrase (prep-IO) if it can be encoded with the same semantic role as the nominal object, normally a recipient (Zifonun et al., 1997, p. 1320; Helbig & Buscha, 2001, p. 458; Eisenberg, 2020a, p. 330). The prepositional alternative is supported by a few verbs, typically verbs of transaction, transfer, or communication. Common examples include *schicken* ('to send'), *senden* ('to send'), *bringen* ('to bring'), *übergeben* ('to transfer, to pass'), *schreiben* ('to write'), which combine with directional prepositions such as *an*, *zu*, *auf*, *in*, and *nach*<sup>50 51</sup> (Zifonun et al., 1997, pp. 1320–1322; Proost, 2015, p. 158), as in (122a) and (122b).

- (122) a. Maya schrieb ihrem Freund eine E-Mail. (IO-DO)  
 Maya wrote her friend an email  
 'Maya wrote her friend an email.'
- > Maya schrieb eine E-Mail an ihren Freund. (DO-prep-IO)  
 Maya wrote an email to her friend  
 'Maya wrote an email to her friend.'
- b. Sven bringt seinem Vater die Zeitung. (IO-DO)  
 Sven brings his father the newspaper

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<sup>50</sup> Among all the prepositions, *an* has the highest productivity, as noted by Willems (2020): trivalent verbs occur in morphosyntactically alternating realizations of the construction, with the goal argument either marked as a dative NP or PP (in particular with the preposition *an*, to a lesser extent also *zu*) (p. 172).

<sup>51</sup> Weinrich (2003) points out that employing a dative object versus a prepositional structure yields distinct pragmatic nuance. For example, the dative variant often denotes allocation (*Zuwendung*), as in *Warum schreibst du ihm nicht*, whereas the prepositional pattern, as in *Warum schreibst du nicht einfach an ihn*, emphasizes a social contact with the addressee (*Adressat*) (p. 622). From a pure syntactic perspective, both structures are grammatical.

‘Sven brings his father the newspaper.’

> Sven     bringt     die Zeitung     zu seinem Vater.     (DO-prep-IO)

Sven     brings     the newspaper     to his father

‘Sven brings the newspaper to his father.’

It is important to note that not all the verbs that support the ditransitive structure are sensitive to the prepositional alternative. Verbs such as *geben* (‘give’)<sup>52</sup> and *erzählen* (‘tell’) solely support the dative pattern but not the prepositional one, as in (123). This contrasts with English, as these two verbs are commonly seen with the DO-to-IO pattern.

(123) a.    Der Lehrer     gab             ein Buch             \*an den Schüler.

the teacher     gave             a book             to the student

cf.    Eng. ‘The teacher gave a book to the student.’

b.    Die Mutter     erzählte     eine Geschichte     \*zu ihrem Kind.

the mother     told             a story             to her child

cf.    Eng. ‘The mother told a story to her child.’

#### 4.5.1.2 English

In English, two main word orders are used for constructing a ditransitive construction: the IO either precedes the DO (IO-DO) or follows the DO (DO-prep-IO) if it is paraphrased by a prepositional phrase, normally introduced by *to* or *for* (Quirk et al.,

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<sup>52</sup> According to Proost (2015), the prepositional pattern is rarely used for information verbs and the verb *geben* (‘give’). In a random sample of 100 instances from the *DeReKo* (*Archiv aller Korpora geschriebener Sprache*) where the verb *geben* occurred, only one instance was found where the recipient argument was realized by a PP, introduced by the preposition *an* (p. 158).

1985, p. 59), as exemplified in (124a) and (124b). These two structures are semantic synonyms, and the alternation between them is often referred to as *dative alternation* or *benefactive alternation* (Gerwin, 2013, p. 446).<sup>53</sup>

- (124) a. Hanna sent/gave Clara a package. (IO-DO)  
 b. Hanna sent/gave a package to Clara. (DO-to-IO)

The IO-DO and DO-prep-IO constructions are synonymous semantically but not pragmatically, with the prepositional pattern laying a focus on the recipient (Goldberg, 1995, as cited in Willems, 2020, p. 148). The *to*-phrase “is felt to be a clearer marker of syntactic relationships than word order (Biber et al., 2021, p. 920). In the IO-DO word order, the IO carries less communicative dynamism as compared with the DO; where the converse is true, the prepositional alternative is employed (Quirk et al., 1985, p. 1396). Both constructions are commonly used in English, but the prepositional pattern is more common than the IO-DO pattern when the DO has a length of two words or more (Biber et al., 2021, p. 920).

Certain verbs do not allow the IO-DO order, (125a). There are many cases of IO-DO sentences with no prepositional counterparts (Collins, 1995, p. 36), as in (125b).

- (125) a. Joe **told** Mary a story. (Goldberg, 1992, p. 377)  
 Joe **\*whispered** Mary a story.  
 b. Mary **told** a lie to Bill. (Collins, 1995, p. 36)  
 Mary **\*spared** the trouble to Bill.

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<sup>53</sup> In the case of thematic fronting, the prepositional phrase can be fronted before the DO, as in *Hanna sent/gave to Clara a package*, for communicative dynamism without changing the rhematic force of the DO as in (124a); nonetheless, the word order only applies when the DO is not pronominal (Quirk et al., 1985, p. 1396). As the V-prep-IO-DO order is a form of markedness and has few occurrences in corpora and will not be extensively discussed in this contrastive study. For the frequency of occurrences of unmarked and marked dative alternation in *ICE-GB*, refer to Ozón (2009).

Unlike German, the DO-IO pattern is not used in standard English,<sup>54</sup> as the case is not overt in English but in German, (126). However, this contrast is neutralized by the fact that the DO-IO pattern is less productive than the default IO-DO pattern in German.<sup>55</sup>

- (126) Eng. The teacher gave the book \*his student. (\*DO-IO)  
 Ger. Der Lehrer gab das Buch seinem Schüler. (DO-IO)

Another mismatch between English and German is the applicability of the prepositional alternative. As exemplified in (127), certain English verbs support both the IO-DO and DO-prep-IO structures, whereas their German counterparts solely support the former pattern, as mentioned earlier.

- (127) a. Eng. The teacher *gave* the book to his student. (DO-prep-IO)  
 Ger. Der Lehrer *gab* das Buch \*an seinen Schüler. (\*DO-prep-IO)  
 b. Eng. I *told* a story to my child. (DO-prep-IO)  
 Ger. Ich *erzählte* eine Geschichte \*zu meinem Kind. (\*DO-prep-IO)

To conclude, when both objects are nominal, German and English exhibit more similarities than differences. Both languages typically adhere to the canonical word order of IO<sub>NOM</sub>-DO<sub>NOM</sub>, with a lesser preference for, or even an exclusion of, the

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<sup>54</sup> The IO-DO word order is reported to be found in northern England; however, this pattern was rarely found in the corpus (see Siemund, 2013, p. 223 for discussion).

<sup>55</sup> Audehm's (2006) investigation of sequence in German double object constructions, utilizing data from the *Osnabrücker Korpus* (OS) and the *Arzt-Patienten-Gespräche* corpus (AP), substantiated the infrequency of the DO-IO word order. The predominant pattern observed was IO-DO, with 91.43% occurrence in OS and 81.81% in AP (p. 53). Notably, a majority of these occurrences featured a constellation of IO<sub>PRON</sub>-DO<sub>NOM</sub>, and a mere 2.38% of instances in OS entailed the co-occurrence of two nominal objects (pp. 51–53).



DO<sub>NOM</sub>-IO<sub>NOM</sub> pattern. The most notable contrast lies in the applicability of the prepositional alternative of DO<sub>NOM</sub>-prep-IO<sub>NOM</sub>, commonly employed in English but restricted by certain verbs in German.

#### 4.5.1.3 Chinese

The objects in Chinese are marked by coverbs, with the IO marked by 给 *gěi* and the DO by 把 *bǎ*. Three possible word orders are employed for forming a ditransitive construction when both objects are nominal: V-(gěi)-IO-DO, V-DO-gěi-IO, and bǎ-DO-V-gěi-IO.

The coverb 给 *gěi* originates from the verb 给 *gěi* ('to give'). When functioning as a coverb, it marks the recipient and thus exhibits syntactic and semantic similarities to the prepositions *to/for* in English or *an/zu* in German. In a ditransitive construction, the IO may precede the DO, forming the V-gěi-IO-DO structure (Ross & Ma, 2014, p. 17), as shown in (128).

#### (128) *V-gěi-IO-DO*

|                                            |                 |            |           |             |           |            |              |
|--------------------------------------------|-----------------|------------|-----------|-------------|-----------|------------|--------------|
| 杰克                                         | 借/带/递           | <u>给</u>   | <u>了</u>  | <u>露西</u>   | <u>一</u>  | <u>本</u>   | <u>书</u> 。   |
| Jiékè                                      | jiè/dài/dì      | <u>gěi</u> | <u>le</u> | <u>Lùxī</u> | <u>yì</u> | <u>běn</u> | <u>shū</u> . |
| Jack                                       | lend/bring/pass | PTCL.IO    | PTCL.PFV  | Lucy.IO     | one       | CL         | book.DO      |
| 'Jack lent/brought/passed a book to Lucy.' |                 |            |           |             |           |            |              |

The coverb 给 *gěi* can be omitted in a few specific cases, such as when the verb itself is already 给 *gěi* ('to give') or 送 *sòng* ('to give gifts'), forming a V-IO-DO construction (Liu, 2006, p. 1). As exemplified in (129), replacing the verbs with 递 *dì* ('to pass') or 带 *dài* ('to bring') renders the sentence grammatically unacceptable.

(129) *Verb choice and grammaticality of the V-IO-DO pattern (gěi-omission)*

- a. 杰克 送/给 了 露西 一本书。  
 Jiékè sòng/gěi le Lùxī yì běn shū.  
 Jack give gifts/give PTCL.PFV Lucy.IO one CL book.DO  
 ‘Jack gave Lucy a book as a present.’ / ‘Jack gave Lucy a book.’
- b. 杰克 \*递/\*带 了 露西 一瓶水。  
 Jiékè \*dì/\*dài le Lùxī yì píng shuǐ.  
 Jack pass/bring PTCL.PFV Lucy.IO one bottle water.DO  
 ‘Jack passed/brought Lucy a bottle of water.’

Alternatively, the DO may precede the IO, forming the V-DO-gěi-IO word order (Li & Thompson, 1981, pp. 371–373), as shown in (130). This pattern finds correspondence with the prepositional alternative in English and German. Note that in (139b), the verb 听 *tīng* (‘to listen’) must follow the IO, denoting the purpose of the action of telling a story to his friend.

(130) *V-DO-gěi-IO*

- a. 杰克 借/带/递 了 一本书 给 露西。  
 Jiékè jiè/dài/dì le yì běn shū gěi Lùxī.  
 Jack lend/bring/pass PTCL.PFV one CL book.DO PTCL.IO Lucy.IO  
 ‘Jack lent/brought/passed a book to Lucy.’
- b. 他 讲 了 一个故事 给他朋友 听。  
 Tā jiǎng le yì gè gùshì gěi tā péngyou tīng.  
 he tell PTCL.PFV one CL story.DO PTCL.IO his friend.IO for listening  
 Eng. ‘He told a story to his friend.’

- c. 他 发 了 一 封 邮 件 给 他 上 司。  
 Tā fā le yì fēng yóujiàn gěi tā shàngsī.  
 he send PTCL.PFV one CL email.DO PTCL.IO his supervisor.IO  
 Eng. ‘He sent an email to his supervisor.’

The third possibility for constructing a ditransitive sentence in Chinese exhibits broader applicability: *bǎ*-DO-V-*gěi*-IO (the *bǎ*-construction). In Chinese, the DO is typically marked by the coverb 把 *bǎ* and immediately follows the subject (Li & Thompson, 1981; Zou, 1995; Ziegeler, 2000; among others). The *bǎ*-construction is less constrained by the verb, as exemplified in (131).

(131) *Bǎ-construction: bǎ-DO-V-gěi-IO*

- a. 他 把 书 带/递/送 给 了 露西。  
 Tā bǎ shū dài/dì/sòng gěi le Lùxī.  
 he PTCL.DO book.DO bring/pass/give PTCL.IO PTCL.PFV Lucy.IO  
 ‘He brought/passed/gave the book to Lucy.’
- b. 他 把 邮 件 发 给 了 上 司。  
 Tā bǎ yóujiàn fā gěi le shàngsī.  
 he PTCL.DO email.DO send PTCL.IO PTCL.PFV supervisor.IO  
 ‘He sent the emails to his supervisor.’
- c. 他 把 事 故 报 告 给 了 上 司。  
 Tā bǎ shìgù bàogào gěi le shàngsī.  
 he PTCL.DO accident.DO report PTCL.IO PTCL.PFV supervisor.IO  
 ‘He reported the accident to his supervisor.’

It is important to note that the *bǎ*-construction is grammatical only when the DO precedes the verb; placing it elsewhere will result in ungrammaticality, (132).

- (132) \*他 带/递/送      给   了   露西    把   一   本   书。  
 \*Tā   dài/dì/sòng      gěi   le   Lùxī    bǎ   yì   běn   shū.  
 he   bring/pass/give   PTCL.IO PTCL.PFV Lucy.IO   PTCL.DO one CL   book.DO

Thus, Chinese aligns with English and German in one respect only: the V-DO-gěi-IO pattern, which corresponds to the prepositional alternative (V-DO-prep-IO).

In other cases, contrasts are seen. Although the V-gěi-IO-DO pattern is identical to the V-prep-IO-DO sequence, it represents a marked order in English and finds little correspondence in reference works for German grammar. While the V-IO-DO structure is commonly used in English and German, it only applies to very few “verbs of giving” in Chinese, in which the coverb 给 *gěi* can be omitted. The *bǎ*-construction contrasts sharply with ditransitive constructions in the other two languages because the DO directly precedes the verb, forming an SOV order.

#### ✧ **Contrasting German, English, and Chinese**

Summarizing literature, the applicability of word order patterns often correlates with the lexical features of the verb. As our current study focuses on examining CLI at the level of syntactic representation, we refrain from exhaustively discussing the relationship between lexical features and word order alternation in forming ditransitive constructions. Instead, we concentrate on analyzing the word orders commonly used for constructing ditransitive constructions in each language and listing out their applicability in the presence of several common archetypes of verbs, including verbs of giving (e.g., *give*), verbs of dislocation (e.g., *bring*, *pass*), and verbs of communication (e.g., *write*, *send*). The objective is to compare the presence or absence of thus far observed syntactic representations in the grammar of German, English, and Chinese.

Table 8 outlines the shared and distinct features among the three languages when both objects are nominal.

**Table 8: Object Placement in German, English, Chinese (Nominal DO, Nominal IO)**

| Word Order                                      | German                                                              | English                                                | Chinese                                                                                                 |
|-------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>V-DO-IO</b>                                  | v**Ich<br>schenke/schicke <u>ein</u><br>Buch <u>dem Kind</u> .      |                                                        |                                                                                                         |
| <b>V-DO-prep-IO</b>                             | v*** Ich<br>*schenke/schicke <u>ein</u><br>Buch <u>an</u> das Kind. | v Ich give/send <u>a</u><br><u>book to the child</u> . | v 我送/寄一本书 <u>给那个</u><br><u>孩子</u> 。Wǒ sòng/jì yì běn<br>shū <u>gěi nàge háizi</u> .                     |
| <b>V-IO-DO</b>                                  | v Ich schenke/schicke<br><u>dem Kind ein Buch</u> .                 | v I give/send <u>the</u><br><u>child a book</u> .      | v ***我送/*寄 <u>那个孩子</u><br><u>一本书</u> 。Wǒ sòng/*jì<br><u>nàge háizi yì běn shū</u> .                     |
| <b>V-prep-IO-DO</b>                             |                                                                     | v**I give/send <u>to</u><br><u>the child a book</u> .  | v 我送/寄 <u>给那个孩子一</u><br><u>本书</u> 。Wǒ sòng/jì <u>gěi</u><br><u>nàge háizi yì běn shū</u> .              |
| <b>bǎ-<br/>construction</b>                     |                                                                     |                                                        | v 我 <u>把</u> 一本书送/寄 <u>给那</u><br><u>个孩子</u> 。Wǒ <u>bǎ</u> yì běn<br>shū sòng/jì <u>gěi nàge háizi</u> . |
| **less productive/non-canonical but grammatical |                                                                     |                                                        |                                                                                                         |
| ***grammaticality restricted by the verb        |                                                                     |                                                        |                                                                                                         |

The word orders V-DO-prep-IO and V-IO-DO are common to all three languages. However, the productivity of the V-IO-DO pattern is extremely restricted in Chinese. The prepositional alternative is more productive in Chinese and English compared with German, where it is only applicable to specific verbs, such as verbs of communication.

Chinese contrasts with English and German as it typically marks the objects using coverbs, and the V-prep-IO-DO pattern, a marked structure in English, is a common practice in Chinese grammar. Moreover, the language stands out as it employs the *bǎ*-construction, forming an SOV word order, which lacks a syntactic representation in English and German.

To conclude the distinctiveness of German in forming ditransitive constructions featuring nominative objects, the contrast lies in its permission for the V-DO-IO pattern and the restricted productivity for the V-DO-prep-IO pattern due to verb sensitivity.

## 4.5.2 Nominal DO, Pronominal IO

### 4.5.2.1 German

In German syntax, the *Gesetz der Wachsenden Glieder*<sup>56</sup> ('Law of Increasing Constituents') governs the linearization of constituents in the middlefield, requiring a shorter constituent to be placed after the longer one (Lenerz, 1977, p. 63; Bader, 2020, p. 1061; Eisenberg, 2020a, p. 416). According to this principle, a pronoun naturally precedes a longer noun phrase, forming an unmarked word order (Eisenberg, 2020a, p. 418). In spoken German, a majority of cases of pronominalized objects preceding the nominal ones are observed when the pronoun refers to an IO (Audehm, 2006, p. 42), as shown in (133).

- (133)      Der Lehrer      gab/schickte      dem Schüler      das/ein Buch.      (IO-DO)  
                 the teacher      gave/sent      the student.IO      the/a book.DO
- > Der Lehrer      gab/schickte      ihm      das/ein Buch.      (IO-DO)  
                 the teacher      gave/sent      him.IO      the/a book.DO
- 'The teacher gab/sent him the/a book.'

If the prepositional alternative is permitted by the verb, pronominalizing the IO does not affect the grammaticality of the structure, (134).

- (134)      Ich      \***gebe**/send      ein Buch      an meinen Vater.      (DO-prep-IO)  
                 I      give/send      a book.DO      to my      father
- > Ich      \***gebe**/send      ein Buch      an ihn.      (DO-prep-IO)  
                 I      give/send      a book.DO      to him
- 'I'm \*giving/sending a book to him.'

---

<sup>56</sup> This principle, first introduced by Behaghel (1909/1910), was formulated by him in 1930 as follows: "*Von zwei Gliedern von verschiedenem Umfang steht das umfangreichere nach* ('Of two constituents of different lengths, the longer one follows the shorter one')" (Bader, 2020, p. 1061).

Another grammatical arrangement is to place a strong dative personal pronoun in the final slot of the middlefield to emphasize the recipient (Eisenberg, 2020a, p. 418). Strong dative pronouns, such as *mir* ('me.DAT.SG'), *dir* ('you.DAT.SG'), and *ihm* ('him.DAT.SG'), may appear after the nominal object, as exemplified in (135).

- (135) Der Lehrer      gave      das Buch      ihm/mir.      (DO-IO)  
the teacher      gab      the book.DO      him.IO.SG/me.IO.SG  
‘The teacher gives HIM/ME the book.’

Nonetheless, this word order is seldom encountered in natural speech, as evidenced by its low frequency of occurrence in the empirical data (N = 3 out of 276, 1.08%, see Audehm 2006, pp. 48–49). Audehm found three instances of DO<sub>NOM</sub>-IO<sub>PRON</sub> in the corpora, and they all feature IOs as beneficiaries instead of recipients, exemplified in (136).

- (136) ...du kannst ja auch Kanonen dir kaufen. (DO-IO)  
 ...you can INTJ also cannons.DO yourself.IO buy  
 ‘...you can also buy cannons for yourself.’ (Audehm, 2006, p. 49)

#### 4.5.2.2 English

The IO-DO and DO-prep-IO patterns are employed also in scenarios with a nominal DO and a pronominal IO, as in (137a) and (137b). The DO-IO pattern is not used in English, (137c). The case of thematic fronting of *to*-phrase has been discussed and will not be included in further discussion.

- (137) a. I give him a necklace/the book. (IO-DO)  
 b. I give a necklace/the book to him. (DO-prep-IO)  
 c. \*I give a necklace/the book him. (\*DO-IO)

The choice of word order patterns follows the weight principle: the end-weight matters. Biber et al.'s (2021) corpus findings show that with the verbs *give*, *offer*, and *sell*, most cases following the IO-DO pattern feature IOs consisting of one word (p. 919). The IO tends to be much shorter than the DO when it comes earlier in the clause, and over 50% of IOs are realized by personal pronouns (p. 920).

To compare English and German, when the IO is pronominalized, the two languages show similarities not only in the structure employed but also in the frequency of distribution of the structure. First, the DO<sub>NOM</sub>-IO<sub>PRON</sub> pattern is ungrammatical in English and is notably restricted in German (though grammatical). Second, the IO<sub>PRON</sub>-DO<sub>NOM</sub> pattern is the preferred sequence due to the principle of end-weight for both languages. The prepositional alternative is less productive compared with the IO-DO pattern due to the heavier weight of the DO relative to the IO, particularly when the DO is a multi-word noun phrase. It is used when the recipient is marked.

#### 4.5.2.3 Chinese

The rules introduced in Section 4.5.1.3 for forming ditransitive constructions remain consistent also in the scenario with a nominal DO and a pronominalized IO: V-(gěi)-IO-DO, V-DO-gěi-IO, and bǎ-DO-V-gěi-IO. The grammaticality of word orders is not relevant to the form of the IO. Examples in (138) recapture the three patterns mentioned earlier.

(138) a. *V-(gěi)-IO-DO*

Uncle Sam sent to my brother and I many presents.

> 山姆 叔叔 寄 给 我们 很多 礼物。

Shānmǔ shūshu jì gěi wǒmen hěnduō lǐwù.

Sam uncle send PTCL.IO us.IO many presents.DO

‘Uncle Sam sent us many presents.’



Uncle Sam gave to my brother and I many presents.

- > 山姆 叔叔 给 了 我们 很多 礼物。  
Shānmǔ shūshu      gěi   le      wǒmen   hěnduō lǐwù.  
Sam uncle              give PTCL.PFV   us.IO      many   presents.DO  
'Uncle Sam gave us many presents.'

b. *V-DO-gěi-IO*

He wrote/brought/sent letters to Karl and Isa.

- > 他 写/带/寄              了      信      给      他们。  
Tā   xiě/dài/jì              le      xìn      gěi      tāmen.  
He   write/bring/send   PTCL.PFV   letter.DO   PTCL.IO them.IO  
'He wrote/brought/sent letters to them.'

c. *Bǎ-DO-V-gěi-IO*

She brought/passed/gave the books to Lucy/his aunt.

- > 她 把      书              带/递/送              给      了      她。  
Tā   bǎ      shū              dài/dì/sòng              gěi      le      tā.  
she PTCL.DO book.DO   bring/pass/give   PTCL.IO PTCL.PFV her.IO  
'She brought/passed/gave the books to her.'

Consistent with the discussion in Section 4.5.1.3, Chinese exhibits structural parallels with German and English in the V-DO-gěi-IO pattern.

✧ **Comparing German, English, Chinese**

The conclusions drawn in Table 9 outline the comparative analysis of German, English, and Chinese concerning nominal DOs and pronominal IOs. The findings mirror those presented at the end of Section 4.5.1.

**Table 9: Object Placement in German, English, and Chinese (Nominal DO, Pronominal IO)**

| Word Order                                      | German                                                                 | English                                                  | Chinese                                                                                                |
|-------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>V-DO-IO</b>                                  | v**Ich schenke/<br>bringe <u>ein Buch</u> <u>dir</u> .                 |                                                          |                                                                                                        |
| <b>V-IO-DO</b>                                  | v Ich schenke/<br>bringe <u>dir</u> <u>ein Buch</u> .                  | v I give/bring <u>you</u><br><u>a book</u> .             | v ***我送/*带 <u>你</u> 一 <u>本书</u> 。<br>Wǒ sòng/*dài <u>nǐ</u> <u>yì běn shū</u> .                        |
| <b>V-DO-prep-IO</b>                             | v*** Ich *schenke/<br>bringe <u>ein Buch</u> <u>zu</u><br><u>dir</u> . | v Ich give/bring <u>a</u><br><u>book</u> <u>to you</u> . | v 我送/带一 <u>本书</u> <u>给你</u> 。Wǒ<br>sòng/dài <u>yì běn shū</u> <u>gěi nǐ</u> .                          |
| <b>V-prep-IO-DO</b>                             |                                                                        | v**I give/bring <u>to</u><br><u>you</u> <u>a book</u> .  | v 我送/带 <u>给你</u> 一 <u>本书</u> 。Wǒ<br>sòng/dài <u>gěi nǐ</u> <u>yì běn shū</u> .                         |
| <b>bǎ-construction</b>                          |                                                                        |                                                          | v 我 <u>把</u> 一 <u>本书</u> 送/带 <u>给你</u> 。<br>Wǒ <u>bǎ</u> <u>yì běn shū</u> sòng/dài<br><u>gěi nǐ</u> . |
| **less productive/non-canonical but grammatical |                                                                        |                                                          |                                                                                                        |
| ***grammaticality restricted by the verb        |                                                                        |                                                          |                                                                                                        |

### 4.5.3 Pronominal DO, Nominal IO

#### 4.5.3.1 German

As mentioned in the preceding section, according to the Law of Increasing Constituents, a pronominal object should be placed before the nominal one. The default word order is hence DO-IO when the DO is pronominal and the IO is nominal, as in (139).

- (139) Der Lehrer gab den Stift/das Buch dem Schüler. (DO-IO)  
the teacher gave the.ACC pen.DO/ the.DAT student.IO  
the.ACC book.DO
- > Der Lehrer gab den/es dem Schüler. (DO-IO)  
the teacher gave it.ACC.DO /it.ACC.DO the.DAT student.IO
- ‘The teacher gave it/it to the student.’

In the prepositional alternative, pronominalizing the DO does not affect the grammaticality of the sentence, (140).

- (140) Ich schicke ein Paket/den Brief an meine Tante. (DO-prep-IO)  
 I send a.ACC package.DO/ to my aunt.IO  
 the.ACC letter.DO  
 ‘I send a package/a letter to my aunt.’

- > Ich schicke es/den an meine Tante. (DO-prep-IO)  
 I send it.ACC.DO /it.ACC.DO to my aunt.IO  
 ‘I send it to my aunt.’

Although some grammarians acknowledge the grammaticality of the IO<sub>NOM</sub>-DO<sub>PRON</sub> word order (e.g., Eisenberg, 2020a, p. 418), there is scarce evidence in empirical studies of the productivity of this arrangement. Only two utterances were collected in Audehm’s (2006) study, as in (141).

- (141) Ich würde dem Zuschauer vorher genauer das zeigen. (IO-DO)  
 I would the.DAT viewer.IO before exactly it.ACC.DO show  
 ‘I would show the viewer it in more detail beforehand.’  
 (Audehm, 2006, p. 49)

The sentence as in (141) is grammatical because the DO is pronominalized in a neutral rhematic form *das* (‘it’), which has a focusing function (Weinrich, 2003, p. 389). Replacing it with the weak neutral pronoun *es*, the expression immediately turns ungrammatical, (142a). In this case, the only grammatical word order is the DO-IO, (142b).

- (142) I would show it to the viewer.  
 a. ich würde dem Zuschauer \*es zeigen. (\*IO-DO)  
 I would the viewer.IO it.ACC.DO show

but: b. ich würde es dem Zuschauer zeigen. (DO-IO)  
 I would it.ACC.DO the.DAT viewer.IO show

To wrap up, when the DO is pronominalized but the IO is not, the majority pattern used in German is the DO-IO, as the IO has more end-weight. Albeit grammatically acceptable, the productivity of the IO-DO variant is largely restricted.

#### 4.5.3.2 English

In English, placing a pronominalized DO at clause-final will result in ungrammatical structures (Collins, 1995, p. 39), (143b). It is not grammatically acceptable to place a heavy PP before the pronominal IO, (143c). The IO-DO pattern is not observed, as the IO is to be marked by the preposition, (143d).

(143) Hanna sent flowers/the flower to her brother.

- a. Hanna sent them/it to her brother. (DO-prep-IO)
- b. \*Hanna sent her brother them/it. (\*IO-DO)
- c. \*Hanna sent to her brother them/it. (\*prep-IO-DO)
- d. \*Hanna sent them/it her brother. (\*IO-DO)

For the prepositional pattern, a slight tendency has been observed that the DO is shorter than the noun phrase following the preposition. The DO is more likely to be realized by a personal pronoun, which agrees with the principle of end-weight (Biber et al., 2021, p. 920). The sentences in (143b) and (143c) do not follow this principle.

Comparing English with German in the scenario of pronominal DO and nominal IO, the two languages share structural similarities only in using the DO<sub>PRON</sub>-prep-IO<sub>NOM</sub> order. The grammaticality of the IO<sub>NOM</sub>-DO<sub>PRON</sub> pattern is restricted or rejected by the grammar of both languages. German contrasts English in that it greatly supports

the DO<sub>PRON</sub>-IO<sub>NOM</sub> pattern, an arrangement consistently non-existent in English grammar.

#### 4.5.3.3 Chinese

In Chinese, the V-gěi-IO-DO and V-DO-gěi-IO patterns become ungrammatically when the IO is pronominalized, as shown in (144a) and (144b). Conversely, the grammaticality of the *bǎ*-construction is not restricted to the form of the object, (144c).

(144) He brought/sent/gave Lucy it/them (a book/books).

- a. \*他 带/递/送      给 了 露西      它/它们。 (\*V-gěi-IO-DO)  
 \*Tā    dài/dì/sòng      gěi    le      Lùxī      tā/tāmen.  
 he    bring/pass/give    PTCL.IO PTCL.PFV Lucy.IO    it.DO/them.DO
- b. \*他 带/递/送      它/它们      给 露西。 (\*V-DO-gěi-IO)  
 \*Tā    dài/dì/sòng      tā/tāmen      gěi      Lùxī.  
 he    bring/pass/give    it.DO/them.DO    PTCL.IO    Lucy.IO
- c. 他 把 它/它们      带/递/送      给 露西。 (*bǎ*-construction)  
 Tā    bǎ      tā/tāmen      dài/dì/sòng      gěi      Lùxī.  
 he    PTCL.DO it.DO/them.DO    bring/pass/give    PTCL.IO Lucy.IO

In this scenario, Chinese does not have structural correspondence with German or English.

#### ✧ Contrasting German, English, and Chinese

Table 10 shows the patterns used by the three languages when the DO is pronominal and the IO is nominal.

**Table 10:** Object Placement in German, English, and Chinese (Pronominal DO, Nominal IO)

| Word Order                               | German                                                          | English                                                | Chinese                                                                                                    |
|------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>V-DO-IO</b>                           | v Ich schenke/bringe <u>es</u><br><u>deinem Bruder</u> .        |                                                        |                                                                                                            |
| <b>V-DO-prep-IO</b>                      | v*** Ich *schenke/bringe<br><u>es <u>zu</u> deinem Bruder</u> . | v Ich give/bring <u>it</u><br><u>to your brother</u> . |                                                                                                            |
| <b>V-IO-DO</b>                           |                                                                 |                                                        |                                                                                                            |
| <b>V-prep-IO-DO</b>                      |                                                                 |                                                        |                                                                                                            |
| <b>bǎ-construction</b>                   |                                                                 |                                                        | v 我 <u>把</u> 它 <u>送/带</u> <u>给</u> 你<br><u>哥哥</u> 。Wǒ <u>bǎ</u> tā<br>sòng/dài <u>gěi</u> nǐ <u>gēge</u> . |
| ***grammaticality restricted by the verb |                                                                 |                                                        |                                                                                                            |

Chinese differs from German and English in that it solely supports the *bǎ*-construction when the DO is pronominal and the IO is nominal, which leads to an SOV order. The V-DO-IO pattern is only supported by German, and it represents the canonical word order. Only German and English share similarities in using the prepositional construction of V-DO-prep-IO. Nonetheless, a key difference remains: it is the only grammatical option in English in this case but is limited to a handful of verbs in German, as noted previously.

#### 4.5.4 Pronominal DO, Pronominal IO

##### 4.5.4.1 German

When both objects are personal pronouns, the word order follows a base hierarchy of accusative preceding dative (Engel, 1972, p. 20; Hentschel & Weydt, 2003, p. 435; Bader, 2020, p. 1066). The majority word order is DO-IO, (145).

- (145) Sie erzählt einer Freundin einen Witz.  
 she told a.DAT friend.IO a.ACC joke.DO  
 ‘She told a friend a joke.’
- > a. Sie erzählt ihn ihr.  
 she told it.ACC.DO her.DAT.IO
- b. \*Sie erzählt ihr ihn.  
 she told her.DAT.IO it.ACC.DO  
 ‘She told it to her.’ (Hentschel & Weydt, 2003, p. 436)

A reversed pattern occurs only when the direct object indicates a rheme, at which point the pronominal form also shifts. This is exemplified in (146) from Weinrich (2003, p. 388), in which the pronoun *es* is replaced by *das*.

- (146) Wie oft habe ich dir das Abendteuer schon erzählt!  
 how often have I you.DAT.IO the.ACC adventure.DO already told  
 ‘How often have I already told you about the adventure!’
- > Wie oft habe ich dir das schon erzählt!  
 how often have I you.DAT.IO it.ACC.DO /that.ACC.DO already told  
 ‘How often have I already told you about it!’

To sum up, when both objects are pronominal, the most commonly used pattern is the DO>IO, and the reversed pattern or the prepositional alternative occurs less frequently (Lorenz et al., 2019, p. 1417).

#### 4.5.4.2 English

When both DO and IO are personal pronouns, native speakers overwhelmingly prefer the prepositional construction DO-to-IO, followed by IO-DO (Lorenz et al., 2019, p.

1416). The non-prepositional variants, DO-IO and IO-DO, are used only in British English, according to Quirk et al. (1985, p. 1396). The DO-IO word order, such as *Give it me*, is solely confined to dialectal use (Gerwin, 2013, pp. 452–455; Siemund, 2013, pp. 223–225). The three patterns are exhibited below in (147).

- (147) I gave an apple to Lucas.
- > a. I gave it to him. (DO-to-IO, majority pattern)
  - b. I gave him it. (IO-DO, minority pattern)
  - c. I gave it him. (DO-IO, minority pattern)

Note that the V-IO-DO pattern almost exclusively occurs with *it* because its role as DO is clear; other personal pronouns, such as *them*, could be interpreted as an IO or a DO (Biber et al., 2021, p. 921). Furthermore, a cursory examination in COCA reveals that the productivity of the DO-IO pattern appears to be restricted by the verb.<sup>57</sup>

Thus far, no correspondence has been observed between English and German in their basic orders for placing pronominal objects. While the DO-IO is commonly used in German, it is only dialectal in English; the prevalent prepositional pattern in English, on the contrary, is uncommon in German.

#### 4.5.4.3 Chinese

When both objects are personal pronouns, the only permitted word order is the *bǎ-* construction, using *Jack lent (the book) it to her (Lucy)* as an example, (148).

---

<sup>57</sup> The grammaticality of the DO<sub>PRON</sub>-IO<sub>PRON</sub> combination is constrained by the verb used. For example, COCA has documented 11 occurrences of the token “*give it him*,” 3 occurrences of “*give it them*,” 4 occurrences of “*give them me*,” and 29 occurrences of “*give it you*”. However, when replacing the verb “*give*” with “*pass*” or “*send*,” only 1 instance of “*send them you*” and 1 of “*pass it him*” have been documented. An examination in the corpus could confirm Lorenz et al.’s (2019) finding that the prepositional construction is the most common form of ditransitive structure in English (compare the 1026 occurrences of “*give it to him*” with the mere 11 occurrences of “*give it him*”).



(148) a. *V-gěi-IO-DO*

\*杰克 借 给 她 它。

\*Jiékè jiè gěi tā tā.

Jack lend PTCL.IO her.IO it.DO

cf. Eng. ‘Jack lent her it.’

b. *V-DO-gěi-IO*

\*杰克 借 它 给 她。

\*Jiékè jiè tā gěi tā.

Jack lend it.DO PTCL.IO her.IO

cf. Eng. ‘Jack lent it her.’

c. *bǎ-DO-V-gěi-IO*

杰克 把 它 借 给 了 她。

Jiékè bǎ tā jiè gěi le tā.

Jack PTCL.DO it.DO lend PTCL.IO PTCL.PFV her.IO

#### ✧ Contrasting German, English, and Chinese

Table 11 shows the word order patterns the three languages employ when both objects are pronominal. In this setting, each language uses a distinct structure for the most typical way to arrange the word order. English and German form a sharp contrast in that the former predominantly uses the prepositional alternative, whereas the latter frequently uses the DO-IO pattern.

**Table 11:** *Object Placement in German, English, and Chinese (Pronominal DO, Pronominal IO)*

| Word Order     | German                                   | English                           | Chinese |
|----------------|------------------------------------------|-----------------------------------|---------|
| <i>V-DO-IO</i> | ✓ Ich gebe/bringe <u>es</u> <u>dir</u> . | ✓** I give <u>it</u> <u>you</u> . |         |

| Word Order                                      | German                                             | English                                | Chinese                                                                               |
|-------------------------------------------------|----------------------------------------------------|----------------------------------------|---------------------------------------------------------------------------------------|
| <b>V-DO-prep-IO</b>                             | v*** Ich *gebe/bringe <u>es</u><br><u>zu dir</u> . | v Ich give/bring<br>it <u>to you</u> . |                                                                                       |
| <b>V-IO-DO</b>                                  | Ich gebe/bringe <u>dir</u><br>* <u>es/das</u> .    | v** I give <u>you</u> it.              |                                                                                       |
| <b>V-prep-IO-DO</b><br><b>bǎ-construction</b>   |                                                    |                                        | v 我 <u>把</u> 它送/带 <u>给</u> 你。<br>(Wǒ <u>bǎ</u> tā sòng/dài <u>gěi</u><br><u>nǐ</u> .) |
| **less productive/non-canonical but grammatical |                                                    |                                        |                                                                                       |
| ***grammaticality restricted by the verb        |                                                    |                                        |                                                                                       |

#### 4.5.5 Conclusion: Contrasts in Ditransitive Construction

In examining how German, English, and Chinese construct a ditransitive structure, our analysis first reveals that structural similarities and disparities across languages are related to the form of the objects, on the one hand. On the other hand, even though certain structures are shared by the languages, their productivity varies. In the following, we conclude three main aspects where German differs from Chinese and English.

First, except for the setting where both objects are pronominal, German is the only language that supports the V-DO-IO pattern. Nevertheless, the structure represents a marked word order in settings where the DO is nominal. Chinese and English do not support such a pattern.

Second, when the DO is nominal, German, English, and Chinese all permit the V-DO-prep-IO pattern. However, the productivity of this word diverges across languages. While English and Chinese commonly use this structure, its productivity is contingent upon the verbs in German.

Finally, when both objects are pronominal, Chinese differs from German and English because it solely employs the *bǎ*-construction, which leads to an SOV sequence. English and German contrast each other in that English frequently employs the V-DO-prep-IO pattern, whereas German predominantly uses the V-DO-IO one.

## 5 Methodology

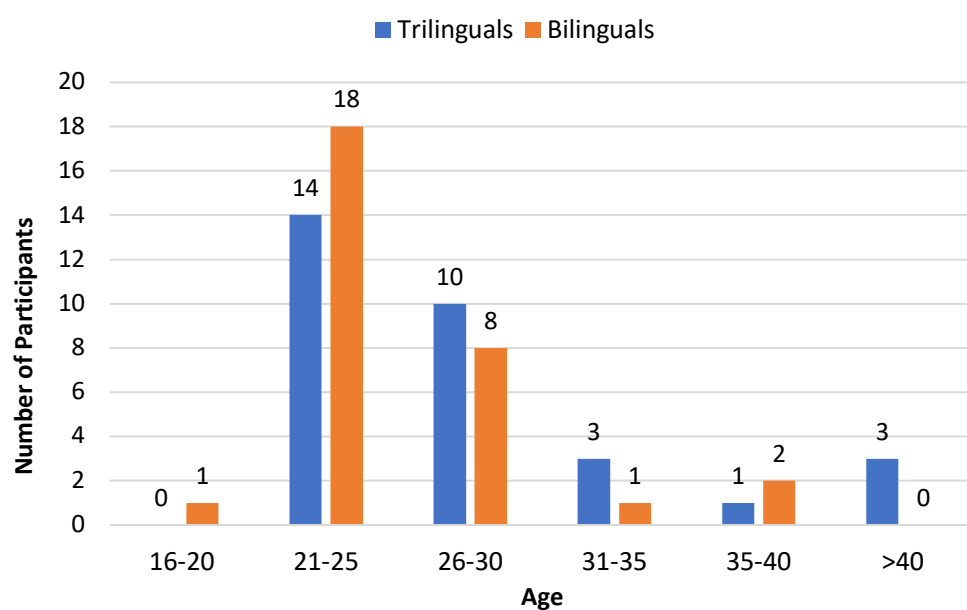
This methodology chapter is subdivided into two parts. Section 5.1 describes the participants of the study, including the recruitment process, criteria, educational background, and linguistic biography. Section 5.2 presents the experimental design, where we divide the experiment into four parts based on the contrastive study in Chapter 4. The concrete hypotheses, stimuli, as well as evaluation criteria can be found in this section.

### 5.1 Participants

#### 5.1.1 Participants Groups, Age, and Gender

Two groups of participants were recruited for the experiment in this study: 30 trilingual participants (L1 Chinese-L2 English-L3 German) and 30 bilingual participants (L1 Chinese-L2 English). The trilingual group consisted of 7 males and 23 females aged between 21 and 57, and the bilingual group consisted of 11 male and 19 female participants aged between 16 and 40, as shown in Figure 3.

**Figure 3:** *Ages of Participants*



The gender imbalance in the trilingual group resulted from the limited availability of participants who met the recruitment criteria. Most participants were aged between 20 and 30, particularly the bilinguals (26 participants out of 30). This age distribution was influenced by the recruitment platform used (Section 5.1.2). Given that we regard language proficiency and exposure as the primary precursors for CLI, we consider the imbalance between the two groups in terms of gender and age to be acceptable. All participants had either reached a high level of language proficiency or had prolonged exposure to German/English, minimizing the impact of age. Participants completed an acceptability judgment task (ATJ) and a questionnaire collecting personal information and linguistic background, including language contact and language usage (Sections 5.1.3 to 5.1.6). The questionnaire was bilingual in both English and Chinese (See Appendix 13).

### 5.1.2 Recruitment

The trilingual participants were recruited from a forum for Chinese migrants in Germany<sup>58</sup> and three online community groups: *ZJUer*<sup>59</sup> in Germany, *Chinese Students and Scholars in Hamburg*, and *Overseas Chinese in Hamburg*. Twenty-seven bilingual participants were recruited from the internal alumni forum<sup>60</sup> of Zhejiang University; three were recruited externally and were Chinese late migrants in New Zealand. The recruitment took place in 2021.

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<sup>58</sup> Name of the forum: *Kaiyuan*. Link: [www.kaiyuan.info](http://www.kaiyuan.info) (March 2021). A forum run by Kaiyuan GmbH, which provides various services for overseas Chinese in Germany. Note that the name or link might change over time.

<sup>59</sup> ZJU: An abbreviation for Zhejiang University. The online community consists of graduate students from Zhejiang University who currently work and live in Germany.

<sup>60</sup> The name of the internal forum is *ZJU CC98 Network Association*. This forum facilitates the posting of diverse information for students at ZJU, including job listings. As a ZJU alumna, the researcher utilized this platform for recruitment purposes. The researcher would like to thank Li Zhu for assisting in posting recruitment information when external personnel lacked access to the internal section.

The recruitment advertisements outlined the eligibility criteria, primarily focusing on the requisite educational and language proficiency levels. Before the commencement of the experiment, interested participants underwent a short interview to ascertain their language proficiency and linguistic background. The interview included the following questions:

- *(for trilinguals only) Do you live in Germany? If so, do you use German actively?*
- *What is your level of English/German? Please report the scores you achieved in the language tests.*
- *Have you learned any other languages besides English (and German)? If so, what is the proficiency level in these languages?*

Additional questions were administered to each participant to determine their individual language proficiency and exposure levels, ensuring that all participants exhibited similar linguistic backgrounds in terms of foreign language use. To avoid any potential influence from other languages, candidates were excluded if they reported actively learning or using any language beyond the A1 level, other than English and German.<sup>61</sup> Given the study's focus on CLI among sequential multilingual speakers, simultaneous Chinese-German bilinguals, such as L1 German speakers with Chinese as their heritage language, were excluded from participation.

The participants were informed of the purpose of the study and provided with compensation for their participation. They were offered compensation amounted to a flat rate of €10 in recognition of their time and effort, not contingent on the experiment results.

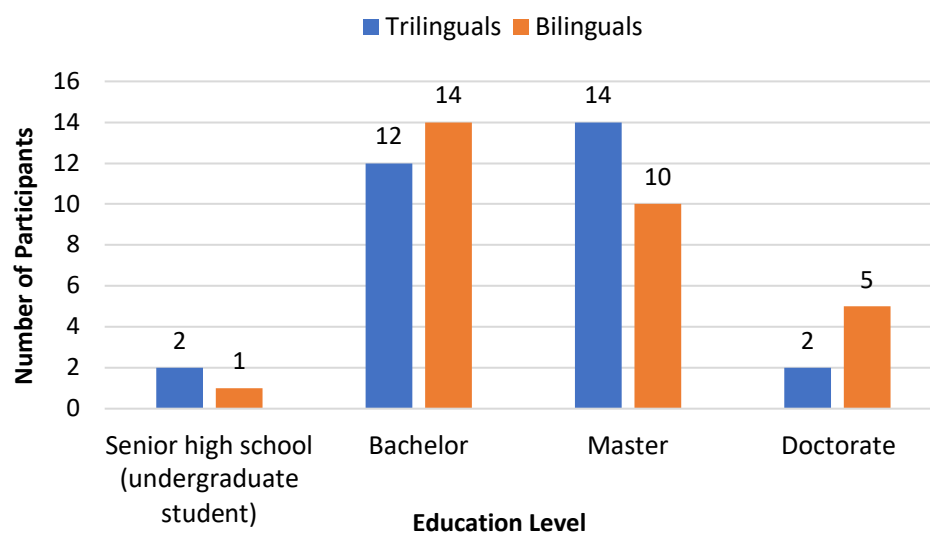
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<sup>61</sup> One trilingual participant reported having *Großes Latinum* ('Advanced Latin Certificate') but never actively using the language. Another two participants reported having attended Italian and Korean language courses of A2 level, respectively, but indicated having lower actual proficiency. Due to the multilingual ecology in Germany, finding participants with minimal exposure to additional languages proved challenging. Given that Latin is not a contemporary language of communication and that these participants have not actively used Italian and Korean, we included them as exceptions.

### 5.1.3 Education and Profession

Figure 4 shows the highest educational level pursued by the participants. Most of them were enrolled in undergraduate or graduate programs. While the participants were asked to report their highest education level, it was likely that some chose the degree they were currently pursuing at the time of participation. However, all subjects had been enrolled in an undergraduate program.

**Figure 4:** *Highest Education Level of Participants*



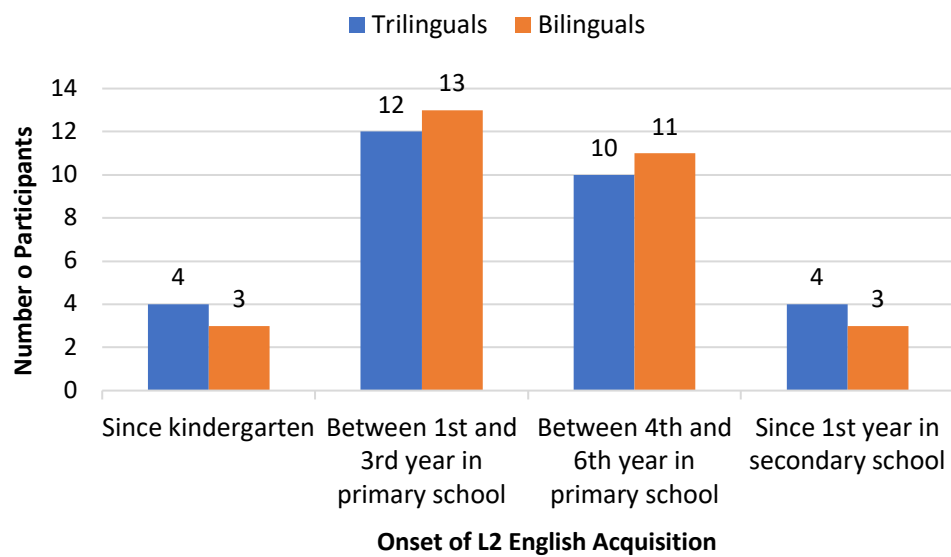
### 5.1.4 Onset of L2/L3 Acquisition

Figure 5 shows the participants' onset of L2 English acquisition. Both trilingual and bilingual groups exhibited comparable distributions in their onset of English learning, with most participants in each group ( $N_{TRI}=22$  out of 30, 73.3%;  $N_{BI}=24$  out of 30, 80%) commencing their English acquisition during primary school.<sup>62</sup> Only a small proportion of participants began to learn the language at an earlier age (in kindergarten), and only a few candidates started the process slightly later (secondary school, around the 7<sup>th</sup> grade at 12 or 13 years old).

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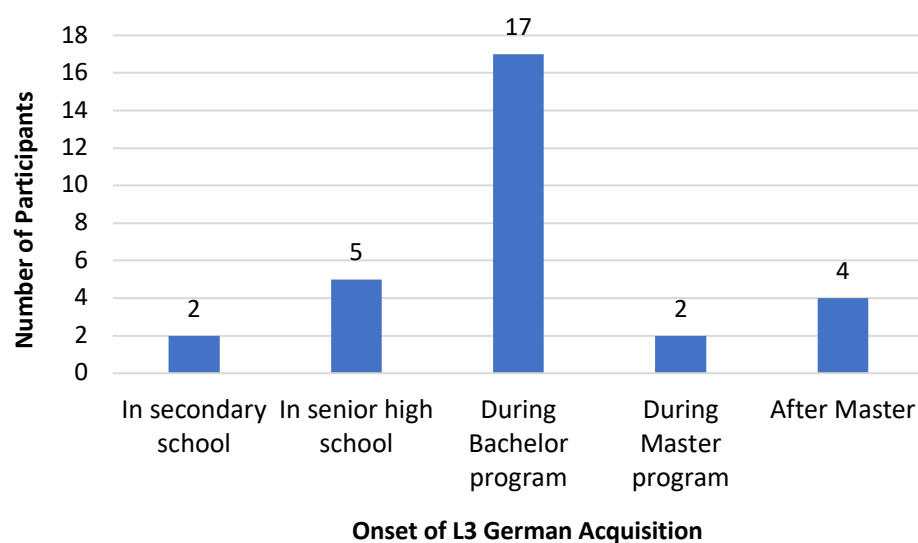
<sup>62</sup> The primary education cycle in China comprises a six-year program.

**Figure 5: Participants' Onset of L2 English Acquisition**



Regarding the onset of L3 German acquisition among trilingual participants, the majority (N = 17 out of 30, 56.7%) commenced learning German as their second foreign language during their bachelor's program. Only 4 participants initiated their German learning at a relatively later age (after completing their master's program), as exhibited in Figure 6.

**Figure 6: Trilinguals' Onset of L3 German Acquisition**



Finally, the language acquisition patterns of all participants indicate a chronologically ordered progression, with L1 Chinese, L2 English (and L3 German for trilinguals) acquired sequentially over time.

### 5.1.5 Language Proficiency

Participants' language proficiency was assessed by the self-reported results of language tests. The lowest English/German level for participation should correspond to the B2 of the *Common European Framework of Reference for Languages* (CEFR). The participants in this study passed several nationally and internationally recognized language proficiency tests, listed in Tables 12 and 13.

For statistical purposes, all the self-reported results of language tests are converted according to CEFR. Please note that there is not always a corresponding conversion between the test results and the CEFR level given by authorities. The corresponding CEFR levels for TEM, CEM, Abitur, PGG, and PGH are estimated based on the description of language competence provided by the Council of Europe.<sup>63</sup>

**Table 12: English Proficiency Tests and Corresponding CEFR Levels**

| English Proficiency Tests   | Level/Evaluation | Corresponding CEFR Level |
|-----------------------------|------------------|--------------------------|
| <b>TEM</b> <sup>64</sup>    | TEM 4            | B2/C1                    |
|                             | TEM 8            | C1/C2                    |
| <b>CEM</b> <sup>65</sup>    | CEM 4            | B2                       |
|                             | CEM 6            | B2/C1                    |
| <b>IELTS</b> <sup>66</sup>  | 6.5              | B2/C1                    |
| <b>Abitur</b> <sup>67</sup> | English 2.0      | B2/C1                    |

<sup>63</sup> Website: [Global scale - Table 1 \(CEFR 3.3\): Common Reference levels - Common European Framework of Reference for Languages \(CEFR\) \(coe.int\)](https://www.coe.int/en/web/common-european-framework-reference-languages/table-1-cefr-3.3-common-reference-levels-common-european-framework-reference-languages)

<sup>64</sup> TEM: *Test for English Majors*, a national proficiency test for English major students in China. It has two levels, TEM-4 for sophomores and TEM-8 for seniors.

<sup>65</sup> CET: *College English Test*, a national test in China that assessing English proficiency of undergraduate and postgraduate students. It has two levels: CET4 and CET6.

<sup>66</sup> IELTS: *International English Language Testing System*, a global test for non-native English speakers, scored on a scale from “band 1” (“non-user”) to “band 9” (“expert user”).

<sup>67</sup> *Abitur*: The secondary school leaving qualification in Germany that grants the right to enter higher education. English is a common core examination subject.

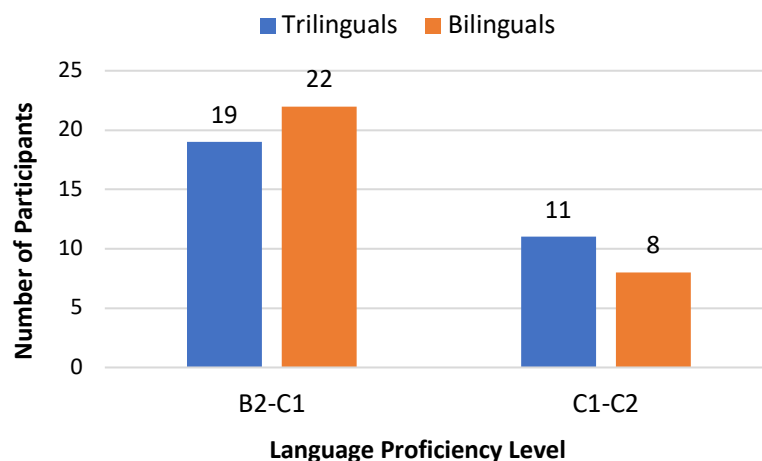


**Table 13: German Proficiency Tests and Corresponding CEFR Levels**

| German Proficiency Test                     | Level/Evaluation       | Corresponding CEFR Level |
|---------------------------------------------|------------------------|--------------------------|
| <b>Goethe-Zertifikat</b>                    | (mapped to CEFR level) | (mapped to CEFR level)   |
| <b>DSH<sup>68</sup></b>                     | DSH II                 | C1                       |
|                                             | DSH III                | C2                       |
| <b>TestDaF<sup>69 70</sup></b>              | TDN3                   | B2                       |
|                                             | TDN4                   | B2/C1                    |
|                                             | TDN5                   | C1                       |
| <b>National Test for German Proficiency</b> | PGG <sup>71</sup>      | B2                       |
|                                             | PGH <sup>72</sup>      | C1/C2                    |

### 5.1.5.1 English Proficiency

All participants reported to have reached the English proficiency of at least B2 level, as summarized in Figure 7.

**Figure 7: Participants' L2 English Proficiency**

<sup>68</sup> DSH: *Deutsche Sprachprüfung für den Hochschulzugang* (German Language Examination for University Admission), a language test of German proficiency for non-native speakers planning to study at German universities and colleges.

<sup>69</sup> TestDaF: *Test Deutsch als Fremdsprache* (Test of German as a Foreign Language), a standardized proficiency test for non-native German speakers.

<sup>70</sup> Corresponding CEFR levels are available on the TestDaF website. <https://www.testdaf.de/de/teilnehmende/warum-testdaf/testdaf-niveaus-tdn/> (July 2023).

<sup>71</sup> PGG: *Prüfung für das Germanistik-Grundstudium* (Exam for German Major Study, intermediate level), a national test of German proficiency for sophomore German majors.

<sup>72</sup> PGH: *Prüfung für das Germanistik-Hauptstudium* (Exam for German Major Study, advanced level), a national test of German proficiency for senior German majors.

Two groups exhibited similar distributions of language levels, with a majority leveled between B2 and C1. This trend may be attributed to the widespread participation in the CEM6 test, which is strongly encouraged or required by Chinese higher education institutions. Table 14 documents the number of participants at each proficiency level.

**Table 14: Trilingual and Bilingual Participants' English Proficiency**

|                                | <b>B2</b> | <b>B2/C1</b> | <b>C1</b> | <b>C2</b> |
|--------------------------------|-----------|--------------|-----------|-----------|
| <b><i>Trilingual Group</i></b> | 11        | 8            | 11        | 0         |
| <b><i>Bilingual Group</i></b>  | 2         | 20           | 6         | 2         |

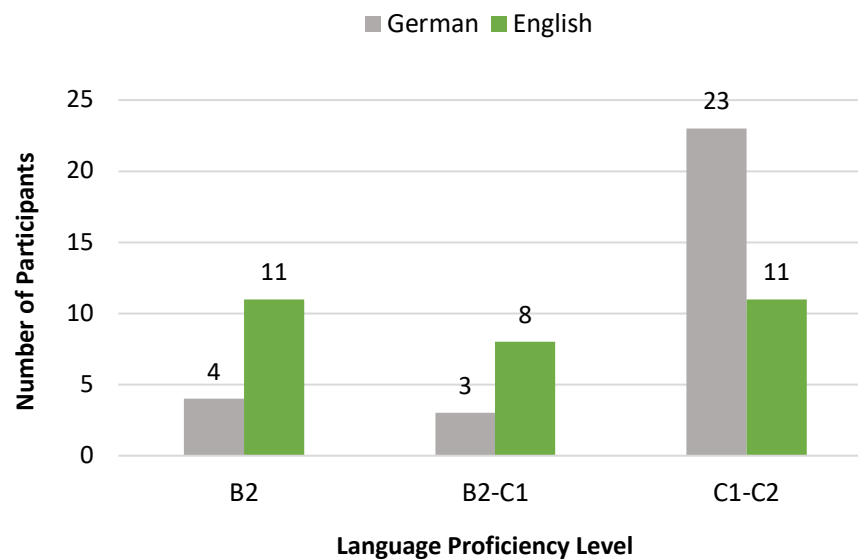
#### 5.1.5.2 German Proficiency

Among 30 trilingual participants, 23 individuals achieved levels C1 or C2 in German proficiency. Four participants reported a tested proficiency of level B2 upon arrival. However, they reported to have since either worked or studied in Germany. One such participant initially arrived in Germany with a B2 certificate and spent nine years attending senior high school and furthering her studies. During the ongoing immersion in the German language, her German proficiency notably improved. Due to a scarcity of trilingual participants meeting the established criteria, 2 subjects who had resided in Germany for over ten years without possessing language certificates were included. Their self-reported exposure to German ranged from 75-100% and 30-50%, respectively (will be discussed in the next section). Their prolonged residence in Germany ensured a substantial amount of language exposure and language use, qualifying them as suitable candidates for the study. Their German proficiency was categorized as level B2.

As demonstrated in Figure 8, the overall German proficiency of the trilingual group surpassed their proficiency in English.<sup>73</sup>

<sup>73</sup> The research design ideally required participants with matched high-level proficiency (C1-C2) in English and German. However, owing to the empirical scarcity of such highly proficient trilinguals within the target population, this criterion proved unfeasible during

**Figure 8: Comparison of Trilinguals' German and English Proficiency**



### 5.1.6 Frequency of Language Contact and Language Usage

To assess the extent of language input and output, participants were prompted to estimate the overall proportion of their daily exposure to Chinese, English, (and German), as well as the proportion of each language used in professional context and personal life. The following inquiries<sup>74</sup> were made:

- *(Multiple choice) On average, how frequently do you use or encounter Chinese/English/German daily? (\*Using Chinese/English/German includes listening, speaking, reading, and writing, such as talking with others in Chinese/English/German, watching Chinese/English/German-speaking TV series, reading books in Chinese/English/German, and writing emails using Chinese/English/German.)*

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recruitment. Therefore, a minimum proficiency of B2 was set as an inclusion criterion, with the participant pool ultimately spanning the range from B2 to C2.

<sup>74</sup> A bilingual (English-Chinese) version of the questionnaire was administered to ensure full comprehension by all participants (see Appendix 13 for the full questionnaire).

- *How frequently do you use each language at work/study on average? Please provide your answer in the following format: At work/study, I approximately use \_\_\_\_% Chinese, \_\_\_\_% English, \_\_\_\_% German.*
- *Apart from work/study, how frequently do you use each language in your personal life on average? Please provide your answer in the following format: Outside of work/study, I approximately use \_\_\_\_% Chinese, \_\_\_\_% English, \_\_\_\_% German.*

Figure 9 illustrates the self-reported overall frequency of exposure to L1 Chinese among the two groups. The data reveals that a significant portion of trilingual participants (N = 21 out of 30, 70%) reported having less contact with their mother tongue compared with other languages (Frequency < 50%). In contrast, most bilingual participants (N = 22 out of 30, 73.3%) identified Chinese as the most common language to which they were exposed. This sharp contrast is likely attributed to the differing recruitment locations: the trilingual participants, mainly recruited in Germany, have been inevitably immersed in a non-Chinese linguistic environment.

**Figure 9: Participants' Self-Reported Overall Frequency of Use/Exposure to L1 Chinese**

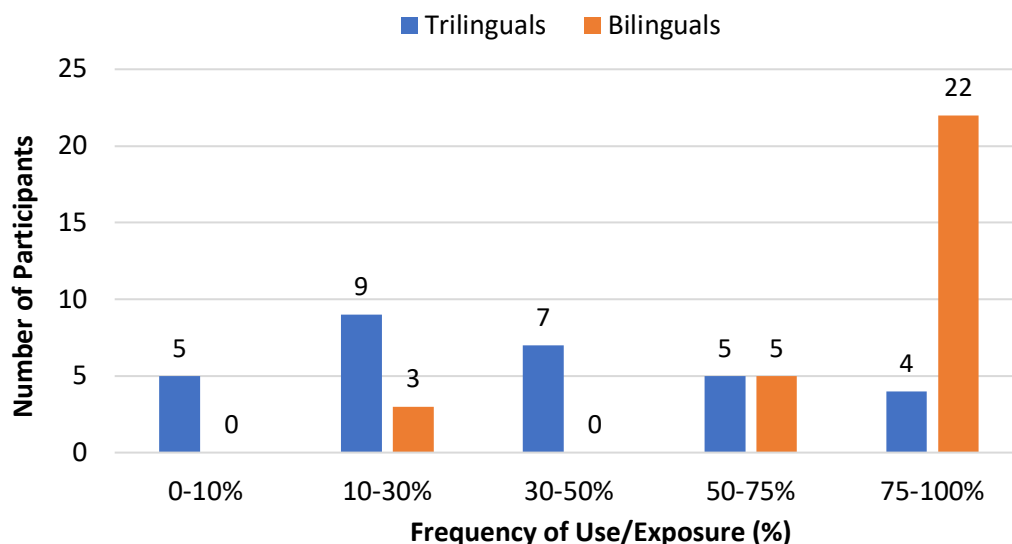


Figure 10 demonstrates participants' self-reported overall exposure to L2 English. A positive correlation is observed between the two groups regarding contact frequency

with this language. Despite their high English proficiency, most participants reported having minimal to infrequent exposure to (Frequency < 30%) their L2 English.

**Figure 10:** *Participants' Self-Reported Overall Frequency of Use/Exposure to L2 English*

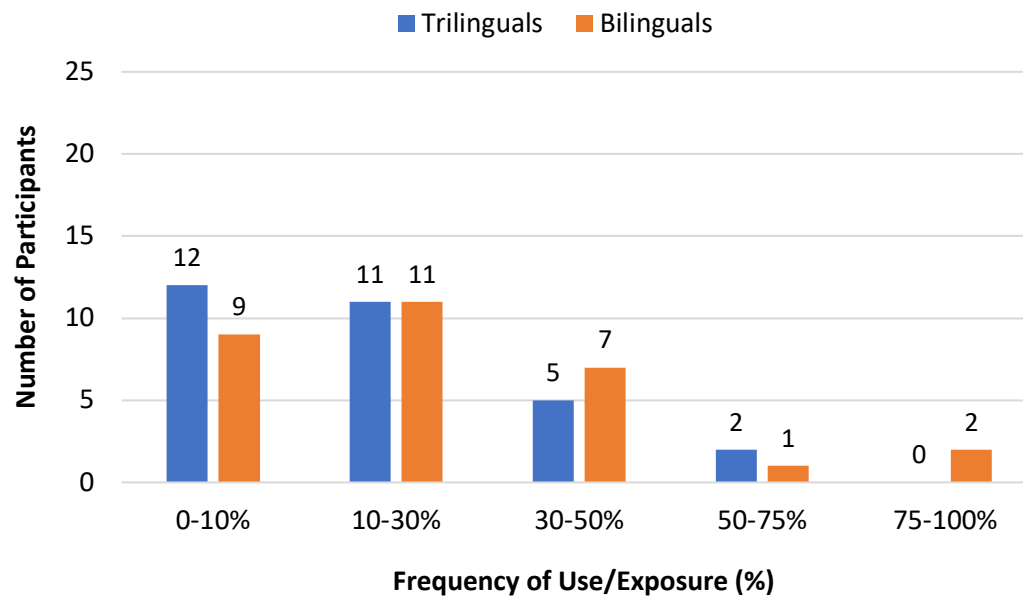


Figure 11 shows trilingual participants' self-reported frequency of exposure to L3 German. Nearly half of them (N = 13 out of 30, 43.3%) reported frequent use of the language (frequency > 50%), while only 2 participants reported using this language rarely. This aligns with the earlier results that trilinguals generally had infrequent exposure to L1 Chinese and L2 English. As all trilinguals resided in Germany by the time of recruitment, it is reasonable that German had been their language for both input and output.

**Figure 11:** *Trilinguals' Self-Reported Frequency of Use/Exposure to L3 German*

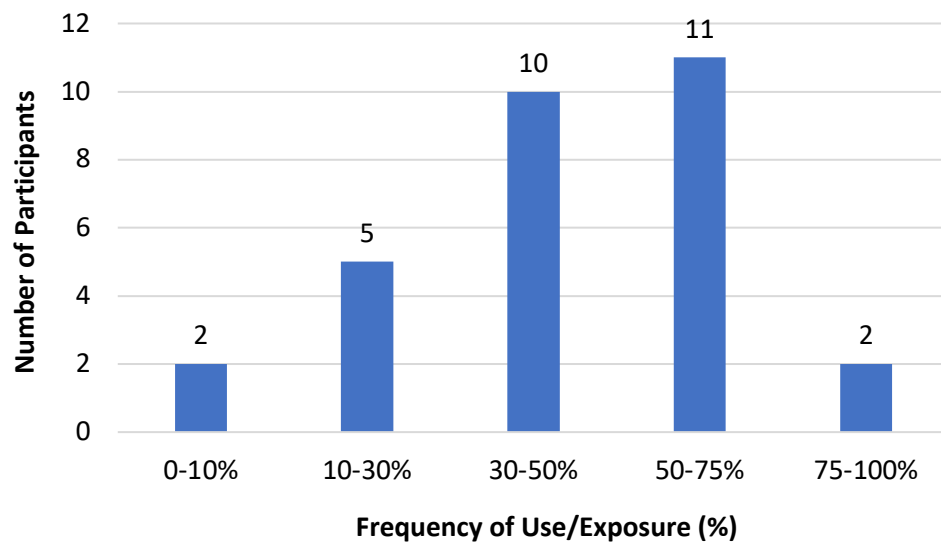


Figure 12 and Figure 13 respectively display the proportions representing the frequency of language use/exposure among trilinguals and bilinguals. L2 English was the least frequently used language by both groups. The bilinguals primarily spoke their native language, Chinese, whereas the trilinguals were more frequently exposed to both L1 Chinese and L3 German.

**Figure 12:** *Proportion of Trilinguals' Self-Reported Frequency of Exposure to Chinese, English, and German*

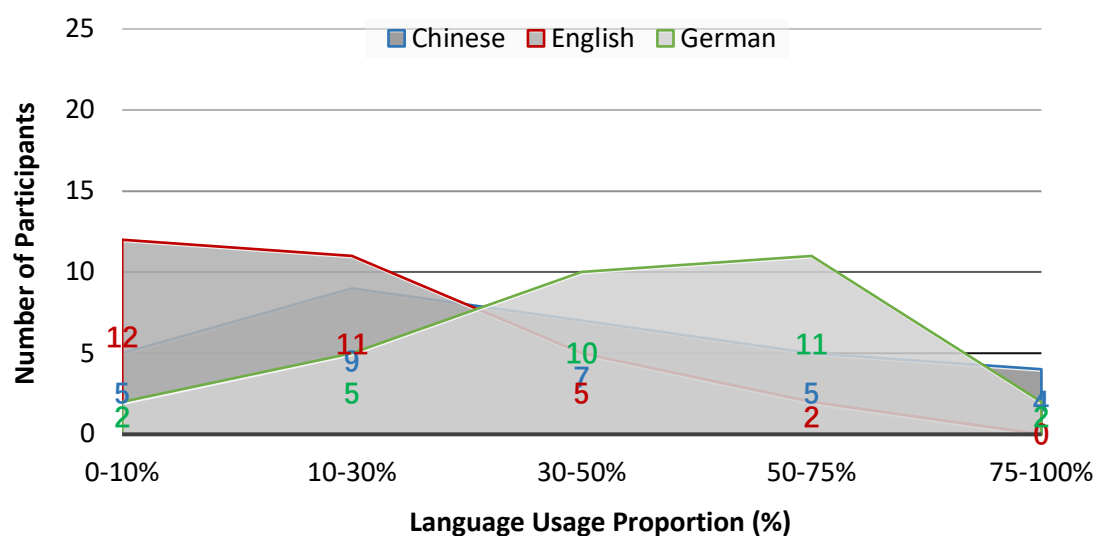
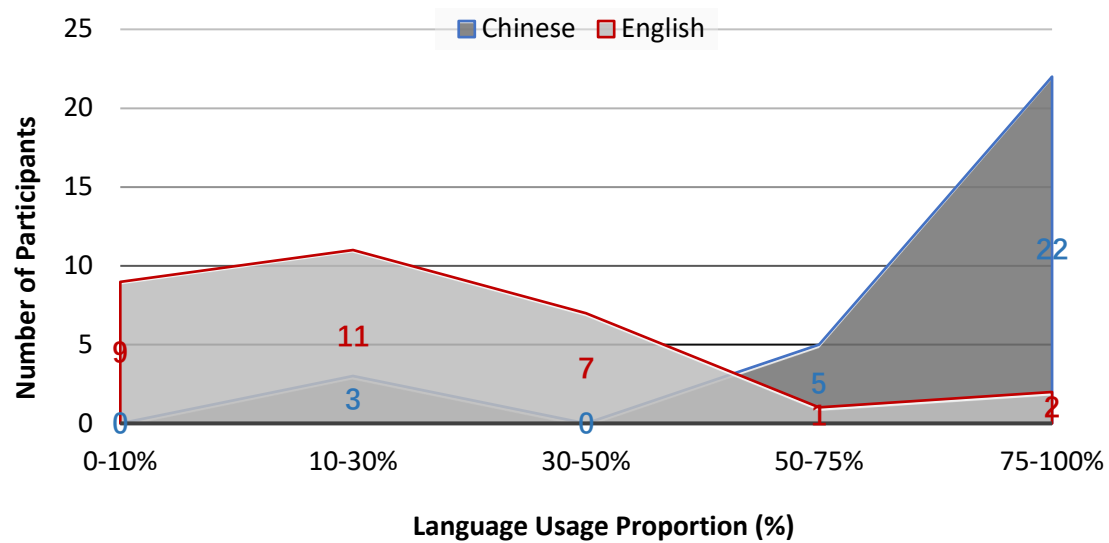


**Figure 13:** *Proportion of Bilinguals' Self-Reported Frequency of Exposure to Chinese and English*



To mitigate the potential inaccuracies in self-reported data and offer a more comprehensive understanding of participants' multilingual biography, the proportion of language use in specific situations was documented. Figure 14 and Figure 15 respectively show the participants' self-reported frequency of using L1 Chinese at work/study and in private life.

**Figure 14:** *Participants' Self-Reported Frequency of Using L1 Chinese at Work/Study*

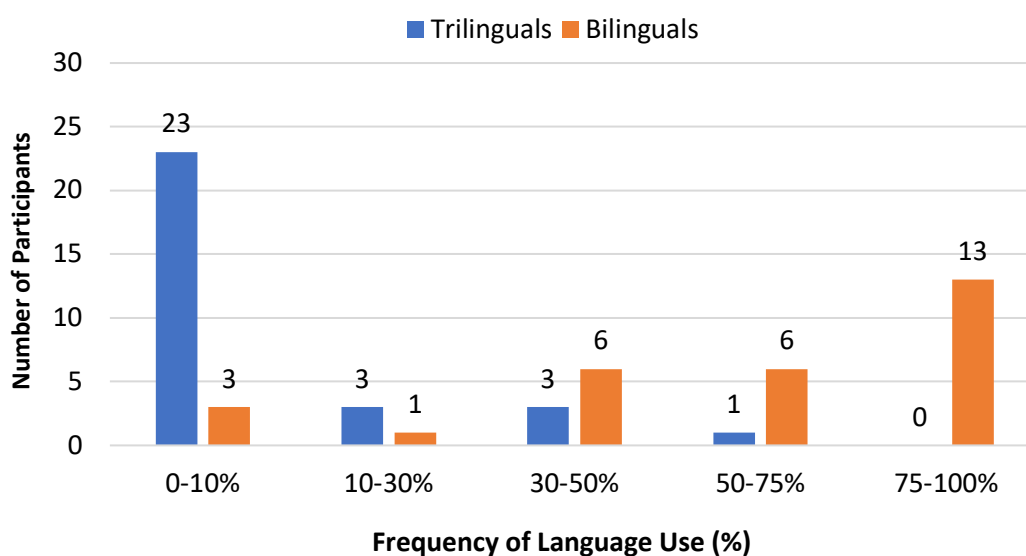
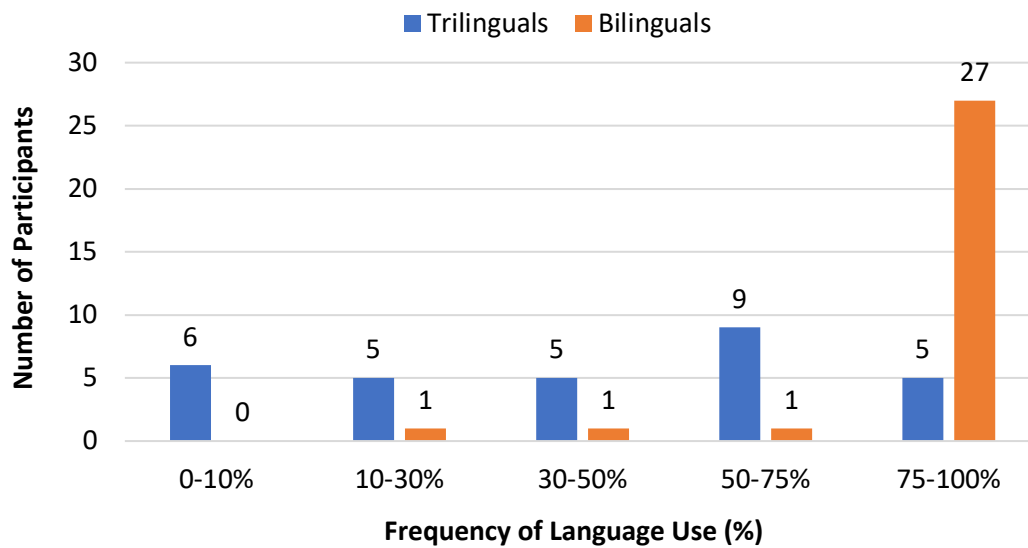


**Figure 15: Participants' Self-Reported Frequency of Using L1 Chinese in Personal Life**



Unlike the bilinguals, who predominantly used their native language for work or study, almost none of the trilingual participants reported frequent use of their mother tongue at work/study. Neither was Chinese commonly used in the personal life of the trilinguals, which sharply contrasted with the bilingual group, where nearly every participant reported highly frequent use of Chinese in their personal life. In short, the native language Chinese was not frequently used by the trilingual participants.

Figure 16 and Figure 17 respectively show the two groups' self-reported frequency of using L2 English at work/study and in personal life.

**Figure 16: Participants' Self-Reported Frequency of Using L2 English at Work/Study**

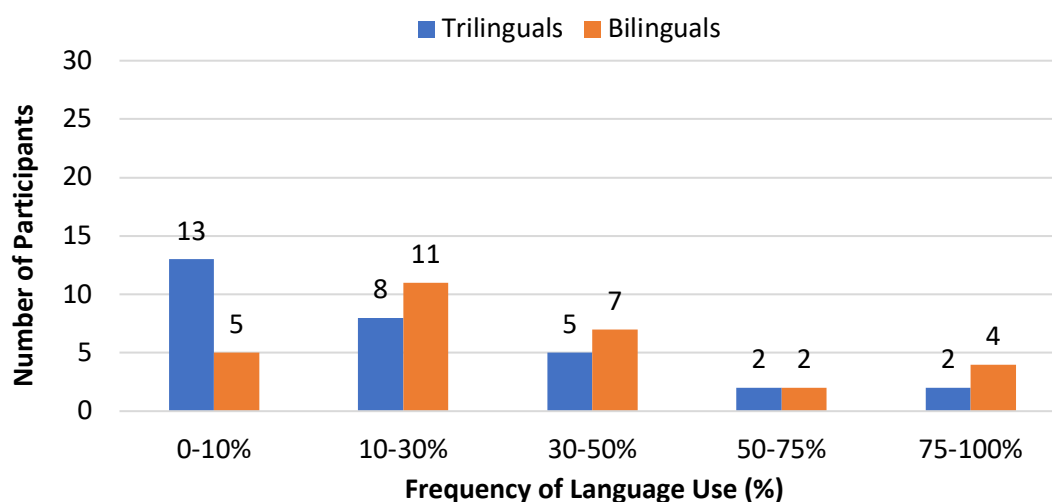
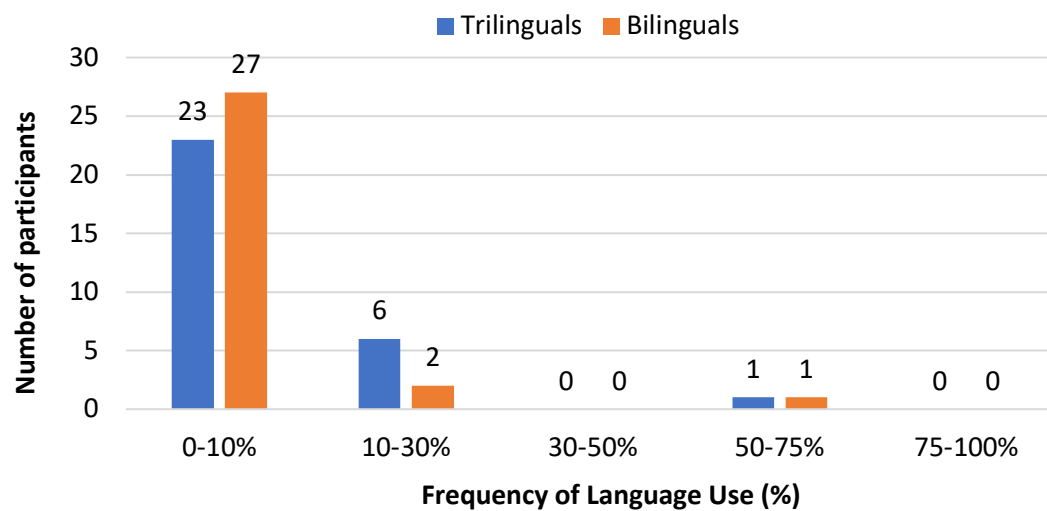




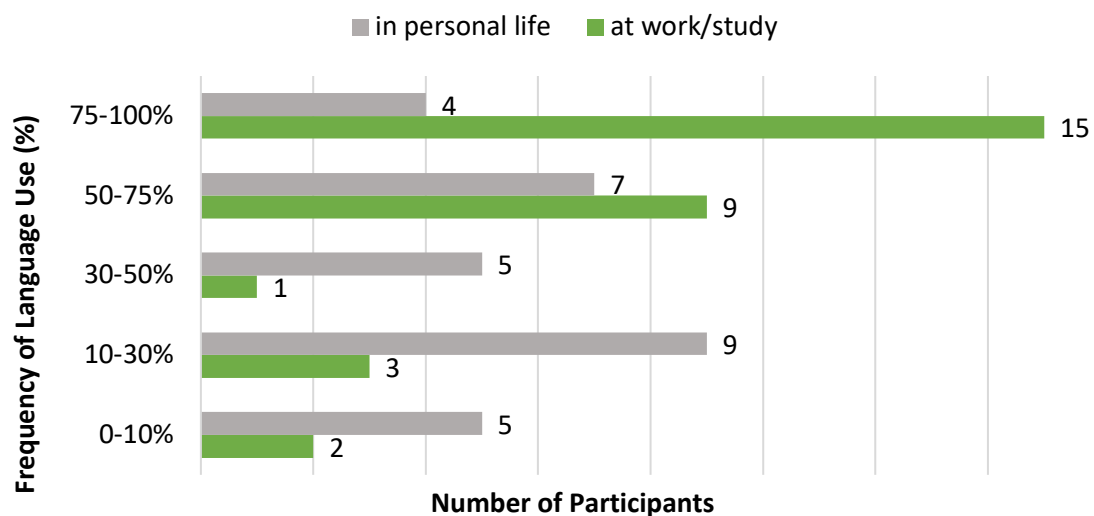
**Figure 17: Participants' Self-Reported Frequency of Using L2 English in Personal Life**



The data indicated that English was infrequently used at work/study and in personal life for both groups. A consistent trend emerged across both groups, with more participants reporting English being frequently used at work/study than in personal life. Overall, English was not a predominantly used language, as indicated by only a few participants reporting frequent usage.

Figure 18 exhibits trilingual groups' frequency of using German at work/study and in personal life.

**Figure 18: Trilinguals' Self-Reported Frequency of Using L3 German**



L3 German was predominantly used by trilingual participants for work or study, with a majority reporting frequent use of the language (Frequency > 50%, N = 24 out of 30, 80%). Usage of German in personal life varies among trilingual participants: nearly half (N = 14 out of 30, 46.7%) reported infrequent use, possibly balanced by their use of L1 Chinese; while one-third (N = 11 out of 30, 36.7%) reported it being rather frequently used. Overall, the data further support the previous finding that L3 German was primarily used among trilingual participants.

### **5.1.7 Foreign Language Dominance**

This section synthesizes the data regarding language proficiency and language use, revealing German as the predominant foreign language among the trilingual participants. Notably, they reported marginally superior proficiency in German compared with English and more frequent contact with the language.

English, on the other hand, did not emerge as a dominant language within either group. Despite minor discrepancies in English proficiency between the two groups, both met the requisite level for participation eligibility. Importantly, both groups exhibited similar patterns of English usage and exposure, maintaining proficiency levels around B2/C1 but employing the language infrequently.

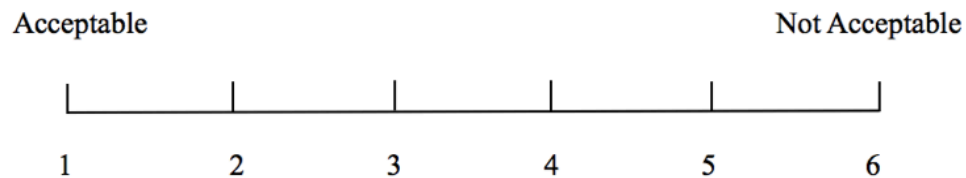
## **5.2 Experimental Design**

### **5.2.1 Acceptability Judgment Task**

An acceptability judgment task (ATJ) was conducted to assess the integral grammatical knowledge of both participant groups. Participants were required to rate stimuli using a six-point Likert scale (Figure 19). They were instructed to make judgments as quickly as possible based on their subjective sense of the naturalness and correctness of the sentences, with 1 point indicating “the sentence appears extremely unnatural and incorrect to me” and 6 points suggesting “the sentence appears perfectly natural and

correct to me.” A 6-point scale, rather than an odd-numbered scale, was used to avoid the tendency of participants to select a neutral middle point.

**Figure 19:** *The 6-Point Likert Scale in the Acceptability Judgment Task*



The primary focus of the task was subjective acceptability; thus, participants were not permitted to consult grammar rules while rating the stimuli. To facilitate a better understanding of the task, the instructions were bilingual in Chinese and English. The time allotted for completing the task was self-regulated, with a maximal duration of 1.5 hours. The researcher was available online during the ATJ to address any uncertainties or questions.

### **5.2.2 General Hypotheses**

If L3 German syntax influences the participants’ integral knowledge of L2 English word order, it is expected that the trilingual participants will perceive the English stimuli differently, whose word order aligns with German syntax while violating the syntactic configuration of English and Chinese. The first general hypothesis is formulated as follows:

- ✧ *If L3 German exerts an influence on its users’ implicit knowledge of L2 English syntax, compared with the bilingual group, the trilingual group will exhibit significantly greater acceptability to English stimuli arranged in German word order, even when this word order does not adhere to the syntactic configuration of English and Chinese.*

To better illustrate the concept of our experimental design, we show an example of stimulus reflecting language contrasts. As seen in Table 15, while German requires subject-simple verb inversion (V2) when a manner adverbial is fronted, English and Chinese do not permit the inverted order; instead, they support the marked verb-third position (V3). The trilingual participants are expected to assign higher scores to the ungrammatical V2 stimulus: *\*Beautifully sings the opera singer* than the bilingual controls because this word order Adv<sub>MANNER</sub>-V-S is grammatical only in German.

**Table 15:** *Example of an Ungrammatical Stimulus Arranged in German Word Order and its Word-for-Word Counterparts in German and Chinese*

| <i>Involved Word Order: Adv<sub>MANNER</sub>-V-S</i> |                     |          |                          |
|------------------------------------------------------|---------------------|----------|--------------------------|
|                                                      | <b>Adv</b>          | <b>V</b> | <b>S</b>                 |
| Stimulus in English:                                 | <i>*Beautifully</i> | sings    | <i>the opera singer.</i> |
| Counterpart in German:                               | <i>Schön</i>        | singt    | <i>der Opernsänger.</i>  |
| Counterpart in Chinese:                              | <i>*优美地</i>         | 唱歌       | <i>歌剧演员。</i>             |
|                                                      | <i>*Yōuměide</i>    | chànggē  | <i>gējùyǎnyuán.</i>      |

The second general hypothesis pertains to scenarios where more than one word order is available for arranging a sentence in English. The trilingual participants are expected to show preference to the stimulus variant whose word order aligns with German syntax and display lower acceptance of the other variant that violates the German syntactic rule.<sup>75</sup> The hypothesis is formulated as follows:

- ✧ *If L3 German exerts an influence on its users' implicit knowledge of L2 English syntax, in situations where several word orders are available in English, the trilingual group will favor the stimulus variant that aligns with German syntactic configuration over the one that violates German grammar rules.*

<sup>75</sup> This hypothesis relates to the surface structural overlap hypothesis, which states that linguistic property is more likely to be subject to CLI if it can be represented with two different syntactic structures in one language but only one possibility in the other (Hulk & Müller, 2000; Argyri & Sorace, 2007; Kupisch, 2014). The surface structural overlap, nonetheless, was initially introduced to explain transfer phenomena in the context of early bilingual acquisition.

An example is provided in Table 16, where English grammar supports two types of orders in forming a transitive VPC. In this scenario, German solely permits the discontinuous order; Chinese allows for the continuous order but also employs a word order distinct from that of German and English (see Section 4.3). The trilinguals are expected to show higher ratings for the discontinuous variant, *She throws the trash away*, than the continuous one, *She throws away the trash*.

**Table 16:** Example of a Pair of Grammatical Stimuli and Grammaticality of their Word-for-Word Counterparts in German and Chinese

| <i>Involved Word Orders: V-DO-Ptcl and V-Ptcl-DO</i> |                                                  |                                                 |
|------------------------------------------------------|--------------------------------------------------|-------------------------------------------------|
|                                                      | <b>V-DO-Ptcl</b>                                 | <b>V-Ptcl-DO</b>                                |
| <i>Stimulus in English:</i>                          | She <b>throws</b> <u>the trash</u> <b>away</b> . | She <b>throws away</b> <u>the trash</u> .       |
| <i>Counterpart in German:</i>                        | Sie <b>schmeißt</b> <u>den Müll</u> <b>weg</b> . | *Sie <b>schmeißt weg</b> <u>den Müll</u> .      |
| <i>Counterpart in Chinese:</i>                       | *她 扔 <u>垃圾</u> 掉。<br>*Tā rēng <u>lājī</u> diào.  | 她 扔 掉 <u>垃圾</u> 。<br>Tā rēng diào <u>lājī</u> . |

In the following section, we introduce the stimuli for four scenarios where backward transfer is hypothesized to occur. For each scenario, specific sub-hypotheses are made.

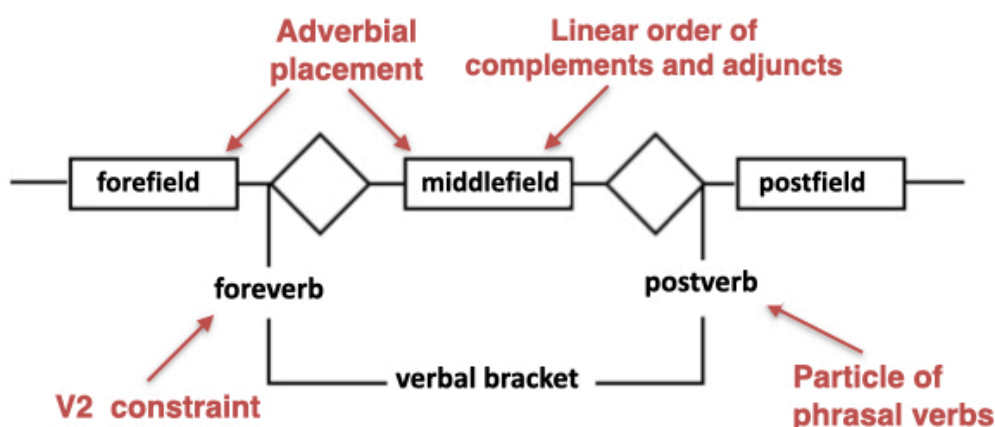
### 5.2.3 Sub-Hypotheses and Stimuli

The stimuli in the ATJ were designed based on the structural mismatches between German and English/Chinese, as elaborated in Chapter 4. The mismatches arise from the features of word orders governed by the German verbal bracket.

Figure 20 illustrates several syntactic features that German from English and Chinese. These syntactic features might be transferred to how speakers of German perceive English word order, they are (1) the V2 constraint, which permits only one constituent to occupy the forefield; (2) word order configurations in the middlefield, including the linear order of complements (direct object, indirect object, PP complement), adjuncts (different types of adverbials), and their order when present

together; (3) the verb-final position (VF), where the particle of a phrasal verb (corresponding to the concept of *Trennbare Verb* ‘separable verb’) functions as a postverb and must occupy the VF position.

**Figure 20:** German Bracket Fields and Sources for Potential Backward Transfer



(adapted from *Duden Textgrammatik der deutschen Sprache*, Weinrich, 2003, p. 60)

Based on these syntactic features, four main scenarios have been identified in which the trilingual participants might perceive word orders differently: (1) inversion, (2) word order variation in transitive verb-particle constructions (VPCs), (3) adverbial placement in SV declarative clauses, and (4) patterns of placing objects in forming ditransitive constructions. The concrete contrasts between German and English/Chinese have been detailed in Chapter 4, providing the basis for designing corresponding stimuli for the ATJ. In the following four sub-sections, we briefly revisit the language contrasts, formulate sub-hypotheses tailored for each scenario, and list the stimuli as well as the rationale for their design.

### 5.2.3.1 Inversion

The first potential of syntactic transfer from German to English arises from its V2 constraint. In German, only one constituent is permitted to occupy the forefield. If the forefield is occupied by a non-subject element, the subject must move the middlefield

after the finite verb, resulting in an obligatory subject-verb inversion. While most inversions are grammatical in German, their grammaticality in English and Chinese is largely restricted by the linguistic context, especially the type of the fronted element. Based on this syntactic disparity, a sub-hypothesis is formulated:

- ✧ *Compared with the bilinguals, trilingual participants will show higher acceptance of stimuli in subject-verb inversion, whether grammatical or not.*

We expected the trilinguals to assign higher mean scores to stimuli featuring the X-S-V or X-Aux-S-V structures than the bilingual controls. X represented a non-subject element, as exemplified below by a manner adverb and a non-directional PP, respectively.

(149) *Subject-simple verb inversion*

|      | <b>Adv</b>           | <b>V</b>      | <b>S</b>                 |
|------|----------------------|---------------|--------------------------|
| Eng. | * <i>Beautifully</i> | sings         | <i>the opera singer.</i> |
| Ger. | <i>Schön</i>         | <i>singt</i>  | <i>der Opernsänger.</i>  |
| Chn. | * <i>优美地</i>         | 唱 着           | <i>歌剧演员。</i>             |
|      | * <i>Yōuměide</i>    | chàng zhe     | <i>gējù yǎnyuán.</i>     |
|      | beautifully          | sing PTCL.DUR | opera singer             |

(150) *Subject-auxiliary inversion*

|      | <b>PP</b>         | <b>Aux</b> | <b>S</b>   | <b>V</b> |
|------|-------------------|------------|------------|----------|
| Eng. | * <i>With him</i> | should     | <i>you</i> | talk.    |
| Ger. | <i>Mit ihm</i>    | sollst     | <i>du</i>  | reden.   |
| Chn. | * <i>和 他</i>      | 应该         | <i>你</i>   | 谈谈。      |
|      | * <i>Hé tā</i>    | yīnggāi    | <i>nǐ</i>  | tántan.  |
|      | with him          | should     | you        | talk     |

Moreover, the sub-hypothesis is expected to hold even if the word order after the inversion part does not completely conform to the linear order of the German verbal bracket. This occurs when the sentence contains an additional constituent other than the fronted element, the auxiliary, the verb, and the subject.

Consider example (151), where the sentence features a direct object. In German verbal syntax, a non-finite verb should move to the VF position at the clause’s final, and the direct object is placed in the middlefield, forming an Adv-Aux-S-DO-V order. In English and Chinese, the lexical verb immediately follows the auxiliary (if there is any in Chinese), following the Adv-Aux-S-V-DO sequence. Therefore, the word order of the sentence *Probably has he forgotten us* only partially aligns with German word order in the subject-auxiliary inversion, *probably has he*, whereas the remainder of the sentence, *forgotten us*, does not conform to the configuration of the verbal bracket.

|       |      |                       |            |                    |                     |                 |           |
|-------|------|-----------------------|------------|--------------------|---------------------|-----------------|-----------|
| (151) |      | <b>Adv</b>            |            | <b>Aux</b>         | <b>S</b>            | <b>V</b>        | <b>DO</b> |
|       | Eng. | <i>*Probably</i>      |            | has                | he                  | forgotten       | us.       |
|       | Ger. | <i>Wahrscheinlich</i> | hat        | er                 | <i>*vergessen</i>   |                 | uns.      |
|       | Chn. | <i>*可能</i>            |            |                    | 他                   | 忘 了             | 我们。       |
|       |      | <i>*Kěnéng</i>        |            |                    | tā                  | wàng le         | wǒmen.    |
|       |      | probably              |            |                    | he                  | forget PTCL.PFV | us        |
| but:  | Ger. | <b>FOREFIELD</b>      | <b>V2</b>  | <b>MIDDLEFIELD</b> | <b>VF</b>           |                 |           |
|       |      | <b>Adv</b>            | <b>Aux</b> | <b>S DO</b>        | <b>V</b>            |                 |           |
|       |      | <i>Wahrscheinlich</i> | hat        | er uns             | <b>vergessen.</b>   |                 |           |
|       |      | probably              | has        | he us              | forgotten.V.NON-FIN |                 |           |

Similarly, in example (152), the particle of a VPC in German functions as a postverb and is separated from the main verb, occupying the clause-final position, while in English and Chinese, it may remain attached. The surface structure of the English



sentence only partially overlaps that of German in the subject-simple verb inversion, but not the placement of the verb-particle.

|       |                  |                |          |               |
|-------|------------------|----------------|----------|---------------|
| (152) | <b>Adv</b>       | <b>V-Ptcl</b>  | <b>S</b> | <b>DO</b>     |
| Eng.  | <i>*Slowly</i>   | figures out    | John     | the solution. |
| Ger.  | <i>Langsam</i>   | *findet heraus | John     | die Lösung.   |
| Chn.  | <i>*慢慢地</i>      | 想-出            | 约翰       | 解决办法。         |
|       | <i>*Mànmande</i> | xiǎng-chū      | Yuēhàn   | jiějuébànfǎ.  |
|       | slowly           | figure-out     | John     | solution      |

|      |                  |               |                               |                |
|------|------------------|---------------|-------------------------------|----------------|
| but: | <b>FOREFIELD</b> | <b>V2</b>     | <b>MIDDLEFIELD</b>            | <b>VF</b>      |
|      | <b>Adv</b>       | <b>V</b>      | <b>S</b> <b>DO</b>            | <b>Ptcl</b>    |
| Ger. | <i>Langsam</i>   | <i>findet</i> | <i>John</i> <i>die Lösung</i> | <i>heraus.</i> |
|      | slowly           | figures       | John    the solution          | out            |

We expect the trilinguals to show greater acceptance toward stimuli such as *Probably has he forgotten us* and *Slowly figures out John the solution*, even if they only partially adhere to the German word order. If this expectation proves true, it can be argued that the V2 constraint in German has stronger transferability compared with other features, such as the requirement for non-finite verbs and particles to occupy the VF position.

The ATJ included 88 stimuli featuring different types of fronted non-subject elements. Among them, 27 were grammatical and 61 were ungrammatical. The imbalance in the number of grammatical stimuli lies in the fact that only a few circumstances allow for inversion in English. Thirty-seven of them featured subject-auxiliary inversion, and 51 featured subject-simple verb inversion. These inverted stimuli involved fronted elements falling into ten categories, thus with different grammaticality, as shown in Table 17.

**Table 17: Category of Fronted Elements**

| Category Code           | Category of Fronted Elements                       |
|-------------------------|----------------------------------------------------|
| <b>A</b>                | Directional phrase                                 |
| <b>AA</b> <sup>76</sup> | Locative phrase                                    |
| <b>B</b>                | Non-directional adverbial with longer PPs          |
| <b>C</b>                | Stance adverbial (attitude/evaluation/probability) |
| <b>D</b>                | Manner adverbial                                   |
| <b>E</b>                | Frequency adverbial                                |
| <b>F</b>                | Adverbial with negative/restrictive meaning        |
| <b>G</b>                | Adverbial clause                                   |
| <b>H</b>                | <i>So + adj/adv</i> construction                   |
| <b>I</b>                | Direct quote                                       |

As detailed in Section 4.2, whether an inversion is grammatical in English largely depends on the type of the fronted element. Inversion can be triggered when the fronted elements are directional phrases, locative phrases, adverbials with restrictive or negative meaning, *so + adj/adv*, and direct quotes (Categories A, AA, F, H, and I). The fronting of other types of elements, mainly adverbials in other semantic categories, does not lead to inversion in English, as in contrast to German. Chinese aligns with English as it only allows for directional and locative inversion. Based on Biber et al.'s (1999) taxonomy of adverbials (§10), we arranged several semantic classes of adverbials in the experiment (Categories B to E). Inverted stimuli featuring these fronted elements were ungrammatical. All stimuli were labeled using a categorical labeling system; for example, stimulus A1 denoted the first sentence in the stimuli set where the fronted element was a directional phrase.

Moreover, fronted elements with different lengths and syntactic weights were arranged to ensure diversity within the dataset. These included short adverbs and prepositions, longer PPs and AdvPs, and clauses. Generally, trilinguals are expected to assign higher scores than bilinguals to all stimuli, irrespective of grammaticality,

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<sup>76</sup> Stimuli featuring the fronting of a locative phrase is labeled AA because locative inversion overlaps with directional inversion in certain cases. For instance, the locative phrase *on the wall* in the context of “hanging something on the wall” denotes a direction or a movement. In the current study, this case is categorized as directional inversion.

semantic category, and syntactic weight. However, given the complexity of the inversion phenomenon, it was of interest to consider these variables in the experiment.

**(1) DIRECTIONAL INVERSION**

Fourteen inverted sentences featuring the fronting of a directional phrase were provided in the AJT, as listed in Table 18. Stimuli A1 to A6 featured subject-auxiliary inversion with motion verbs, and stimuli A7 to A12 were their subject-auxiliary equivalences. Stimuli A13 and A14 were arranged to test participants' acquisition of the specific rule that directional inversion is incompatible with transitive structures.

**Table 18: Stimuli Featuring Directional Inversion**

| Type                          | No. | Stimuli                                                 |
|-------------------------------|-----|---------------------------------------------------------|
| Subject-auxiliary inversion   | A1  | <i>*In has he come.</i>                                 |
|                               | A2  | <i>*Into the North Atlantic Ocean has Titanic sunk.</i> |
|                               | A3  | <i>*Back to the village has the farmer come.</i>        |
|                               | A4  | <i>*Into the house must the boys run.</i>               |
|                               | A5  | <i>*Into the house have they run.</i>                   |
|                               | A6  | <i>*Down the hill has the football rolled.</i>          |
| Subject-simple verb inversion | A7  | <i>*In came he.</i>                                     |
|                               | A8  | <i>Into the North Atlantic Ocean sank Titanic.</i>      |
|                               | A9  | <i>Back to the village comes the farmer.</i>            |
|                               | A10 | <i>With him should you talk</i>                         |
|                               | A11 | <i>*Into the house run they.</i>                        |
|                               | A12 | <i>Down the hill rolled the football.</i>               |
|                               | A13 | <i>*On each wall hangs Bill a large picture.</i>        |
|                               | A14 | <i>*On each wall hangs Bill it.</i>                     |

Subject-auxiliary inversion using the X-Aus-S-V word order is not permitted when a directional phrase is fronted, stimuli A1 to A6 were therefore ungrammatical. Subject-simple verb directional inversion is possible; however, it occurs only when the verb is intransitive and the subject is not a light-weight pronoun. Stimuli A7, A11, A13, and A14 were thus ungrammatical. The German word-for-word counterparts of these stimuli would be grammatical.

## (2) LOCATIVE INVERSION

Ten stimuli featuring the fronting of a locative phrase were arranged, as listed in Table 19. The grammaticality of locative inversion is contingent on the verb. Verbs denoting motion, such as *run*, *sit*, *stand*, and *be*, support locative inversion in simple and progressive tenses; other verbs, such as *write* and *reside*, do not. Stimuli AA7 to AA10 were ungrammatical, as they featured non-motion verbs. We aimed to investigate whether the participants could discern the grammaticality in specific situations, or whether they would generalize the grammaticality of locative inversion solely based on the overarching Adv<sub>LOC</sub>-V-S word order.

**Table 19:** *Stimuli Featuring Locative Inversion*

| No.  | Stimuli                                        |
|------|------------------------------------------------|
| AA1  | <i>In the shadow is standing a tall man.</i>   |
| AA2  | <i>Among the guests was Mary.</i>              |
| AA3  | <i>Among the guests sits Mary.</i>             |
| AA4  | <i>In the shadow stands a tall man.</i>        |
| AA5  | <i>At an old desk sits Jimmy Brown.</i>        |
| AA6  | <i>Along the riverside runs a little dog.</i>  |
| AA7  | <i>*In a corner are laughing the children.</i> |
| AA8  | <i>*At an old desk is writing Tom Lopez.</i>   |
| AA9  | <i>*At an old desk writes Tom Lopez.</i>       |
| AA10 | <i>*In Munich resides the man.</i>             |

Besides, stimuli with the progressive form were included in the ATJ, even though German does not employ the *be* + *gerund* structure. This structure was tentatively incorporated to investigate whether backward transfer operates strictly verbatim (Adv<sub>LOC</sub>-Aux<sub>BE</sub>-V<sub>GERUND</sub>-S) or at the level of an overarching word order conforming to German syntax (Adv<sub>LOC</sub>-V-S, e.g., <*In the shadow*> *is standing* <*a tall man*>). If the former is true, the trilinguals will show greater acceptance than the bilinguals only when assessing stimuli with simple tenses. If transfer occurs at the overarching word order level, meaning that the abstract X-V-S syntactic representation is transferred—

which is almost always grammatical in German—the trilinguals will show higher acceptability to all these stimuli, regardless of other variables in the sentence.

### (3) *NON-DIRECTIONAL PREPOSITION PHRASES*

The fronting of non-directional prepositional adverbials does not trigger inversion. Table 20 shows 12 stimuli featuring a non-directional PP with more than one word. None of the stimuli was grammatical.

**Table 20:** *Inverted Stimuli with Fronted Non-Directional PPs*

| Type                             | No. | Stimuli                                                      |
|----------------------------------|-----|--------------------------------------------------------------|
| Subject-auxiliary<br>inversion   | B1  | <i>*With him should you talk.</i>                            |
|                                  | B2  | <i>*With the class teacher should all parents talk.</i>      |
|                                  | B3  | <i>*Until midnight should they stay awake.</i>               |
|                                  | B4  | <i>*In this way can you rebuild your life.</i>               |
|                                  | B5  | <i>*At 7:00 must I get up.</i>                               |
| Subject-simple verb<br>inversion | B6  | <i>*In my opinion is the answer correct.</i>                 |
|                                  | B7  | <i>*Since 1999 left no employee the company.</i>             |
|                                  | B8  | <i>*In his notebook writes the student everything down.</i>  |
|                                  | B9  | <i>*At nine o'clock goes Nick to bed.</i>                    |
|                                  | B10 | <i>*Every day at 7:00 go Nick and his brother to school.</i> |
|                                  | B11 | <i>*To me means this present a lot.</i>                      |
|                                  | B12 | <i>*For three hours lasted the movie.</i>                    |

Various semantic types of PP adverbials were provided in this setting, such as comitative adverbials (e.g., *with him*, *with the class teacher*), temporal adverbials (e.g., *until midnight*, *every day at 7:00*), and stance adverbials (e.g., *in my opinion*, *to me*).

These stimuli featured various structures, including intransitive construction, as in B1 *\*With him should you talk*; transitive construction, as in B4 *\*In this way can you rebuild your life*; intransitive verb-particle construction, as in B3 *\*Until midnight should they stay awake*; and PP-complement, as in B9 *\*At nine o'clock goes Nick to bed*. It should be noted that stimuli B3, B4, and B5 only partially overlapped with their grammatical German counterparts in the subject-auxiliary inversion X-Aux-S. The rest

of the sentence deviated from the verb-final position (VF) configuration of German, explained earlier.

#### (4) *STANCE ADVERBIALS*

Stimuli C1 to C9 were ungrammatical inversions with fronted short stance adverbials. They included adverbs of probability (*probably*), evaluation (*largely*), and attitude (*surprisingly*, *absolutely*, *certainly*), as listed in Table 21. Stimuli C1 to C5 featured subject-auxiliary inversion and C6 to C9 subject-simple verb inversion.

**Table 21:** *Inverted Stimuli with Fronted Stance Adverbials*

| Type                          | No. | Stimuli                                          |
|-------------------------------|-----|--------------------------------------------------|
| Subject-auxiliary inversion   | C1  | <i>*Probably has he forgotten us.</i>            |
|                               | C2  | <i>*Probably will he leave early.</i>            |
|                               | C3  | <i>*Surprisingly have they already finished.</i> |
|                               | C4  | <i>*Absolutely should you take a rest.</i>       |
|                               | C5  | <i>*Unfortunately was he killed.</i>             |
| Subject-simple verb inversion | C6  | <i>*Probably comes Alex as well.</i>             |
|                               | C7  | <i>*Probably likes she this feeling.</i>         |
|                               | C8  | <i>*Certainly was it very good.</i>              |
|                               | C9  | <i>*Largely depends it on his decision.</i>      |

The word orders of stimuli C1, C4, and C7 did not fully conform to German syntactic configuration within the verbal bracket.

#### (5) *MANNER ADVERBIALS*

Twelve ungrammatical inversions with fronted manner adverbials were arranged in the ATJ, as in Table 22. Stimuli D1, D2, and D7 only partially overlapped with German word order in subject-verb inversion, but the sentence segments after the subject followed the syntactic configuration of English. The word orders of other stimuli matched exactly that of their German counterparts.

**Table 22: Inverted Stimuli with Fronted Manner Adverbials**

| Type                          | No. | Stimuli                                                   |
|-------------------------------|-----|-----------------------------------------------------------|
| Subject-auxiliary inversion   | D1  | <i>*Over and over again has he made the same mistake.</i> |
|                               | D2  | <i>*Quickly has he fallen asleep.</i>                     |
|                               | D3  | <i>*Quickly was the problem solved.</i>                   |
| Subject-simple verb inversion | D4  | <i>*Quickly ran the children into the classroom.</i>      |
|                               | D5  | <i>*Quickly put the firefighter the fire out.</i>         |
|                               | D6  | <i>*Slowly read the children the text.</i>                |
|                               | D7  | <i>*Slowly figures out John the solution.</i>             |
|                               | D8  | <i>*Easily solved the team the problem.</i>               |
|                               | D9  | <i>*Beautifully sings the opera singer.</i>               |
|                               | D10 | <i>*Angrily speaks the woman.</i>                         |
|                               | D11 | <i>*Elegantly talks the movie star.</i>                   |
|                               | D12 | <i>*Loudly barks the dog.</i>                             |

**(6) FREQUENCY ADVERBIALS**

Stimuli E1 to E9 featured ungrammatical subject-simple verb inversions with the fronting of frequency adverbials, as listed in Table 23. Longer phrases and short adverbs as fronted elements were included in the stimuli set. All of them were arranged according to German word order. Notice that the adverb in E5 *\*Rarely felt my grandpa so excited* not only denoted frequency but also carried a negative meaning. The stimulus was nevertheless ungrammatical, as only subject-auxiliary inversion is permitted when the fronted adverbial has a negative or restrictive meaning.

**Table 23: Inverted Stimuli with Fronted Frequency Adverbials**

| No. | Stimuli                                               |
|-----|-------------------------------------------------------|
| E1  | <i>*Every morning throws my mom the garbage away.</i> |
| E2  | <i>*Often thinks he about his mother.</i>             |
| E3  | <i>*Twice a week visits Lucie her grandma.</i>        |
| E4  | <i>*Twice a week visits she her grandma.</i>          |
| E5  | <i>*Rarely felt my grandpa so excited.</i>            |
| E6  | <i>*Quite often smokes Wendy cigarettes.</i>          |
| E7  | <i>*Every morning drinks he a glass of milk.</i>      |

| No. | Stimuli                           |
|-----|-----------------------------------|
| E8  | <i>*Twice a week comes she.</i>   |
| E9  | <i>*Twice a week comes Nancy.</i> |

### (7) ADVERBIALS WITH NEGATIVE/RESTRICTIVE MEANING

Table 24 lists grammatical inversions featuring the fronting of adverbials with restrictive or negative meanings. Stimuli F1 to F4 involved the fronting of adverbial phrases, while stimuli F5 to F8 featured fronted adverbial clauses.

**Table 24:** *Inverted Stimuli Featuring Fronted AdvPs with Negative/Restrictive Meaning*

| Type                     | No. | Stimuli                                                                  |
|--------------------------|-----|--------------------------------------------------------------------------|
| Fronted adverbial phrase | E5  | <i>*Rarely felt my grandpa so excited.</i>                               |
|                          | F1  | <i>Rarely has my grandpa felt so excited.</i>                            |
|                          | F2  | <i>On no account should you give up.</i>                                 |
|                          | F3  | <i>Only in this way can you earn enough money for your next holiday.</i> |
|                          | F4  | <i>Never had I seen such a wonderful thing!</i>                          |
| Fronted adverbial clause | F5  | <i>Not until the rain stops can we go outside.</i>                       |
|                          | F6  | <i>Only when you finish the homework can you play video games.</i>       |
|                          | F7  | <i>Only after you've read the book will you see what I mean.</i>         |
|                          | F8  | <i>Not until the rain stops are we allowed to go.</i>                    |

These sentences only reflected the overarching X<sub>CLAUSE</sub>-Aux-S-V sequence employed in German. The word orders in the adverbial clause or the main clause did not always correspond exactly to those in the German translation. For instance, compare F7 with its German equivalent: *Erst wenn du das Buch gelesen hast (X), wirst (Aux) du (S) sehen (V), was ich meine*. Stimulus F7 aligned with German only in the abstract syntactic representation of subject-auxiliary inversion, and it did not have a word-for-word alignment with German for sentence components within the X-Aux-S-V frame. We mainly aimed to examine whether the abstract syntactic representation of X-Aux-S-V would influence trilinguals' perception of the stimulus. If the trilinguals still assign higher scores to these sentences compared with the bilinguals, we may conclude that the V2 constraint has a strong transferability.



## (8) *FRONTED ADVERBIAL CLAUSES*

Table 25 presents stimuli with fronted adverbial clauses in the ATJ.

**Table 25:** *Inverted Stimuli with Fronted Adverbial Clauses*

| Type                                | No. | Stimuli                                                              |
|-------------------------------------|-----|----------------------------------------------------------------------|
| Restrictive<br>adverbial<br>clause  | F5  | <i>Not until the rain stops can we go outside.</i>                   |
|                                     | F6  | <i>Only when you finish the homework can you play video games.</i>   |
|                                     | F7  | <i>Only after you've read the book will you see what I mean.</i>     |
|                                     | F8  | <i>Not until the rain stops are we allowed to go.</i>                |
| Non-restrictive<br>adverbial clause | G1  | <i>*When she was young, was she very poor.</i>                       |
|                                     | G2  | <i>*When she was young must she work very hard to make a living.</i> |
|                                     | G3  | <i>*Before we act must we think twice.</i>                           |
|                                     | G4  | <i>*Before we play games should we do our homework.</i>              |
|                                     | G5  | <i>*Even if the chance is very low should you give a try.</i>        |

In English, inversion is grammatical when fronting a non-restrictive or non-negative adverbial clause. Stimuli F5 to F8 were hence grammatical; G1 to G5 were ungrammatical, because the fronted clause did not contain a restrictive or a negative meaning. In contrast, in German, subject-verb inversion is obligatory when a subordinate clause is fronted, irrelevant to the semantic type of the clause. If German syntax is transferred, the trilingual participants will show greater acceptance of all these stimuli than bilinguals, regardless of whether the adverbial clause has a restrictive or negative meaning.

## (9) *SO + ADJ/ADV CONSTRUCTION*

Stimuli H1 to H4 involved grammatical inversions after *so + adj/adv* construction, as listed in Table 26. Following the same rationale used to examine German influence in the restrictive/negative inversion setting, we focused on the influence of the overarching word order of  $X_{SO+ADV/ADJ-Aux-S-V}$ .

**Table 26: Inverted Stimuli Featuring So + Adj/Adv Fronting**

| No. | Stimuli                                                                   |
|-----|---------------------------------------------------------------------------|
| H1  | <i>So hard has he tried.</i>                                              |
| H2  | <i>So polluted was the river that all the fish died.</i>                  |
| H3  | <i>So hard must I work that I wonder whether it is really worth it.</i>   |
| H4  | <i>So bad must his health be that the doctors can no longer help him.</i> |

**(10) DIRECT QUOTE**

The final sub-scenario examined was inversion after the fronting of a direct quote, whereby only a subject-simple verb inversion is permitted in English. Canonically, the weak pronoun does not move after the verb; however, an inversion does not lead to ungrammaticality. In German, an inversion in this context is obligatory, as in ‘*Kein Problem, ’ sagte er/Bob*’ (“No problem,” said he/Bob’). Five stimuli were arranged in this setting, with two of them involving a weak pronoun as subject (I3, I4), three instances with a noun phrase as subject (I1, I2, I5), and one with an adverbial adjunct (I3) after the subject, as shown in Table 27.

**Table 27: Inverted Stimuli Featuring Fronted Direct Quotes**

| No. | Stimuli                                 |
|-----|-----------------------------------------|
| I1  | <i>“No problem,” said Mary.</i>         |
| I2  | <i>“No problem,” murmured Mary.</i>     |
| I3  | <i>“Let’s go home,” said he loudly.</i> |
| I4  | <i>“Let’s go home,” said he.</i>        |
| I5  | <i>“Let’s go home,” said the man.</i>   |

We anticipate that the trilingual group will assign higher scores to all five stimuli than the bilinguals and that their judgments will not be influenced by the form of the subject.

**➤ V2 vs. V3 Constraint**

While the primary objective is to examine the direct influence of German V2 constraint, specifically by assessing participants’ perception of sentences arranged in X-V-S and

X-Aux-S-V patterns that conform to German syntax, the other area of interest is whether this syntactic feature indirectly affects how trilinguals perceive the V3 position, a position disallowed in German grammar but commonly seen in English and Chinese. In this regard, two supplementary sub-hypotheses are formulated:

- ✧ *Compared with bilingual participants, the trilingual participants will show lower acceptance toward the respective V3 counterparts of the stimuli in subject-verb inversion.*
- ✧ *Trilinguals will allocate higher scores to any V2 variant and lower ratings for the corresponding V3 variant, while bilinguals will exhibit the opposite pattern.*

The second sub-hypothesis is a stronger version. It suggests that trilinguals will accept the stimulus as soon as it features subject-verb inversion, implying that the transferability of the German V2 constraint is strong enough to override the SV constraint of English.

Fifty-two<sup>77</sup> corresponding V3 stimuli (X-S-V or X-S-Aux) were arranged in the ATJ, forming 52 pairs of V2-V3 counterparts, as listed in Table 28.

**Table 28: Pairs of V2-V3 Variants**

| Pair | No.  | Stimuli pairs in V2 and V3                                 |
|------|------|------------------------------------------------------------|
| (1)  | A2   | V2 <i>*Into the North Atlantic Ocean has Titanic sunk.</i> |
|      | A2'  | V3 <i>Into the North Atlantic Ocean Titanic has sunk.</i>  |
| (2)  | A6   | V2 <i>*Into the house have they run.</i>                   |
|      | A6'  | V3 <i>Into the house they have run.</i>                    |
| (3)  | A8   | V2 <i>In came he.</i>                                      |
|      | A8'  | V3 <i>In he came.</i>                                      |
| (4)  | A11  | V2 <i>Into the house run the boys.</i>                     |
|      | A11' | V3 <i>Into the house the boys run.</i>                     |

<sup>77</sup> In the current experiment, the number of V3 stimuli was intentionally reduced by 60% to 52 to manage cognitive load and prevent participants from developing habitual thinking patterns. The stimuli were presented in a random order to avoid consistent scoring biases.

| Pair | No.   | Stimuli pairs in V2 and V3                                 |
|------|-------|------------------------------------------------------------|
| (5)  | A12   | V2 <i>*Into the house run they.</i>                        |
|      | A12'  | V3 <i>Into the house they ran.</i>                         |
| (6)  | A14   | V2 <i>*On each wall hangs Bill a large picture.</i>        |
|      | A14'  | V3 <i>On each wall Bill hangs a large picture.</i>         |
| (7)  | A16   | V2 <i>Down the hill rolled the football.</i>               |
|      | A16'  | V3 <i>Down the hill the football rolled.</i>               |
| (8)  | AA2   | V2 <i>Among the guests was Mary.</i>                       |
|      | AA2'  | V3 <i>*Among the guests Mary was.</i>                      |
| (9)  | AA3   | V2 <i>Among the guests sits Mary.</i>                      |
|      | AA3'  | V3 <i>?Among the guests Mary sits.</i>                     |
| (10) | AA5   | V2 <i>At an old desk sits Jimmy Brown.</i>                 |
|      | AA5'  | V3 <i>?At an old desk Jimmy Brown sits.</i>                |
| (11) | AA6   | V2 <i>Along the riverside runs a little dog.</i>           |
|      | AA6'  | V3 <i>Along the riverside a little dog runs.</i>           |
| (12) | AA7   | V2 <i>*In a corner are laughing the children.</i>          |
|      | AA7'  | V3 <i>In a corner the children are laughing.</i>           |
| (13) | AA8   | V2 <i>*At an old desk is writing Tom Lopez.</i>            |
|      | AA8'  | V3 <i>*At an old desk Tom Lopez is writing.</i>            |
| (14) | AA10  | V2 <i>*In Munich resides the man.</i>                      |
|      | AA10' | V3 <i>*In Munich the man resides.</i>                      |
| (15) | B2    | V2 <i>*With the class teacher should all parents talk.</i> |
|      | B2'   | V3 <i>*With the class teacher all parents should talk.</i> |
| (16) | B3    | V2 <i>*Until midnight should they stay awake.</i>          |
|      | B3'   | V3 <i>Until midnight they should stay awake.</i>           |
| (17) | B4    | V2 <i>*In this way can you rebuild your life.</i>          |
|      | B4'   | V3 <i>In this way you can rebuild your life.</i>           |
| (18) | B5    | V2 <i>*At 7:00 must I get up.</i>                          |
|      | B5'   | V3 <i>At 7:00 I must get up.</i>                           |
| (19) | B6    | V2 <i>*In my opinion is the answer correct.</i>            |
|      | B6'   | V3 <i>In my opinion the answer is correct.</i>             |
| (20) | B7    | V2 <i>*Since 1999 left no employee the company.</i>        |
|      | B7'   | V3 <i>Since 1999 no employee left the company.</i>         |
| (21) | B11   | V2 <i>*To me means this present a lot.</i>                 |
|      | B11'  | V3 <i>To me this present means a lot.</i>                  |
| (22) | B12   | V2 <i>*For three hours lasted the movie.</i>               |

| Pair | No.  | Stimuli pairs in V2 and V3                                                   |
|------|------|------------------------------------------------------------------------------|
|      | B12' | V3 <i>For three hours the movie lasted.</i>                                  |
| (23) | C1   | V2 <i>*Probably has he us forgotten.</i>                                     |
|      | C1'  | V3 <i>Probably he has forgotten us.</i>                                      |
| (24) | C4   | V2 <i>*Absolutely should you take a rest.</i>                                |
|      | C4'  | V3 <i>Absolutely you should take a rest.</i>                                 |
| (25) | C5   | V2 <i>*Unfortunately was he killed.</i>                                      |
|      | C5'  | V3 <i>Unfortunately he was killed.</i>                                       |
| (26) | C6   | V2 <i>*Probably comes Alex as well.</i>                                      |
|      | C6'  | V3 <i>Probably Alex comes as well.</i>                                       |
| (27) | D1   | V2 <i>*Over and over again has he made the same mistake.</i>                 |
|      | D1'  | V3 <i>Over and over again he has made the same mistake.</i>                  |
| (28) | D2   | V2 <i>*Quickly has he fallen asleep.</i>                                     |
|      | D2'  | V3 <i>Quickly he has fallen asleep.</i>                                      |
| (29) | D3   | V2 <i>*Quickly was the problem solved.</i>                                   |
|      | D3'  | V3 <i>Quickly the problem was solved.</i>                                    |
| (30) | D4   | V2 <i>*Quickly ran the children into the classroom.</i>                      |
|      | D4'  | V3 <i>Quickly the children ran into the classroom.</i>                       |
| (31) | D9   | V2 <i>*Beautifully sings the opera singer.</i>                               |
|      | D9'  | V3 <i>Beautifully the opera singer sings.</i>                                |
| (32) | D10  | V2 <i>*Angrily speaks the woman.</i>                                         |
|      | D10' | V3 <i>Angrily the woman speaks.</i>                                          |
| (33) | D11  | V2 <i>*Elegantly talks the movie star.</i>                                   |
|      | D11' | V3 <i>Elegantly the movie star talks.</i>                                    |
| (34) | D12  | V2 <i>*Loudly barks the dog</i>                                              |
|      | D12' | V3 <i>Loudly the dog barks.</i>                                              |
| (35) | E8   | V2 <i>*Twice a week comes she.</i>                                           |
|      | E8'  | V3 <i>Twice a week she comes.</i>                                            |
| (36) | F1   | V2 <i>Rarely has my grandpa felt so excited.</i>                             |
|      | F1'  | V3 <i>*Rarely my grandpa has felt so excited.</i>                            |
| (37) | F3   | V2 <i>On no account should you give up.</i>                                  |
|      | F3'  | V3 <i>*On no account you should give up.</i>                                 |
| (38) | F4   | V2 <i>Only in this way can you earn enough money for your next holiday.</i>  |
|      | F4'  | V3 <i>*Only in this way you can earn enough money for your next holiday.</i> |
| (39) | F5   | V2 <i>Never had I seen such a wonderful thing!</i>                           |
|      | F5'  | V3 <i>*Never I had seen such a wonderful thing!</i>                          |

| Pair | No. | Stimuli pairs in V2 and V3                                                    |
|------|-----|-------------------------------------------------------------------------------|
| (40) | F6  | V2 <i>Only when you finish the homework can you play video games.</i>         |
|      | F6' | V3 <i>*Only when you finish the homework you can play video games.</i>        |
| (41) | F8  | V2 <i>Only after you've read the book will you see what I mean.</i>           |
|      | F8' | V3 <i>*Only after you've read the book you will see what I mean.</i>          |
| (42) | F9  | V2 <i>Not until the rain stops can we go outside.</i>                         |
|      | F9' | V3 <i>*Not until the rain stops we can go outside.</i>                        |
| (43) | G2  | V2 <i>*When she was young must she work very hard to make a living.</i>       |
|      | G2' | V3 <i>When she was young she must work very hard to make a living.</i>        |
| (44) | G3  | V2 <i>*Before we act must we think twice.</i>                                 |
|      | G3' | V3 <i>Before we act we must think twice.</i>                                  |
| (45) | G4  | V2 <i>*Before we play games should we do our homework.</i>                    |
|      | G4' | V3 <i>Before we play games we should do our homework.</i>                     |
| (46) | G5  | V2 <i>*Even if the chance is very low should you give a try.</i>              |
|      | G5' | V3 <i>Even if the chance is very low you should give a try.</i>               |
| (47) | H1  | V2 <i>So hard has he tried.</i>                                               |
|      | H1' | V3 <i>*So hard he has tried.</i>                                              |
| (48) | H2  | V2 <i>So polluted was the river that all the fish died.</i>                   |
|      | H2' | V3 <i>*So polluted the river was that all the fish died.</i>                  |
| (49) | H3  | V2 <i>So hard must I work that I wonder whether it is really worth it.</i>    |
|      | H3' | V3 <i>*So hard I must work that I wonder whether it is really worth it.</i>   |
| (50) | H4  | V2 <i>So bad must his health be that the doctors can no longer help him.</i>  |
|      | H4' | V3 <i>*So bad his health must be that the doctors can no longer help him.</i> |
| (51) | I1  | V2 <i>"No problem", said Mary.</i>                                            |
|      | I1' | V3 <i>"No problem", Mary said.</i>                                            |
| (52) | I4  | V2 <i>"Let's go home", said he.</i>                                           |
|      | I4' | V3 <i>"Let's go home", he said.</i>                                           |

### ➤ Fillers

The fillers for the experiment part, *Subject-Verb Inversion*, consisted of 52 stimuli. They involved sentences with different degrees of grammaticality and various structures. Such a substantial number of fillers were arranged because this experiment part itself involved 140 stimuli of different structures and grammaticality. Three variables were involved: two types of inversion (subject-auxiliary inversion and

subject-simple verb inversion), ten categories of fronted elements, and two types of grammaticality (ungrammatical and grammatical stimuli). The fillers, accordingly, featured word order variations for stimuli within the same semantic settings, creating varieties of linguistic context and minimizing response bias. Table 29 exemplifies the fillers of different types (see Appendix 12 for the complete set of fillers).

**Table 29: Examples of Fillers for Experiment on Inversion**

| Types of Filler                                           | Examples                                                                  |
|-----------------------------------------------------------|---------------------------------------------------------------------------|
| Fillers in canonical word order                           | <i>The boys must run into the house.</i>                                  |
|                                                           | <i>The movie star talks elegantly.</i>                                    |
|                                                           | <i>He has tried so hard.</i>                                              |
| Ungrammatical SV variants of stimuli                      | <i>*She twice a week comes.</i>                                           |
|                                                           | <i>*You can only in this way earn enough money for your next holiday.</i> |
|                                                           | <i>*The answer is in my opinion correct.</i>                              |
| Subject-auxiliary inversions with other word orders in VP | <i>*All parents should with the teacher talk.</i>                         |
|                                                           | <i>*Probably has he us forgotten.</i>                                     |
| Jumbled sentences or sentences with other errors          | <i>*The football rolled the hill down.</i>                                |
|                                                           | <i>*Angrily is the woman speaking.</i>                                    |
|                                                           | <i>*At an old desk sits him.</i>                                          |

### 5.2.3.2 Verb-Particle Construction

The second anticipated scenario of German-to-English syntactic transfer concerns word order variation within transitive VPCs.

As detailed in Section 4.3, the particle of a VPC functions as a postverb in German and moves to the VF position at clause-final. In a transitive VPC, the direct object (DO) must intervene between the verb and its particle, resulting in a discontinuous order: S-V-DO-Ptcl. In contrast, English generally allows for both discontinuous and continuous patterns within a transitive VPC, where the direct object can precede the particle (S-V-DO-Ptcl) or follow the entire VPC (S-V-Ptcl-DO). Chinese typically employs the continuous order, and only very few directional particles may separate from the verb. Nonetheless, a more common pattern is the *bǎ*-construction, featuring the DO-V-Ptcl

order, which lacks direct structural correspondence in German and English. In short, English and German overlap in allowing for the discontinuous word order, whereas English and Chinese share a structural similarity in employing the continuous word order. This is illustrated in the example below.

(153) *Examples of English sentences in discontinuous order and continuous order and the grammaticality of their word-for-word counterparts in German and Chinese*

| <i>Discontinuous Order</i> |      | <b>S</b>        | <b>V</b>         | <b>DO</b>        | <b>Ptcl</b>        |
|----------------------------|------|-----------------|------------------|------------------|--------------------|
|                            | Eng. | My mom          | <b>throws</b>    | the garbage      | <b>away.</b>       |
|                            | Ger. | Meine Mama      | <b>wirft</b>     | den Müll         | <b>weg.</b>        |
|                            | Chn. | *我妈妈<br>*wǒmāma | 扔<br><b>rēng</b> | 垃圾<br>lājī       | 掉。<br><b>diào.</b> |
| <i>Continuous Order</i>    |      | <b>S</b>        | <b>V</b>         | <b>Ptcl</b>      | <b>DO</b>          |
|                            | Eng. | My mom          | <b>throws</b>    | <b>away</b>      | the garbage.       |
|                            | Ger. | *Meine Mama     | <b>wirft</b>     | <b>weg</b>       | den Müll.          |
|                            | Chn. | 我妈妈<br>wǒmāma   | 扔<br><b>rēng</b> | 掉<br><b>diào</b> | 垃圾。<br>lājī        |

In the second part of the ATJ, participants were presented with 21 pairs of stimuli for rating. Each pair consisted of the same English sentence respectively in discontinuous and continuous patterns. The stimuli in discontinuous order have grammatical, word-for-word counterparts in German, and those in continuous order are translatable literally into Chinese. Two sub-hypotheses are formulated as follows:

- ✧ *Compared with the bilingual participants, the trilingual participants will exhibit lower acceptance toward stimuli written in discontinuous order and higher acceptance toward those written in continuous order.*
- ✧ *Within the same stimuli pair, the trilinguals will prefer the discontinuous variant*



over the continuous one, while the bilinguals will prefer the reverse.

The first sub-hypothesis aimed to examine the potential group differences in accepting the same word order variant; the second sub-hypothesis related to within-group attitudinal differences toward word order variation.

Additionally, we aimed to investigate whether the two groups were sensitive to different types of VPC. Stimuli pairs (1) to (16) were compositional VPCs, with pairs (1) to (10) being directional VPCs and pairs (11) to (16) being aspectual VPCs. Stimuli pairs (17) to (21) were idiomatic VPCs.<sup>78</sup> The entire set of stimuli is listed in Table 30.

**Table 30: Pairs of Stimuli in Discontinuous Order and Continuous Order in the ATJ**

| Pair | Construction Type          | VPC Type: Compositional (Directional)                               |
|------|----------------------------|---------------------------------------------------------------------|
| (1)  | <i>Discontinuous order</i> | <i>S1-1 They bring <u>the food</u> in.</i>                          |
|      | <i>Continuous order</i>    | <i>S1-2 They bring in <u>the food</u>.</i>                          |
| (2)  | <i>Discontinuous order</i> | <i>S2-1 The old man and the boy bring <u>the food</u> in.</i>       |
|      | <i>Continuous order</i>    | <i>S2-2 The old man and the boy bring in <u>the food</u>.</i>       |
| (3)  | <i>Discontinuous order</i> | <i>S3-1 They bring <u>three bowls of strawberries</u> in.</i>       |
|      | <i>Continuous order</i>    | <i>S3-2 They bring in <u>three bowls of strawberries</u>.</i>       |
| (4)  | <i>Discontinuous order</i> | <i>S4-1 The librarians put <u>the books</u> back.</i>               |
|      | <i>Continuous order</i>    | <i>S4-2 The librarians put back <u>the books</u>.</i>               |
| (5)  | <i>Discontinuous order</i> | <i>S5-1 My mom throws <u>the garbage</u> away.</i>                  |
|      | <i>Continuous order</i>    | <i>S5-2 My mom throws away <u>the garbage</u>.</i>                  |
| (6)  | <i>Discontinuous order</i> | <i>S6-1 They took <u>the very expensive ruby necklace</u> away.</i> |
|      | <i>Continuous order</i>    | <i>S6-2 They took away <u>the very expensive ruby necklace</u>.</i> |
| (7)  | <i>Discontinuous order</i> | <i>S7-1 The workers carry <u>the tables</u> out.</i>                |
|      | <i>Continuous order</i>    | <i>S7-2 The workers carry out <u>the tables</u>.</i>                |

<sup>78</sup> To prevent participants from developing habitual thinking patterns, the length of objects and subjects, and the clause types, were varied. Stimuli pairs (3), (6), (12), (18), and (20) featured longer NP direct objects, pairs (9), (14), and (15) were in the imperative mood, and pair (21) was in the present progressive tense. Despite these variables, all stimuli maintained the basic SVO order.

| Pair | Construction Type   | VPC Type: Compositional (Directional)                    |
|------|---------------------|----------------------------------------------------------|
| (8)  | Discontinuous order | S8-1 The students write <u>the notes</u> down.           |
|      | Continuous order    | S8-2 The students write down <u>the notes</u> .          |
| (9)  | Discontinuous order | S9-1 Write <u>the notes</u> down!                        |
|      | Continuous order    | S9-2 Write down <u>the notes</u> !                       |
| (10) | Discontinuous order | S10-1 The students raise <u>the hands</u> up.            |
|      | Continuous order    | S10-2 The students raise up <u>the hands</u> .           |
| Pair | Construction Type   | VPC Type: Compositional (Aspectual)                      |
| (11) | Discontinuous order | S11-1 The boy ate <u>the soup</u> up.                    |
|      | Continuous order    | S11-2 The boy ate up <u>the soup</u> .                   |
| (12) | Discontinuous order | S12-1 The boy ate <u>a big bowl of tomato soup</u> up.   |
|      | Continuous order    | S12-2 The boy ate up <u>a big bowl of tomato soup</u> .  |
| (13) | Discontinuous order | S13-1 We used <u>our supplies</u> up.                    |
|      | Continuous order    | S13-2 We used up <u>our supplies</u> .                   |
| (14) | Discontinuous order | S14-1 Work <u>the project</u> through!                   |
|      | Continuous order    | S14-2 Work through <u>the project</u> !                  |
| (15) | Discontinuous order | S15-1 Switch <u>the gas</u> off!                         |
|      | Continuous order    | S15-1 Switch off <u>the gas</u> !                        |
| (16) | Discontinuous order | S16-1 We switch <u>the gas</u> off.                      |
|      | Continuous order    | S16-2 We switch off <u>the gas</u> .                     |
| Pair | Construction Type   | VPC Type: Idiomatic                                      |
| (17) | Discontinuous order | S17-1 He looks <u>the word</u> up.                       |
|      | Continuous order    | S17-2 He looks up <u>the word</u> .                      |
| (18) | Discontinuous order | S18-1 He looks <u>the answer to the question</u> up.     |
|      | Continuous order    | S18-2 He looks up <u>the answer to the question</u> .    |
| (19) | Discontinuous order | S19-1 They leave <u>that part</u> out.                   |
|      | Continuous order    | S19-2 They leave out <u>that part</u> .                  |
| (20) | Discontinuous order | S20-1 They leave <u>that not well-written part</u> out.  |
|      | Continuous order    | S20-2 They leave out <u>that not well-written part</u> . |
| (21) | Discontinuous order | S21-1 His uncle is making <u>a story</u> up.             |
|      | Continuous order    | S21-2 His uncle is making up <u>a story</u> .            |

### ➤ Fillers

Six fillers were arranged for this part of the ATJ. They were sentences within the same semantical contexts as those stimuli but featuring different word orders or containing an extra sentence constituent, as shown in Table 31.

**Table 31:** *Examples of Fillers for Experiment Part on Word Order Variation of VPCs*

---

|                                                          |
|----------------------------------------------------------|
| <i>*Back put the librarians the books.</i>               |
| <i>*Up ate the boy the soup.</i>                         |
| <i>*Away throws my mom the garbage.</i>                  |
| <i>*Away they took the very expensive ruby necklace.</i> |
| <i>*Out carry the workers the tables.</i>                |
| <i>*His uncle is making now a story up.</i>              |

---

### 5.2.3.3 Placement of Adverbial Adjuncts

The third potential of German syntax influencing trilingual users' perception of English arises from its unique rules governing word order in the middlefield within the verbal bracket. As extensively discussed in Section 4.4, in a German SV simple tense clause, the adverbial adjunct appears in the middlefield after the finite verb. It precedes several other types of elements, including the direct object, the particle of VPCs, and the prepositional complement. On the contrary, the adverbials in English and Chinese usually do not follow the lexical verb. Based on these contrasts, we designed four sets of stimuli in which the adverbial placement corresponded to German grammar. Starting from the same point, we expect the trilingual participants, under German influence, to assign significantly higher ratings to these stimuli. The sub-hypothesis is:

- ✧ *Compared with the bilinguals, the trilingual participants will assign higher acceptance scores to stimuli with the word orders of S-V-Adv-DO, S-V-Adv-Ptcl, S-V-(Adv)-DO-Adv-Ptcl, and S-V-Adv-PP.*

### **(1) ADVERBIAL PLACEMENT IN V-DO CONSTRUCTION**

The first sub-scenario involved adverbial placement in transitive verbs. In German, an adverbial adjunct may intervene between the verb and its direct nominal object, especially the indefinite one object. This syntactic property contrasts sharply with English and Chinese, which in principle prohibit the separation of the verb and its direct object.

Eight stimuli sentences featured the S-V-Adv-DO word order were arranged in the ATJ, as shown in Table 32.

**Table 32:** *Stimuli Featuring the S-V-Adv-DO Word Order*

| No.  | Stimuli                                            |
|------|----------------------------------------------------|
| A1-1 | He tells <u>probably</u> a lie.                    |
| A2-1 | She likes <u>probably</u> this feeling.            |
| A3-1 | *The team solved <u>easily</u> the problem.        |
| A4-1 | *The children read <u>slowly</u> the text.         |
| A5-1 | *Wendy smokes quite often cigarettes.              |
| A6-1 | *He drinks <u>every morning</u> a glass of milk.   |
| A7-1 | *I spend <u>with my family</u> the summer holiday. |
| A8-1 | We found <u>only</u> one mistake.                  |

We arranged 4 sentences containing a definite direct object (A2-1, A3-1, A4-1, and A7-1) and 4 involving an indefinite one (A1-1, A5-1, A6-1, and A8-1). Stimuli A1-1 and A1-2 contained a focusing modifier, *probably*; A8-1 featured a restrictive adverb, *only*. These types of adverbs exceptionally allow for a position following the finite verb and before the direct object. The literal translation of all these stimuli into Chinese is ungrammatical, whereas their word-for-word translation into German are grammatically acceptable.

Note that grammaticality of the stimuli was operationalized as the conventionality and distributional frequency of the adverbial position in native language usage. For instance, the manner adverb *easily* can be placed between the verb and the direct object

for markedness or stylistic purposes; however, this word order, as in A3-1, occurs infrequently compared with the canonical pre-verbal placement, as in *We easily solved the problem*.<sup>79</sup> Conversely, although the V-*probably*-DO order, as in A1-1 and A1-2, also features a non-canonical order, it occurs more frequently than the S-V-*easily*-DO order.<sup>80</sup> For this reason, we included Cinque’s (1999) examples (stimuli A1-1 and A2-1) in the experiment as grammatical stimuli, while classifying stimuli A3-1 as being grammatically less acceptable.

Example (154) shows the grammaticality of the word-for-word translation of the stimuli A4-1 *The children read slowly the text* and its S-Adv-V-DO counterpart in German and Chinese.

(154) *Comparing the grammaticality of the S-V-Adv-DO and S-Adv-V-DO constructions in English, German, and Chinese*

|                   |      | <b>S</b>      | <b>V</b>        | <b>Adv</b>      | <b>DO</b>       |
|-------------------|------|---------------|-----------------|-----------------|-----------------|
| <b>S-V-Adv-DO</b> | Eng. | *The children | read            | <i>slowly</i>   | the text.       |
|                   | Ger. | Die Kinder    | lesen           | <i>langsam</i>  | den Text.       |
|                   | Chn. | *孩子们          | 阅读              | <i>慢慢地</i>      | 这 篇 课文。         |
|                   |      | Háizimen      | yuèdú           | <i>mànmànde</i> | zhè piān kèwén. |
|                   |      | <b>S</b>      | <b>Adv</b>      | <b>V</b>        | <b>DO</b>       |
| <b>S-Adv-V-DO</b> | Eng. | The children  | <i>slowly</i>   | read            | the text.       |
|                   | Ger. | *Die Kinder   | <i>langsam</i>  | lesen           | den Text.       |
|                   | Chn. | 孩子们           | <i>慢慢地</i>      | 阅读              | 这 篇 课文。         |
|                   |      | Háizimen      | <i>mànmànde</i> | yuèdú           | zhè piān kèwén. |

<sup>79</sup> COCA has recorded two occurrences of V-*easily*-DO word order.  
<sup>80</sup> COCA has recorded 25 occurrences of V-*probably*-DO word order.

## (2) ADVERBIAL PLACEMENT IN VPCs

The second sharp contrast between German and English/Chinese is the position of the particle verb of a VPC, as presented in Section 4.3. In German, the particle functions as a postverb, thus all sentence constituents in the middlefield may precede it, including objects and adverbial adjuncts. In English and Chinese, separating the VPC with an adverbial mostly leads to ungrammaticality.

### • *Intransitive VPC*

The second sub-scenario involved adverbial placement in sentences involving intransitive VPCs. As illustrated in Section 4.4.3, in German, when the VPC is intransitive, the only constituent contained in the middlefield is the adverbial adjunct, forming a word order of S-V-Adv-Ptcl. Six stimuli featuring this word order were arranged in the ATJ, as shown in Table 33. They were not grammatical in English, nor were their literal translations into Chinese. Note that stimulus B1-1 involved a verb-adjective complement construction (*fall asleep*) and was not a typical particle verb; however, translated into German, a typical particle verb should be used: *ein|schlafen* (lit. ‘sleep in’).

**Table 33:** *Stimuli Featuring the S-V-Adv-Ptcl Word Order*

| No.  | Stimuli                                   |
|------|-------------------------------------------|
| B1-1 | *He fell <u>quickly</u> asleep.           |
| B2-1 | *The child ran <u>quickly</u> away.       |
| B3-1 | *Children grow <u>fast</u> up.            |
| B4-1 | *The enemy gave <u>easily</u> up.         |
| B5-1 | *Her grandpa passed <u>recently</u> away. |
| B6-1 | *The boy gets <u>at seven o'clock</u> up. |

Below is an example showing the grammaticality of the word-for-word alignments of stimuli B2-1 and its S-Adv-V-Ptcl counterpart in Chinese and German.

(155) *Comparing the grammaticality of the S-V-Adv-Ptcl and S-Adv-V-Ptcl constructions in English, German, and Chinese*

|                     |      | <b>S</b>    | <b>V</b>         | <b>Adv</b>       | <b>Ptcl</b> |
|---------------------|------|-------------|------------------|------------------|-------------|
| <b>S-V-Adv-Ptcl</b> | Eng. | *The child  | ran              | <i>quickly</i>   | away.       |
|                     | Ger. | Das Kind    | lief             | <i>schnell</i>   | weg.        |
|                     | Chn. | 那个孩子        | 跑                | <i>很快地</i>       | 远 了。        |
|                     |      | Nà gè háizi | pǎo              | <i>hěnkùàide</i> | yuǎn le.    |
| <hr/>               |      |             |                  |                  |             |
|                     |      | <b>S</b>    | <b>Adv</b>       | <b>V</b>         | <b>Ptcl</b> |
| <b>S-Adv-V-Ptcl</b> | Eng. | The child   | <i>quickly</i>   | ran              | away.       |
|                     | Ger. | *Das Kind   | <i>schnell</i>   | lief             | weg.        |
|                     | Chn. | 那个孩子        | <i>很快地</i>       | 跑                | 远 了         |
|                     |      | Nà gè háizi | <i>hěnkùàide</i> | pǎo              | yuǎn le.    |

• **Transitive VPC**

The third sub-scenario pertained to how participants accepted stimuli featuring adverbial placement in transitive VPCs. As presented in Section 4.4.4, in a German sentence with a transitive VPC, the middlefield is filled by the adverbial and the direct object, whose word order is relative. The S-V-(Adv)-DO-Adv-Ptcl word order is grammatical in neither English nor Chinese. An exception for English is the intensifying adverb *completely*, which modifies the particle, as in C1-1 and C2-1. Table 34 lists the nine stimuli for this sub-scenario. All the direct objects in this set were definite, reflecting the majority pattern in German, Adv > DO<sub>DEF</sub>. The reverse pattern is also grammatical, especially when the adverbial is a manner adverb.

**Table 34:** *Stimuli Featuring the S-V-(Adv)-DO-Adv-Ptcl Word Order*

| No.  | Stimuli                                |
|------|----------------------------------------|
| C1-1 | We shut the gas <u>completely</u> off. |

| No.   | Stimuli                                               |
|-------|-------------------------------------------------------|
| C2-1  | We used our supplies <u>completely</u> up.            |
| C3-1a | *The firefighter put the fire <u>quickly</u> out.     |
| C3-1b | *The firefighter put <u>quickly</u> the fire out.     |
| C4-1  | *John figures the solution <u>slowly</u> out.         |
| C5-1  | *The children write the notes <u>nicely</u> down.     |
| C6-1  | *My mom throws <u>every morning</u> the garbage away. |
| C7-1a | *She looks the word <u>in the dictionary</u> up.      |
| C7-1b | *She looks <u>in the dictionary</u> the word up.      |

Example (156) showcases the contrasts between German and English/Chinese for expressing stimulus C6-1. The stimulus is grammatical only in its German literal translation, as the particle is placed at the clause-final and the adverb after the finite verb. The S-Adv-V-Ptcl-DO variant is only grammatical in English and Chinese.

(156) *Comparing the grammaticality of the S-V-Adv-DO-Ptcl and S-Adv-V-Ptcl-DO constructions in English, German, and Chinese*

| S-V-Adv-DO-Ptcl | S    | V           | Adv                     | DO                      | Ptcl              |
|-----------------|------|-------------|-------------------------|-------------------------|-------------------|
|                 | Eng. | My mom      | throws                  | <i>every morning</i>    | the garbage away. |
|                 | Ger. | *Meine Mama | schmeißt                | <i>jeden Morgen</i>     | den Müll weg.     |
|                 | Chn. | *我 妈妈       | 扔                       | <i>每天 早上</i>            | 垃圾 掉              |
|                 |      | *Wǒ māma    | rēng                    | <i>měitiān zǎoshàng</i> | lājī diào         |
| S-Adv-V-Ptcl-DO | S    | Adv         | V                       | Ptcl                    | DO                |
|                 | Eng. | My mom      | <i>every morning</i>    | throws                  | away the garbage. |
|                 | Ger. | *Meine Mama | <i>jeden Morgen</i>     | schmeißt                | weg den Müll.     |
|                 | Chn. | 我 妈妈        | <i>每天 早上</i>            | 扔                       | 掉 垃圾。             |
|                 |      | Wǒ māma     | <i>měitiān zǎoshàng</i> | rēng                    | diào lājī.        |



### (3) PLACEMENT OF ADVERBIAL IN V-PP CONSTRUCTION

The last sub-scenario—one in which we anticipated potential L3 influence—involved adverbial placement in sentences with PP complements. German contrasts English in two aspects. First, the base position of a PP complement, especially the prepositional object, is the final slot of the middlefield; the adverbial adjunct precedes the PP. In English, the position of the adjunct largely depends on its internal form and semantic category (Huddleston & Pullum, 2002, p. 780). The position after the finite lexical verb and before the obligatory complement (initial end position) can be grammatical; however, this position has less distribution in the corpus (see Quirk et al., 1985, pp. 500–501 for analysis of the distribution of adverbial position based on the Survey of English Usage corpus).

The second difference between German and English is that the linear order of German follows the tendency of “time before place” in cases where the locative or directional PP functions as a complement. English uses the reverse pattern of “place before time,” where the time adjunct appears at the clause-final (end position). Chinese prohibits the post-verbal position of adverbial adjuncts.

Based on these contrasts, we arranged eight stimuli for this sub-scenario, as shown in Table 35. The adverbial placement of these stimuli conformed to that in German.

**Table 35:** *Stimuli Featuring the S-V-Adv-PP Word Order*

| No.  | Stimuli                                                          | Type of PP complement              |
|------|------------------------------------------------------------------|------------------------------------|
| D1-1 | *Nick and I go <u>every day at 7:00</u> to school.               | Prepositional adverbial complement |
| D2-1 | *Nick goes <u>at nine o'clock</u> to bed.                        |                                    |
| D3-1 | I drive <u>with my brother</u> to the beach.                     |                                    |
| D4-1 | He paid <u>immediately</u> for the book.                         | prepositional object               |
| D5-1 | It depends <u>largely</u> on his decision.                       |                                    |
| D6-1 | Tim cares <u>mainly</u> about the cost.                          |                                    |
| D7-1 | He thinks <u>often</u> about his mother.                         |                                    |
| D8-1 | The police are searching <u>right now</u> for the missing child. |                                    |

The first two sentences, D1-1 and D1-2, featured the ungrammatical linear order of English, as the word order violated the “place before time” convention. Here the V-PP construction involved the idiomatic expression in which the relationship between the PP and the verb *go* is much closer than that between the time adverbial and the verb. Stimulus D1-3 featured a comitative adverbial, which was arranged before the place PP. This construction is less frequently used than the Adv-PP<sub>COMP</sub> variant but is still grammatical. COCA documents one such case: *I drive with him and his family through Soweto to church on this brilliant Sunday* (COCA, *Reconciliation or chaos*, 1999).

D4-3 to D8-1 featured the initial end position of the adjunct (see Section 4.4.5.2). These stimuli were grammatical, but the productivity of these structures varied individually. For example, COCA has documented 210 instances of *depends largely on* and 95 instances of *largely depends on*, 20 occurrences of *often thinks about* but only 5 occurrences of *thinks often about*, no occurrence of *paid immediately for* and 23 occurrences of *immediately paid for*, 1 occurrence of *mainly cared about* and 1 of *cared mainly about*. Notice that stimulus D8-1 *The police are searching right now for the missing child* lacked a word-for-word translation in German, but the sentence still conformed to the overarching order of S-V-Adv-PP.

We expect the trilinguals to adopt the S-V-Adv-PP word order norm as the primary criteria for making judgments and assign higher scores to all these stimuli than the bilinguals, regardless of the varying degrees of grammatical acceptability. Example (157) showcases the word order contrasts between the three languages in this context.

(157) *Comparing the grammaticality of the S-V-Adv-PP and S-Adv-V-PP constructions in English, German, and Chinese*

|            |      | S     | V     | Adv                    | PP <sub>COMP</sub> |
|------------|------|-------|-------|------------------------|--------------------|
| S-V-Adv-PP | Eng. | *Nick | goes  | <i>at nine o'clock</i> | to bed.            |
|            | Ger. | Nick  | geht  | <i>um neun Uhr</i>     | ins Bett.          |
|            | Chn. | *尼克   | 上     | <i>九点钟</i>             | 床。                 |
|            |      | *Níkè | shàng | <i>jiǔ diǎn zhōng</i>  | chuáng.            |

|            |      | S     | Adv                    | V     | PP <sub>COMP</sub> |
|------------|------|-------|------------------------|-------|--------------------|
| S-V-PP-Adv | Eng. | Nick  | <i>at nine o'clock</i> | goes  | to bed.            |
|            | Ger. | *Nick | <i>um neun Uhr</i>     | geht  | ins Bett.          |
|            | Chn. | 尼克    | 九 点 钟                  | 上     | 床。                 |
|            |      | Níkè  | jiǔ diǎn zhōng         | shàng | chuáng.            |

### ➤ V2-V3 Contrast

As a supplementary investigation, we examine whether the trilinguals will show lower acceptability toward adverbial placements that do not align with German syntax, especially the pre-verbal position. This position is always grammatical in Chinese, and grammatical in English in many cases, depending on the semantic category and the length of the adverbial. We speculate that German will exert an indirect influence in neutralizing L1 Chinese's potential impact due to the predominant pre-verbal position of adverbials. A supplementary sub-hypothesis is formulated as follows:

- ✧ *Compared with the bilinguals, the trilingual participants will assign significantly lower acceptance scores to stimuli featuring the S-Adv-V order, being grammatical or not.*

Twenty-five stimuli variants featuring the S-Adv-V word order were arranged in the ATJ, as listed in Table 36. These stimuli included the following word orders: S-Adv-V-DO, S-Adv-V-Ptcl, S-Adv-V-Ptcl-DO, and S-Adv-V-PP.

**Table 36:** *Stimuli Featuring the S-Adv-V-X Word Order*

| Word order | No.      | Stimuli                                    |
|------------|----------|--------------------------------------------|
| S-Adv-V-DO | (1) A1-2 | He <u>probably</u> tells a lie.            |
|            | (2) A2-2 | She <u>probably</u> likes this feeling.    |
|            | (3) A3-2 | The team <u>easily</u> solved the problem. |
|            | (4) A4-2 | The children <u>slowly</u> read the text.  |
|            | (5) A5-2 | Wendy <u>often</u> smokes cigarettes.      |

| Word order                | No.       | Stimuli                                                          |
|---------------------------|-----------|------------------------------------------------------------------|
|                           | (6) A6-2  | *He <u>every morning</u> drinks a glass of milk.                 |
|                           | (7) A7-2  | *I <u>with my family</u> spend the summer holiday.               |
|                           | (8) A8-1  | We <u>only</u> found one mistake.                                |
| S-Adv-V-Ptcl              | (9) B1-2  | He <u>quickly</u> fell asleep.                                   |
|                           | (10) B2-2 | The child <u>quickly</u> ran away.                               |
|                           | (11) B3-2 | *Children <u>fast</u> grow up.                                   |
|                           | (12) B4-2 | The enemy <u>easily</u> gave up.                                 |
|                           | (13) B5-2 | Her grandpa <u>recently</u> passed away.                         |
|                           | (14) B6-2 | *The boy <u>at seven o'clock</u> gets up.                        |
| S-Adv-Ptcl-DO             | (15) C1-2 | We <u>completely</u> shut off the gas.                           |
|                           | (16) C2-2 | We <u>completely</u> used up our supplies.                       |
|                           | (17) C3-2 | The firefighter <u>quickly</u> put out the fire.                 |
|                           | (18) C4-2 | John <u>slowly</u> figures out the solution.                     |
|                           | (19) C5-2 | The children <u>nicely</u> write down the notes.                 |
|                           | (20) C6-2 | *My mom <u>every morning</u> throws away the garbage.            |
| S-Adv-V-PP <sub>OBJ</sub> | (21) D4-2 | He <u>immediately</u> paid for the book.                         |
|                           | (22) D5-2 | It <u>largely</u> depends on his decision.                       |
|                           | (23) D6-2 | Tim <u>mainly</u> cares about the cost.                          |
|                           | (24) D7-2 | He <u>often</u> thinks about his mother.                         |
|                           | (25) D8-2 | The police <u>right now</u> are searching for the missing child. |

Several stimuli were ungrammatical. For instance, canonically, English precludes the pre-verbal placement of multi-word comitative or frequency PPs, such as *with my family* and *every morning*. Stimuli A6-2, A7-2, B6-2, and C6-2 were hence grammatically less acceptable. The adverb *fast* usually precedes the main verb, so B3-2 was ungrammatical. The other 21 instances featured the grammatical position of adverbials. The Chinese word-for-word counterparts of all these stimuli would be grammatical, as the language always permits adverbials to immediately precede a verb in an SVO sentence, irrelevant of the length. Translated word-for-word into German would lead to ungrammatical V3 expressions.

Notice that for the scenario of transitive VPCs, we did not include variants featuring the discontinuous order (S-Adv-V-DO-Ptcl) in the set, such as *We completely*

*shut the gas off*. In this way, we controlled the number of variables to one: the pre-verbal placement of adverbials, meaning, if the trilinguals assign lower ratings for stimuli C1-1 to C6-1, the only possible explanation will be the variable of pre-verbal adverbial placement, rather than the discontinuous word order.

### ➤ Fillers

Fillers for this sub-scenario were 30 sentences within similar semantic contexts but featuring other constructions or errors. These included sentences with adverbials placed at the clause's initial or end position, sentences involving a compound tense, or sentences containing other types of errors, as exemplified in Table 37. See Appendix 12 for the complete set of fillers.

**Table 37:** *Examples of Fillers for Experiment on Adverbial Placement in SV Clauses*

| Types of Filler                            | Examples                                                         |
|--------------------------------------------|------------------------------------------------------------------|
| Fillers with Initial Position of Adverbial | <i>Quickly he fell asleep.</i>                                   |
|                                            | <i>Right now the police are searching for the missing child.</i> |
| Fillers with End Position of Adverbial     | <i>I spend the summer holiday with my family.</i>                |
|                                            | <i>*Tim cares about the cost mainly</i>                          |
| Fillers Involving Compound Tenses          | <i>*You can rebuild in this way your life.</i>                   |
|                                            | <i>*He is telling for sure the truth.</i>                        |
| Fillers with Other Types of Errors         | <i>*Wendy smokes often cigarette.</i>                            |
|                                            | <i>*She ran to the city away.</i>                                |

### 5.2.3.4 Patterns in Forming Ditransitive Construction

The last part of the ATJ examined participants' attitudes toward different word order patterns in forming a ditransitive construction. The contrastive study in Section 4.5 has summarized the similarities and contrasts between German and English/Chinese. First, when the direct object is nominal, all three languages support the IO-DO and DO-prep-IO patterns. While the prepositional alternative is productive in English and Chinese, its productivity is restricted by the verb in German. For instance, verbs such as *schicken*

(‘to send’) and *bringen* (‘to bring’) allow for both patterns, whereas other verbs like *geben* (‘to give’) and *erzählen* (‘to tell’) do not support the prepositional construction. This forms a contrast with English and Chinese. To this end, the first sub-hypothesis is made as follows:

- ✧ *When the direct object is nominal, the trilingual participants will assign lower acceptance scores to stimuli following the DO-to-IO pattern compared with the bilinguals.*

The second contrast pertains to the scenario where both objects are pronominalized. The majority pattern in English is the prepositional alternative, whereas in German it is the DO-IO pattern. Chinese differs from German and English as it places the direct object before the main verb, hence we excluded its potential influence. Based on these contrasts, a second sub-hypothesis is formulated:

- ✧ *When both objects are pronominal, the trilinguals will demonstrate a higher degree of acceptability for the DO-IO pattern compared with the bilinguals.*

To test the first sub-hypothesis, we arranged six pairs of stimuli, with the indirect object of the first sentence in each pair being nominal and that of the second sentence pronominalized, as listed in Table 38. Notice that the stimulus *Give the money to me* does not have a grammatical counterpart featuring a nominal indirect object.

**Table 38:** *Stimuli Featuring the DO-to-IO Pattern (Nominal DO)*

| Set | DO <sub>NOM</sub> -to-IO <sub>NOM</sub>                                | DO <sub>NOM</sub> -to-IO <sub>PRON</sub>                       |
|-----|------------------------------------------------------------------------|----------------------------------------------------------------|
| (1) | <i>She always tells stories to her son.</i>                            | <i>She always tells stories to him.</i>                        |
| (2) | <i>Uncle Sam gave a present to Margaret.</i>                           | <i>Uncle Sam gave a present to her.</i>                        |
| (3) | <i>I bring a necklace to my cousin.</i>                                | <i>I bring a necklace to him.</i>                              |
| (4) | <i>The secretary sends weekly reports to the manager every Friday.</i> | <i>The secretary sends weekly reports to him every Friday.</i> |
| (5) | <i>Pass the water to the farmers!</i>                                  | <i>Pass the water to them!</i>                                 |
| (6) | -                                                                      | <i>Give the money to me!</i>                                   |

These stimuli included five verbs: *tell*, *give*, *bring*, *send*, and *pass*. The German equivalences for *tell* and *give* do not support the prepositional pattern. The verb *give* in the context of *Uncle Sam gave a present to Margaret* can be translated using another verb in German, *schenken*, which also does not support prepositional alternative. We expect the trilinguals to assign significantly lower scores to the prepositional variants in comparison with the bilinguals. The grammaticality of the sentence’s word-for-word translation in German and Chinese is exemplified below in (158).

| (158) | S             | V           | DO           | IO <sub>PREP</sub> |
|-------|---------------|-------------|--------------|--------------------|
| Eng.  | Uncle Sam     | gave        | a present    | to Margaret.       |
| Ger.  | *Onkel Sam    | gab/schenk  | ein Geschenk | an Margaret.       |
| Chn.  | 山姆 叔叔         | 给/送 了       | 一个礼物         | 给 玛格丽特。            |
|       | Shānmǔ shūshu | gěi/sòng le | yí gè lǐwù   | gěi Mǎgélìtè       |

To test the second sub-hypothesis, we converted the above stimuli into pronominal variants written in three word orders: DO-IO, IO-DO, and DO-to-IO, as seen in Table 39. We hypothesize that the trilinguals will assign significantly higher acceptance ratings to the DO-IO pattern across all stimuli.

**Table 39: Stimuli Featuring Pronominal DO and Pronominal IO**

| Set | DO-IO                                           | IO-DO                                           | DO-prep-IO                                         |
|-----|-------------------------------------------------|-------------------------------------------------|----------------------------------------------------|
| (1) | <i>She always tells them him.</i>               | <i>She always tells him them.</i>               | <i>She always tells them to him.</i>               |
| (2) | <i>Uncle Sam gave it her.</i>                   | <i>Uncle Sam gave her it.</i>                   | <i>Uncle Sam gave it to her.</i>                   |
| (3) | <i>I bring it him.</i>                          | <i>I bring him it.</i>                          | <i>I bring it to him.</i>                          |
| (4) | <i>The secretary sends it him every Friday.</i> | <i>The secretary sends him it every Friday.</i> | <i>The secretary sends it to him every Friday.</i> |
| (5) | <i>Pass it them!</i>                            | <i>Pass them it!</i>                            | <i>Pass it to them!</i>                            |
| (6) | <i>Give it me!</i>                              | <i>Give me it!</i>                              | <i>Give it to me!</i>                              |

The grammaticality of the word-for-word translation into German and Chinese is demonstrated in (159).

|       |                     |                     |                          |
|-------|---------------------|---------------------|--------------------------|
| (159) | <i><b>DO-IO</b></i> | <i><b>IO-DO</b></i> | <i><b>DO-prep-IO</b></i> |
| Eng.  | Give it me!         | Give me it!         | Give it to me!           |
| Ger.  | Gib es mir.         | *Gib mir es.        | *Gib es an mich/mir.     |
| Chn.  | *给 它 我!             | *给 我 它!             | *给 它 给 我!                |
|       | *Gěi tā wǒ!         | *Gěi wǒ tā!         | *Gěi tā gěi wǒ!          |

The fillers consisted of 16 sentences within identical semantic contexts but featured the following structures: IO<sub>NOM</sub>-DO<sub>NOM</sub>, DO<sub>NOM</sub>-IO<sub>NOM</sub>, and IO<sub>PRON</sub>-DO<sub>NOM</sub>, exemplified in Table 40 and fully listed in Appendix 12. Among them, sentences following the DO<sub>NOM</sub>-IO<sub>NOM</sub> pattern were ungrammatical.

**Table 40:** *Examples of Fillers for the Scenario of Ditransitive Construction*

| <i><b>Construction of Filler</b></i>  | <i><b>Examples</b></i>                |
|---------------------------------------|---------------------------------------|
| IO <sub>NOM</sub> -DO <sub>NOM</sub>  | <i>I bring my cousin a necklace.</i>  |
| DO <sub>NOM</sub> -IO <sub>NOM</sub>  | <i>*I bring a necklace my cousin.</i> |
| IO <sub>PRON</sub> -DO <sub>NOM</sub> | <i>I bring him a necklace.</i>        |

#### 5.2.4 Evaluation

Participants used LimeSurvey to complete the ATJ. The sequence of the stimuli was scrambled to avoid habitual thinking patterns. The data were transferred to Microsoft Excel and Google Forms for further processing.

When evaluating participants' performance, the mean ratings were considered in addition to analyzing the significance of differences. Mean scores between 1 and 2 denoted that the participants rejected the grammaticality of the stimuli, 3-4 suggested partial acceptance, and 5-6 suggested full acceptance. If one stimulus received a mean



score of lower than 3 points, it indicated that participants considered the sentence to be “rather ungrammatical.” Mean scores assigned by the trilingual groups were marked as M1 and those by the bilingual group as M2. The acceptance scores were related to participants’ capability of discerning grammaticality.

Group differences in ratings for the same stimulus were evaluated analyzed using two-tailed Mann-Whitney U tests; within-group attitudinal differences toward the paired word order variants were assessed via Wilcoxon signed-rank tests. All tests were run in SPSS. For all tests, a  $p$ -value below 0.05 was considered statistically significant. This indicated evidence for a difference: either a difference between the two groups in their rating of a single stimulus, or a difference within the same group in their perception of the two word-order variants. To interpret the strength of evidence supporting the hypotheses,  $p$ -values were analyzed referencing conventional thresholds: highly significant evidence for  $p$  lower than 0.001, significant evidence for  $p$  between 0.001 and 0.05, and marginally significant evidence for  $p$  between 0.05 and 0.1.

The results and the corresponding analysis will be presented in the next chapter.

## 6 Results and Findings

This chapter presents the results of the acceptability judgment task (ATJ). We evaluate the performance of the two experiment groups across the four scenarios where potential backward transfer from L3 German to L2 English may occur, examine the hypotheses, analyze the role of German syntax, and explore the characteristics of backward transfer in each scenario. The results are presented in four sections: Section 6.1 for subject-verb inversion, Section 6.2 for word order variation in transitive VPCs, Section 6.3 for adverbial adjunct placement in SV clauses, and Section 6.4 for word order for ditransitive constructions. Each sub-section begins with a presentation of the data and an analysis of results, followed by the examination of hypotheses, and concludes with an interim summary of the findings.

### 6.1 Subject-Verb Inversion

#### 6.1.1 An Overview of Experiment Results

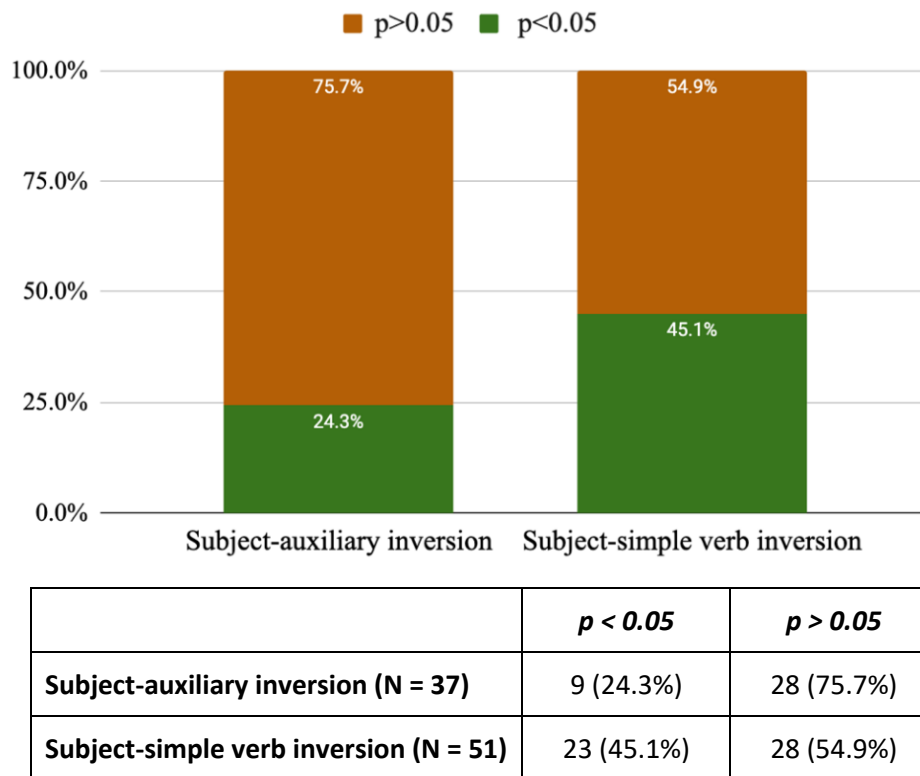
In this part of the experiment, a total number of 88 stimuli with subject-verb inversion were presented to the participants, with 37 instances featuring subject-auxiliary inversion and 51 featuring subject-simple inversion. Among them, 61 stimuli were ungrammatical and 28 were grammatical. Three aspects are considered in the analysis of group differences when making acceptability judgments: (1) whether the participants could discern the overall grammaticality<sup>81</sup> of the stimuli; (2) whether the judgments were related to the type of inversion (subject-simple verb inversion vs. subject-auxiliary inversion); and (3) whether the evaluation was related to the category of the fronted element.

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<sup>81</sup> By “overall grammaticality,” we refer to the participants’ general ability to distinguish the grammatical and ungrammatical ones, such as differentiating \**With him should you talk* by assigning scores lower than a certain threshold. Notice that we do not analyze the specific degree to which the participants accepted the uncanonical but grammatical stimuli.

Figure 21 shows the percentage of stimuli in which two groups exhibited statistically significant differences ( $p < 0.05$ ) and non-significant differences ( $p > 0.05$ ) in their ratings.<sup>82</sup>

**Figure 21:** *Number and Percentage of Inverted Stimuli Reflecting Significant vs. Insignificant Differences Between Two Groups in their Ratings*



Regarding the ratings for subject-auxiliary inversion, significant group differences were observed in assessing 9 out of 37 (24.3%) stimuli. In contrast, when evaluating subject-simple verb inversion, the two groups exhibited attitudinal differences in rating nearly half of the sentences (23 out of 51, 45.1%). This contrast underscores the trilinguals' heightened sensitivity to subject-simple verb inversion compared with subject-auxiliary inversion. Compared with the bilinguals, the trilinguals generally assigned lower scores to subject-auxiliary inversions and higher scores to subject-

<sup>82</sup> Moreover, marginal group differences ( $0.05 < p < 0.1$ ) were shown in the ratings of 8 stimuli (N = 8 out of 88, 9.1%).

simple verb inversions. The performance of each group was largely related to the specific linguistic context for each stimulus.

This overview solely presents the group differences in their ratings and the number of stimuli judged differently. A detailed analysis follows later in this chapter, focusing on the specific patterns of grammaticality judgment.

### 6.1.2 Participants' Acceptability in Relation to Grammaticality

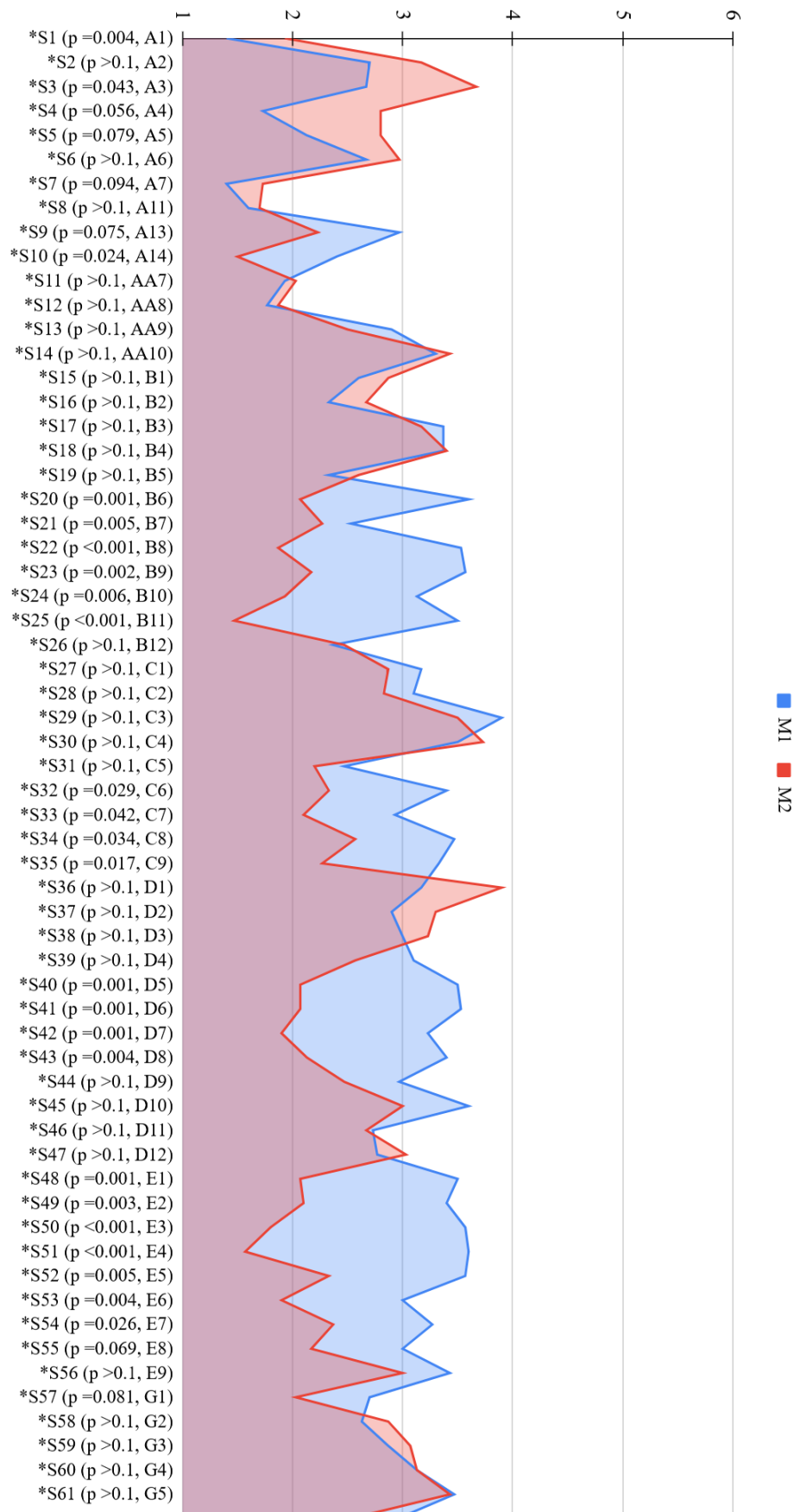
Figure 22 presents the mean ratings of participants for ungrammatical stimuli, covering a total of 61 sentences labeled from \*S1 to \*S61. Due to space constraints, the specific stimuli are not listed in the figure; instead, only their categorical codes denoting the category of fronted elements are shown, ranging from A1 to G5.<sup>83</sup> The mean ratings range from 1 to 6 points. The figure also displays the p-values from the Mann-Whitney U test, denoting the statistical significance of the observed group differences.

The figure shows areas where the ratings from the two groups are highly aligned, as indicated by positive correlations and close scores between M1 and M2 (e.g., \*S11/AA7~\*S19/B5, \*S26/B12~\*S31/C5, \*S58/G2~\*S61/G5). This indicates a shared understanding of the grammatical rules, which underlies the uniform judgments observed in these cases. In certain instances, although both lines follow a similar trajectory, there are notable disparities in the mean scores assigned between them (e.g., \*S1/A1~\*S7/A7, \*S52/E5~\*S57/G1). This shows that although participants could generally recognize the grammaticality, they exhibited varying degrees of acceptance toward them. Finally, for the remaining stimuli (e.g., \*S20/B6~\*S25/B11, \*S32/C6~\*S45/D10, \*S48/E1~\*S51/E4), the lines for M1 and M2 diverge significantly, suggesting that the two groups showed contrasting degrees of acceptability of the sentence.

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<sup>83</sup> For example, A1 denotes the first sentence in the category A: inversion with a fronted directional PP, as outlined in Section 5.2.3.1. See Appendix 1 for participants' mean scores assigned to each ungrammatical stimulus as well as the corresponding group difference.

**Figure 22:** Participant's Mean Ratings for Ungrammatical Inversions and Significance of Group Differences



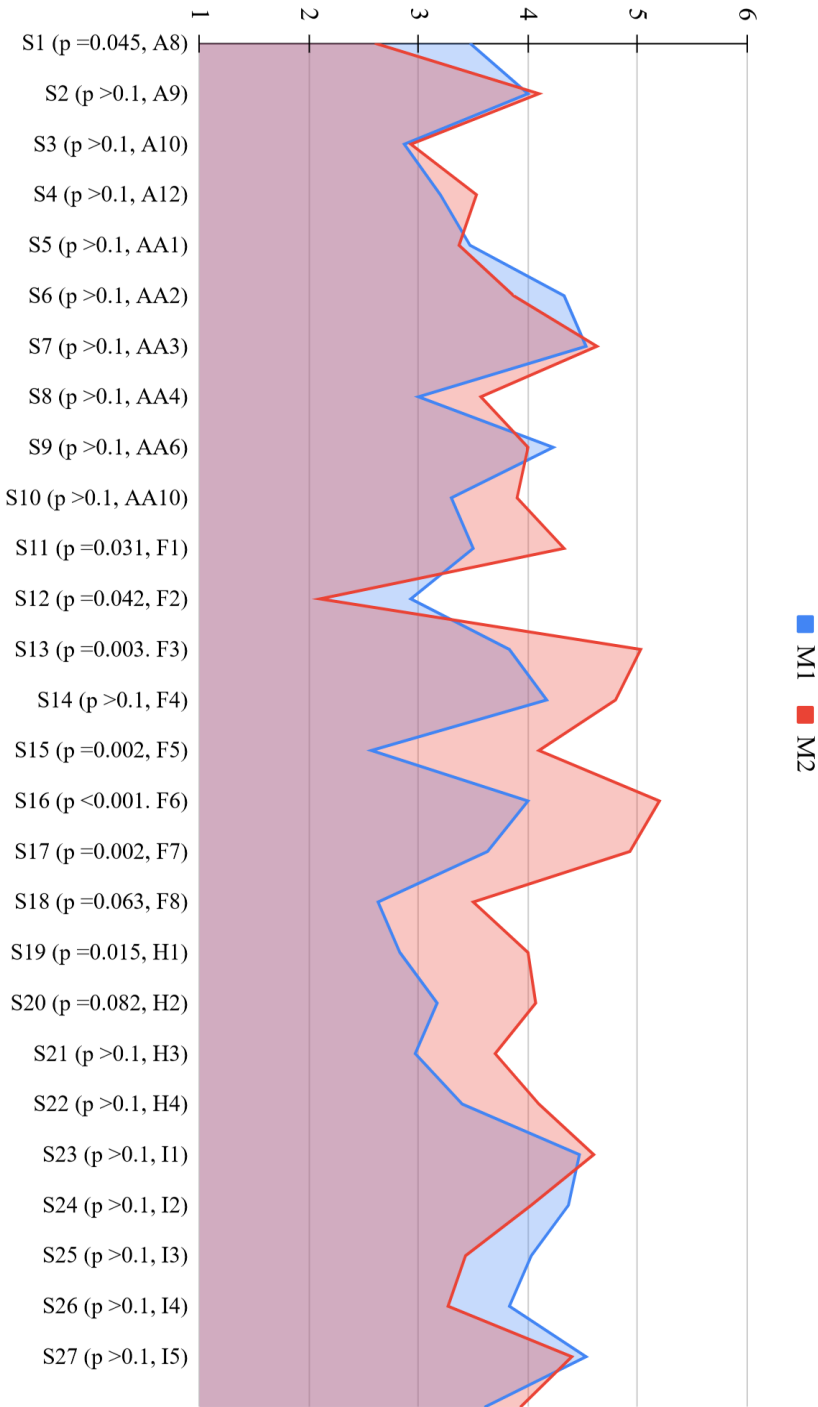
Upon closer examination, the degree of intergroup divergence was largely influenced by the inversion type, and, in some instances, the semantic category of the fronted element. For instance, while both groups demonstrated comparable rating patterns in accepting ungrammatical locative inversions (\*S11/AA7~\*S14/AA10) and ungrammatical subject-auxiliary inversions featuring the fronting of a non-directional PP (\*S15/B1~\*S19/B5), their attitudes toward subject-simple inversions containing fronted non-directional PPs (\*S20/B5~\*S25/B11), stance adverbs (\*S32/C6~\*S35/C9), and adverbials of frequency (\*S48/E1~\*S55/E8) diverged. In some cases, even when the stimuli featured the same category of fronted element, unanimity between groups in rating was not always evident. For example, comparing their ratings for stimuli featuring the fronting of manner adverbials, while extremely remarkable group differences were observed in rating \*S40/D5 to \*S43/D8, no group differences were reflected in the ratings of other stimuli. A comprehensive analysis of these findings is presented in Section 6.1.3, where we analyze the rating patterns according to the category of the fronted element.

Figure 23 demonstrates two groups' ratings for the 27 grammatical stimuli, labeled using a similar approach (S1/A8~S27/I5; see Appendix 2 participants' mean scores assigned to each grammatical stimulus and the group difference).

Unlike the rating patterns observed for the ungrammatical stimuli, both groups demonstrated a consensus in accepting these grammatical sentences, as evidenced by the consistent positive correlations between their trajectories. Nonetheless, although both groups exhibited a similar trend in accepting the grammatical stimuli, statistically significant group differences in the judgment of several individual cases were observed (e.g., S1/A8, S11/F2~S13/F4, S15/F6~S17/F8, S19/H1).

It is of interest that when rating the ungrammatical stimuli, the group differences were more pronounced. This observation leads to our initial speculation that backward influence from the source languages occurs more easily in the perception of instances that do not showcase the grammar rules of the recipient language, but the source language.

**Figure 23:** Participant’s Mean Ratings for Grammatical Inversions and Significance of Group Differences



Furthermore, to gain an initial overview of each group’s overall evaluation of grammaticality, we calculated the mean scores assigned by each group for the complete set of grammatical stimuli and the complete set of ungrammatical stimuli, as presented in Table 41. In this analysis, we focus on the general performance rather than

participants' judgments of each stimulus set with specific linguistic contexts or syntactic features involved.

**Table 41:** *Two Groups' Mean Ratings for All Grammatical and Ungrammatical Stimuli*

|                         | Mean Rating for All<br>Ungrammatical Stimuli | Mean Rating for All<br>Grammatical Stimuli | MD    |
|-------------------------|----------------------------------------------|--------------------------------------------|-------|
| <b>Trilingual Group</b> | M1 <sub>UNGR</sub> = 2.95                    | M1 <sub>GR</sub> = 3.58                    | -0.63 |
| <b>Bilingual Group</b>  | M2 <sub>UNGR</sub> = 2.2                     | M2 <sub>GR</sub> = 3.87                    | -1.67 |
| <b>MD</b>               | 0.75                                         | -0.29                                      |       |

Overall, both groups rated grammatical stimuli higher than ungrammatical ones, suggesting a capacity for discerning (un)grammaticality. The mean ratings for the ungrammatical stimuli set fell below 3 points, leaning toward rejection of grammaticality. Neither group fully accepted the naturalness of the grammatical sentences, with mean scores approaching but not reaching 4 points. This outcome is not surprising, as most of these sentences, albeit grammatical, featured non-canonical word orders. Interestingly, the bilingual participants exhibited a more polarized acceptability judgment. They rated the ungrammatical stimuli lower, on average, than the trilingual group did, and the grammatical stimuli slightly higher. Furthermore, the discrepancy between the two groups' ratings for the ungrammatical stimuli was larger than those for the grammatical ones. This contrast indicated that the bilinguals demonstrated superior performance in the overall judgment of grammaticality.

In the subsequent section, we delve deeper into participants' performance by analyzing disparities and similarities in the trilingual and bilingual group's rating patterns of each stimulus set featuring a specific type of fronted element.

### 6.1.3 Analysis of Participants' Judgments by Categories of Fronted Elements

For each set of stimuli, we will initially present two key aspects: first, the ability of our participants to discern the grammaticality of the presented stimuli; second, any discernible differences in the acceptance of the same stimuli between the trilingual and



bilingual groups. Subsequently, we will explore whether these two groups demonstrated distinct attitudes toward subject-auxiliary inversion and subject-simple verb inversion if both types of inversion were included.

Upon concluding our presentation of rating patterns for each set, we will proceed to a thorough CLI analysis. This analysis includes the assessment of the occurrence of linguistic influence, the identification of its source language, and a detailed exploration of characteristics presented in the observed influence.

### 6.1.3.1 Directional Inversion

Figure 24 and Figure 25 respectively display participants' ratings for subject-auxiliary inversions and subject-simple verb inversions with the fronting of a directional phrase.

**Figure 24:** *Two Groups' Mean Ratings for Directional Inversions (Subject-Auxiliary Inversion)*

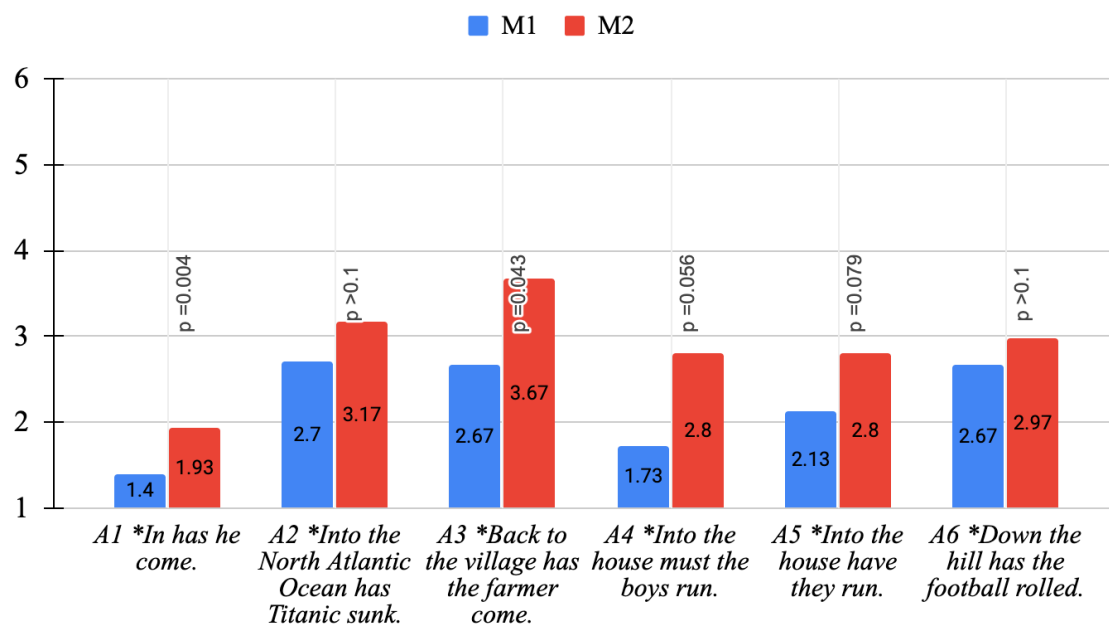
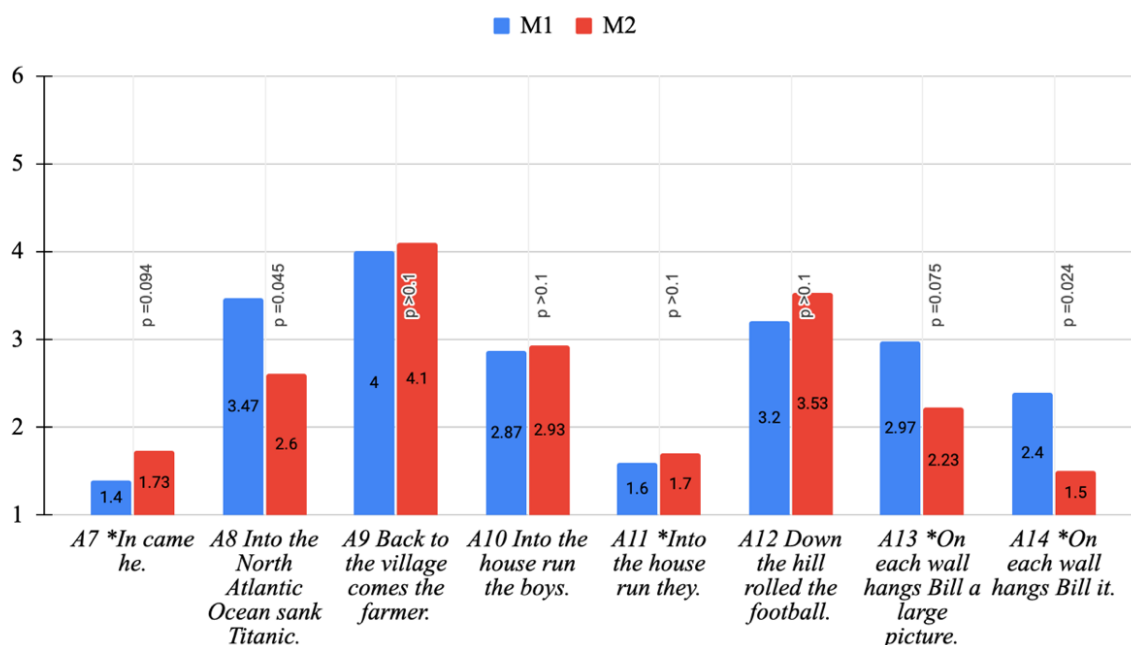


**Figure 25: Two Groups' Mean Ratings for Directional Inversions (Subject-Simple Verb Inversion)**



**Grammaticality Judgment:** In general, the participants could distinguish the grammaticality of the stimuli. On the one hand, they recognized the ungrammatical directional inversions, as indicated by the extremely low mean scores, for instance, those assigned to stimuli A1, A7, and A11. On the other hand, they recognized the grammatical instances, as A8, A9, and A12. The specific fronted element seemed to influence their judgments. The acceptance score increased when the fronted phrase carried more syntactic weight (e.g., *in* vs. *down the hill* or *back to the village*).

**Inversion Type:** In English, subject-auxiliary inversion is not permitted when the non-finite verb is not fronted with the auxiliary (\*X<sub>DIRECTIONAL</sub>-Aux-S-V). The relatively low mean scores assigned to stimuli A1 to A6 indicated that both groups did not accept the grammaticality of these subject-auxiliary inversions. Particularly of interest here is that the trilingual participants even more strictly rejected these sentences, as their mean scores did not exceed 3 points ( $1.4 \leq M1 \leq 2.7$ ,  $1.93 \leq M2 \leq 3.67$ ). Both groups exhibited consistency in their rating patterns: they showed slightly greater acceptance of certain stimuli (A1, A4, and A5) compared with others (A2, A3, and A6). Stimuli

with heavier weights sounded more natural to them, even though they were not grammatical; compare the ratings for A1 *\*In has he come* ( $M1_{A1} = 1.4$ ,  $M2_{A1} = 1.93$ ) and A3 *\*Back to the village has the farmer come* ( $M1_{A3} = 2.67$ ,  $M2_{A3} = 3.67$ ), where the bilinguals even considered the latter case as slightly natural-sounding.

When judging the subject-simple verb inversions, the participants successfully distinguished the ungrammatical stimuli (A7, A11, A13, and A14) from the grammatical ones (A8, A9, A10, and A12). Apart from bilinguals assigning low mean scores to the grammatical stimulus A8, *Into the North Atlantic Ocean sank Titanic* ( $M1_{A8} = 3.47$ ,  $M2_{A8} = 2.6$ ), both groups gave higher scores for the grammatical subject-simple verb inversions than the ungrammatical ones.

These results indicated that both groups of participants were familiar with the related grammar rules: (1) subject-simple verb inversion is permitted only when the subject is non-pronominal (compare the ratings for A10 and A11), and (2) subject-simple inversion does not permit transitive constructions (A13 and A14). Furthermore, neither group considered the grammatical stimuli as fully natural-sounding, which suggested that they recognized that subject-simple verb inversions, albeit grammatical, were non-canonical.

**Group Differences:** When accepting subject-auxiliary inversion, the trilinguals consistently assigned lower scores than the bilinguals did. Disparities in attitude between the groups emerged in 4 out of 6 cases in their ratings for subject-auxiliary inversion, with statistically significant intergroup differences reflected in the ratings for stimulus A1 *\*In has he come* ( $M1_{A1} = 1.4$ ,  $M2_{A1} = 1.93$ ;  $p = 0.004$ ) and A3 *\*Back to the village has the farmer come* ( $M1_{A3} = 2.67$ ,  $M2_{A3} = 3.67$ ;  $p = 0.043$ ), and marginally significant differences in A4 *\*Into the house must the boys run* ( $M1_{A4} = 1.73$ ,  $M2_{A4} = 2.8$ ;  $p = 0.056$ ) and A6 *\*Into the house have they run* ( $M1_{A6} = 2.13$ ,  $M2_{A6} = 2.97$ ;  $p = 0.079$ ). It is noteworthy that these sentences were formulated in a way that exactly

reflected how German syntax would arrange the components.<sup>84</sup> This observation is interesting—contrary to our initial expectations, participants with German knowledge were even more critical of stimuli arranged based on German syntax than those who did not learn German grammar.

When accepting stimuli featuring subject-simple verb inversion, group differences were seen in 4 out of 8, with the group differences for stimuli A8 and A13 being statistically significant. However, this time, the rating patterns were inconsistent. Compared with bilinguals, trilinguals assigned (marginally) significantly higher scores to the two grammatical stimuli: A8 *Into the North Atlantic Ocean sank Titanic* ( $M1_{A8} = 3.47$ ,  $M2_{A8} = 2.6$ ;  $p = 0.045$ ) and A14 *On each wall hangs Bill it* ( $M1_{A14} = 2.4$ ,  $M2_{A14} = 1.5$ ;  $p = 0.024$ ). In rating the ungrammatical sentences A7 *\*In came he* ( $M1_{A7} = 1.4$ ,  $M2_{A7} = 1.94$ ;  $p = 0.094$ ) and A13 *\*On each wall hangs Bill a large picture* ( $M1_{A13} = 2.97$ ,  $M2_{A13} = 2.23$ ;  $p = 0.075$ ), only marginally significant group differences were observed. In rating stimulus A7, the trilinguals even more strictly rejected the sentence. Taken together, the results did not yield solid evidence that trilinguals exhibited greater acceptability for structures with German word order.

### ***Analysis:***

Our findings suggested that the trilingual participants did not solely rely on German syntactic rules as a reference for accepting English directional inversion. This argument arises from their stringent rejection of the subject-auxiliary inversions, even though the stimuli were arranged in a word-for-word order as in German syntax. The trilingual participants could discern the grammaticality and even outperformed the bilinguals, indicating a more solid grasp of English grammar in this context.

At first glance, the overall good performance might be explained by the language mode during the ATJ. For polyglots, the activation level of the language(s) may vary in different linguistic settings. When judging stimuli in English, the trilinguals might

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<sup>84</sup> In German, the non-finite verb moves to the final position of the middlefield when the V2 is occupied by an auxiliary. Compare Stimulus A11 *Into the house must the boys run* with its German counterpart *Ins Haus müssen die Jungen rennen*.

have been operating in a “monolingual mode” of English, during which their German grammar was temporarily inhibited (see Paradis, 1985; Grosjean, 1989, as outlined in Section 2.1.6.2). Even though the word order of the stimuli featuring subject-auxiliary inversion fully overlapped with German word order, the participants did not consider them acceptable.

However, the monolingual mode does not offer a plausible explanation for participants’ greater acceptance of several subject-simple verb inversions. It cannot explain why the trilinguals exhibited reversed rating patterns for the two types of inversion. Namely, if the trilinguals had fully switched to a monolingual mode, group differences would not have emerged, or such differences would only appear in isolated instances. Our anticipation that the trilinguals would rate inversion higher than the bilinguals was partially supported by their acceptance of subject-simple verb inversion. The trilinguals, albeit not consistently, assigned higher ratings for three stimuli aligning with German order, as exemplified in (160). This outcome provides initial evidence of a weak transfer effect from L3 German syntax in the scenario without the presence of auxiliaries.

|       |      |                                  |           |                    |                  |
|-------|------|----------------------------------|-----------|--------------------|------------------|
| (160) | A13  | <b>FOREFIELD</b>                 | <b>V2</b> | <b>MIDDLEFIELD</b> |                  |
|       |      | <b>Adv<sub>DIRECTIONAL</sub></b> | <b>V</b>  | <b>S</b>           | <b>DO</b>        |
|       | Ger. | <i>An jede Wand</i>              | hängt     | Bill               | ein großes Bild. |
|       | Eng. | <i>*On each wall</i>             | hangs     | Bill               | a large picture. |

Regarding the results, we argue that even if speakers are in a monolingual mode for language A, the knowledge of language B (or C, D) might still exert an influence during language use. Achieving a total inhibition of linguistic properties of other languages can be challenging. Therefore, our data provide indirect support for the multi-competence framework by Cook (2003), which posits that languages do not necessarily inhabit a multilingual mind as isolated systems and different linguistic features may overlap and interact (p. 2).

In terms of trilinguals' lower ratings for subject-auxiliary inversion that fully overlaps with German word order, a tentative explanation is the interaction between structural similarities/disparities (Gass, 1984; Westergaard et al., 2017; see Sections 2.1.1 and 2.2.3) and linguistic salience (James, 1996; Jarvis & Pavlenko, 2010; see Section 2.1.5). English and Chinese share structural similarities in their word orders after the auxiliary: the main verb immediately follows the auxiliary, whereas, in German, the non-finite verb must move to the final position of the middlefield, forming an SXV word order, as exemplified in (161).

|       |      |                  |            |                            |                            |
|-------|------|------------------|------------|----------------------------|----------------------------|
| (161) | Chn. | <b>S</b>         | <b>Aux</b> | <b>V<sub>NON-FIN</sub></b> | <b>AdvP</b>                |
|       |      | 男孩 们             | 必须         | 跑                          | 进屋里。                       |
|       |      | nánhái men       | bìxū       | pǎo                        | jìn wū lǐ.                 |
|       | Eng. | The boys         | must       | run                        | into the house.            |
|       | Ger. | <b>FOREFIELD</b> | <b>V2</b>  | <b>MIDDLEFIELD</b>         | <b>VF</b>                  |
|       |      | <b>S</b>         | <b>Aux</b> | <b>AdvP</b>                | <b>V<sub>NON-FIN</sub></b> |
|       |      | Die Jungen       | müssen     | ins Haus                   | rennen.                    |

Due to structural similarities between L1 Chinese and L2 English, the syntactic representation of Aux-V-X word order has been reinforced, and any cases in which the non-finite verb directly follows the auxiliary would be considered more natural-sounding. German stands out as the only language that requires the non-finite verb to move to the clause-final; therefore, the Aux-X-V pattern, as in *The boys must into the house run*, might be particularly noticeable for the trilinguals as a syntactic feature for German, but not for English. In turn, the trilinguals even assigned lower scores to these stimuli than the bilinguals.

Given the scarcity of data thus far, we refrain from drawing a definite conclusion. Instead, we await the outcome of further analysis to ascertain whether the subsequent datasets persist in indicating a tendency for trilingual participants to strictly reject

subject-auxiliary inversion while showing higher acceptability toward subject-simple verb inversion compared with the bilingual controls.

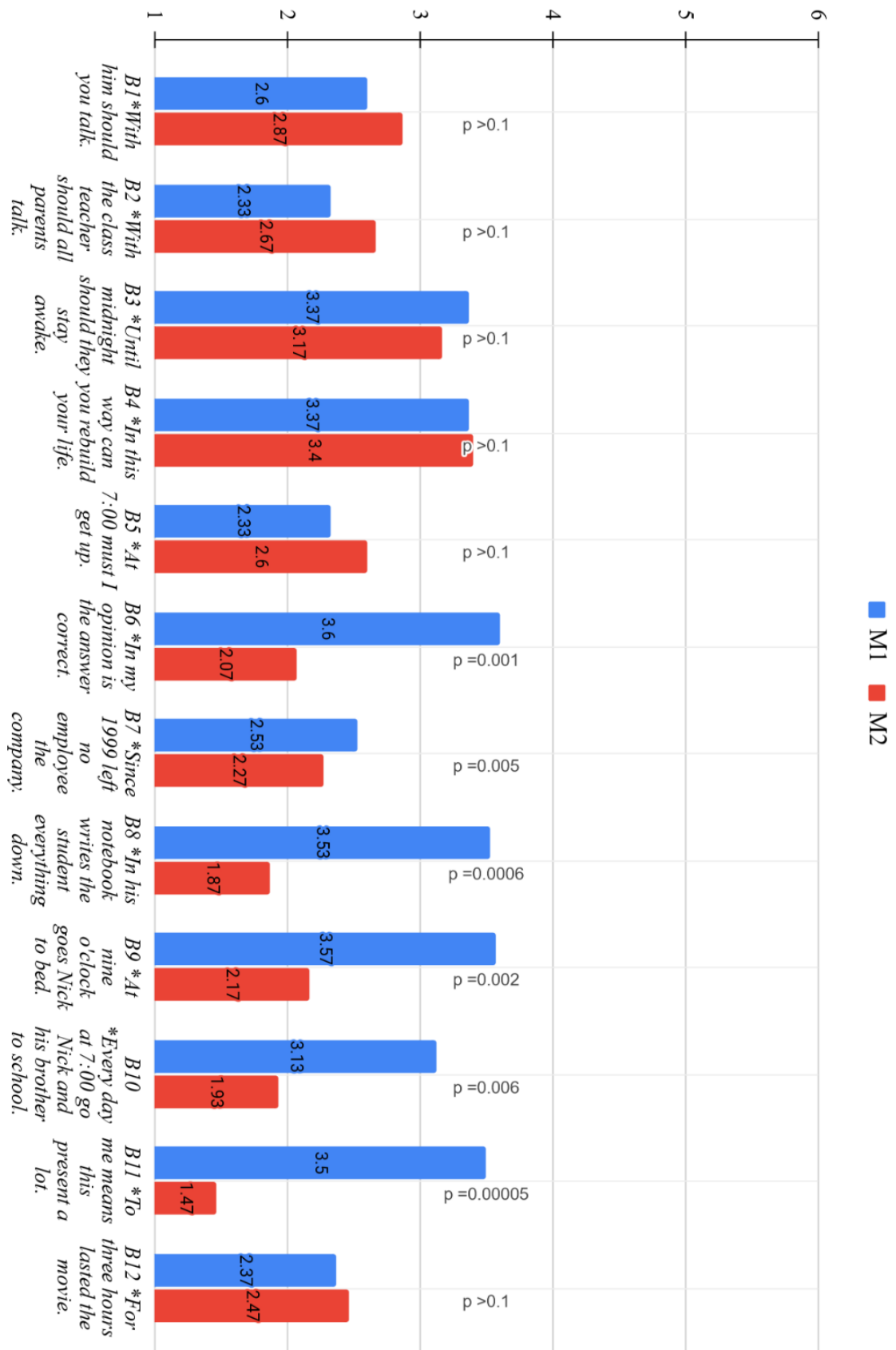
### 6.1.3.2 Non-Directional PP Adverbials

Figure 26 (next page) displays the mean ratings by both groups to the inverted sentences with fronted non-directional PP adverbials. All the stimuli in this set were ungrammatical.

**Grammaticality Judgment:** The mean scores assigned by the bilingual group were low, with most scores falling below the 3-point threshold. This indicated that the bilingual group successfully discerned the ungrammaticality of these stimuli. In contrast, the trilingual group appeared more lenient toward these ungrammatical stimuli, with mean scores varying from 2.33 to 3.6. Notably, for 7 of the 12 sentences, the mean rating from the trilingual group surpassed the 3-point mark., indicating that the trilinguals were generally more tolerant of ungrammaticality compared with the bilinguals. In this sub-scenario, trilinguals were outperformed by the bilingual controls.

**Inversion Type:** As demonstrated in Figure 26, the two groups did not show significantly discernible differences when rating stimuli arranged in subject-auxiliary inversion (B1~B5). In contrast, statistically significant group disparities emerged when assessing subject-simple verb inversions (B6~B11), except for one isolated instance (B12), where the group difference was not evident. The trilinguals assigned notably higher scores to the subject-simple verb inversion. These findings partially corroborate the observations made in the preceding section, where the trilingual group also exhibited a greater propensity toward the subject-simple version compared with the bilinguals, while such propensity was not observed in their ratings for the subject-auxiliary inversion. Moreover, when rating subject-simple verb inversions, group differences were more consistent in comparison with those reflected in the ratings for subject-simple verb directional inversion.

**Figure 26: Two Groups' Mean Ratings for Inversions with Fronted Non-Directional PP Adverbials**





### *Analysis:*

The results met our anticipation that trilinguals would rate stimuli featuring German word order higher. In the case of assessing X-V-S order, the full structural overlap between the English stimuli and their German counterparts has served as a primary factor contributing to transfer. The trilinguals showed nuanced attitudes toward the ungrammatical simple-verb inversions, likely because the X-V-S order is grammatical exclusively in German, as exemplified in (162). However, it is important to recognize that such an influence is detrimental, as it has interfered with trilinguals' perception of English grammaticality.

| (162) |     |      | FOREFIELD        | V2       |                 | MIDDLEFIELD |
|-------|-----|------|------------------|----------|-----------------|-------------|
|       | B9  | Ger. | Um neun Uhr      | geht     | Nick            | ins Bett.   |
|       |     | Eng. | *At nine o'clock | goes     | Nick            | to bed.     |
|       | B11 | Ger. | Mir              | bedeutet | dieses Geschenk | viel.       |
|       |     | Eng. | *To me           | means    | this present    | a lot.      |

This finding is in line with Bybee and Thompson (2000): high *type frequency* strengthens the “representational schema and makes it more accessible for further use with new items” (as cited in Ellis, 2002, p. 166). In our case, the X-V-S word order is of a higher type frequency in German than in English,<sup>85</sup> and the trilinguals likely have intuitively extended this structure in perceiving the “new item”—the English stimuli.

Regarding the ratings for subject-auxiliary inversion, a similar pattern was observed in rating directional inversions. Again, a full overlap of surface syntax between English and German in this case did not result in trilinguals' higher acceptability of these stimuli. For instance, even though stimuli B1 *\*With him should you talk* and B2 *\*With the class teacher should all parents talk* find their word-for-word correspondence in German, as exemplified in (163), the trilinguals still judged

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<sup>85</sup> The high frequency of occurrence of the X-V-S word order in German will be further discussed in Section 6.1.7.

them as being ungrammatical ( $M1_{B1} = 2.6$ ,  $M2_{B1} = 2.87$ ;  $M1_{B2} = 2.33$ ,  $M2_{B2} = 2.67$ ). As mentioned in the previous section, it could be the perceptual salience due to structural mismatches between German and English/Chinese that contributed to this outcome. The trilinguals may have generalized the ungrammaticality of the stimuli as long as they featured auxiliary constructions.

|          |                         |            |                    |                            |
|----------|-------------------------|------------|--------------------|----------------------------|
| (163) B1 | <b>FOREFIELD</b>        | <b>V2</b>  | <b>MIDDLEFIELD</b> | <b>VF</b>                  |
|          | <b>Adv<sub>PP</sub></b> | <b>Aux</b> | <b>S</b>           | <b>V<sub>NON-FIN</sub></b> |
| Ger.     | Mit ihm                 | sollst     | du                 | reden.                     |
| Eng.     | *With him               | should     | you                | talk.                      |

Notice that B3 and B4 only partially aligned with German word order, as the alignment after the auxiliary did not overlap with German word order, as shown in (164). We initially expected that the influence of the obligatory X-Aux-S word order in German would be strong enough to raise trilinguals' acceptance of any subject-auxiliary inversion, even if the word order in the VP did not align with German syntax. This sub-hypothesis has not found support in our data thus far ( $M1_{B3} = 3.37$ ,  $M2_{B3} = 3.17$ ;  $p > 0.1$ ;  $M1_{B4} = 3.37$ ,  $M2_{B4} = 3.4$ ;  $p > 0.1$ ).

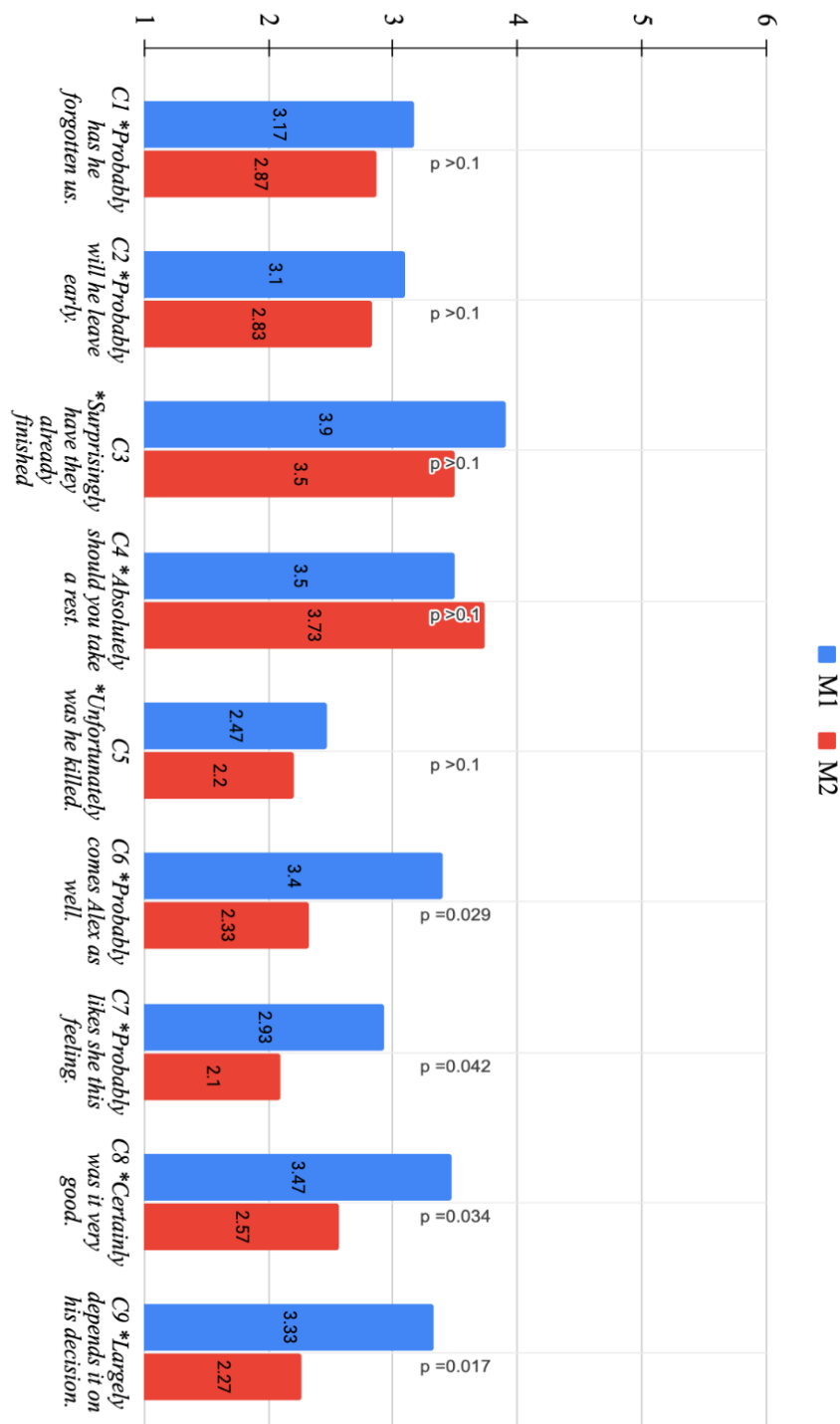
|       |      |                  |            |                    |                                |
|-------|------|------------------|------------|--------------------|--------------------------------|
| (164) | B4   | <b>FOREFIELD</b> | <b>V2</b>  | <b>MIDDLEFIELD</b> | <b>VF</b>                      |
|       |      | <b>AdvP</b>      | <b>Aux</b> | <b>S</b>           | <b>DO</b>                      |
|       |      |                  |            |                    | <b>V<sub>NON-FIN</sub></b>     |
|       | Ger. | So               | kannst     | du                 | dein Leben <u>wiederbauen.</u> |
|       |      | <b>AdvP</b>      | <b>Aux</b> | <b>S</b>           | <b>V<sub>NON-FIN</sub></b>     |
|       |      |                  |            | <b>DO</b>          |                                |
|       | Eng. | *In this way     | can        | you                | <u>rebuild</u> your life.      |

### 6.1.3.3 Stance Adverbials

Figure 27 presents the two groups' ratings for ungrammatical inversions achieved by the fronting of stance adverbials, such as adverbs of probability, evaluation, and attitude.

**Grammaticality Judgment:** Neither group fully accepted the grammaticality of these stimuli, as evidenced by mean scores below 4 points. Compared with the bilingual controls, the trilinguals consistently exhibited less rejection toward these ungrammatical sentences, except for stimulus C4. Again, the trilinguals were slightly outperformed by the bilinguals in distinguishing grammaticality.

**Figure 27:** Two Groups' Mean Ratings for Inversions with Fronted Stance Adverbials



### *Analysis:*

A negative transfer effect from L3 German has again been observed, as trilingual participants showed greater tolerance for ungrammatical subject-simple verb inversions.

Of particular interest here are trilinguals' rating patterns for subject-auxiliary inversions that only partially aligned with German surface syntax, where the inversion of the subject and auxiliary followed the German V2 rule, but the position of the non-finite verb still conformed to the SVO order as in English and Chinese. This raises an interesting question: what mechanism accounted for the similar acceptance of trilinguals and bilinguals for the partial subject-auxiliary inversions? One might hypothesize that if German syntax exerts an all-sweeping influence, trilinguals would (1) demonstrate higher acceptability to X-Aux-S word order and, meanwhile, (2) show lower acceptability to the stimuli in which the non-finite verb does not occupy the clause-final position. However, the anticipated rating pattern was not observed here.

First, thus far, when rating subject-auxiliary inversions that fully overlapped with German syntactic alignments, such as B1 *\*With him should you talk*, B2 *\*With the class teacher should all parents talk*, and C3 *\*Surprisingly have they already finished*, no significant group differences were seen. Second, an additional finding suggested that the trilinguals did not particularly prefer stimuli featuring the VF position. When rating the filler sentence *\*Probably has he us forgotten*, the trilinguals did not show heightened acceptance of its grammaticality, and the group difference was not statistically significant, even though the sentence fully overlapped with the word order in its German counterpart: *Wahrscheinlich hat er uns vergessen* (Adv-Aux-S-DO-V), as shown in (165).

- (165) C1:       \*Probably **has** he **forgotten** us.       (M1 = 3.17, M2 = 2.87;  $p > 0.1$ )  
           Filler 22: \*Probably **has** he **forgotten**.       (M1 = 2.07, M2 = 1.37;  $p = 0.086$ )

|      | FOREFIELD      | V2  | MIDDLEFIELD   | VF                   |
|------|----------------|-----|---------------|----------------------|
|      | AdvP           | Aux | S        DO   | V <sub>NON-FIN</sub> |
| Ger. | Wahrscheinlich | hat | er        uns | <u>vergessen</u> .   |
| Eng. | *Probably      | has | he        us  | <u>forgotten</u> .   |

Both groups rejected this filler, where the lexical verb occupied the final position, conforming to the placement of non-finite verbs in German. This outcome indicated that the VF position is not particularly transferable, probably due to its distinction from both English and Chinese—both languages are constrained by the SVO order.

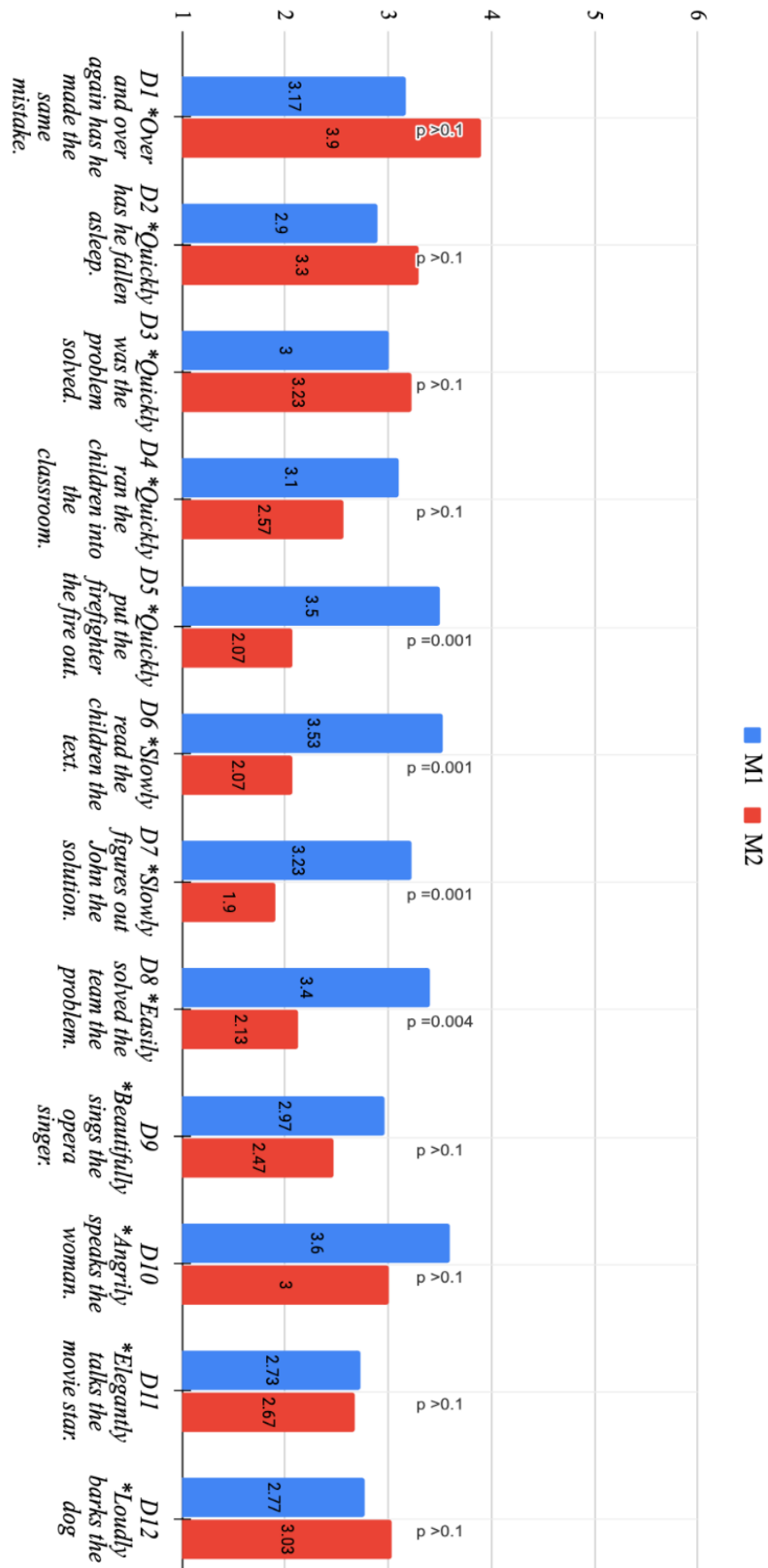
Integrating these findings into our analysis, the null group differences in accepting subject-auxiliary inversions partially aligning with German, such as *C1 \*Probably has he forgotten us*, *C2 \*Probably will he leave early*, *C4 \*Absolutely should you take a rest*, *B3 \*Until midnight should they stay awake*, *B4 \*In this way you can rebuild your life*, and *B5 \*At 7:00 must I get up*, did not result from a potential balancing effect where trilinguals' higher acceptability of subject-auxiliary inversion was offset by their lower acceptability of the non-VF position. Rather, these minimal group differences suggested the minimal transferability of subject-auxiliary inversion and VF position of the non-finite verb from German to English. To this end, we speculate that different syntactic properties exhibit varying levels of transferability.

#### 6.1.3.4 Manner Adverbials

Figure 28 shows participants' ratings for ungrammatical inversions featuring the fronting of manner AdvPs as well as the group differences.

**Grammaticality Judgment:** In evaluating manner inversions, both groups displayed a degree of reluctance in acknowledging the grammaticality of the presented stimuli ( $2.73 \leq M1 \leq 3.6$ ,  $1.9 \leq M2 \leq 3.9$ ). Compared with the bilingual controls, the trilingual participants demonstrated a higher level of acceptability toward these ungrammatical structures, rating more than half of the stimuli (7 out of 12) above 3 points. This suggested that these ungrammatical manner inversions were not entirely unacceptable to them.

**Figure 28: Two Groups' Mean Ratings for Inversions with Fronted Manner AdvPs**



**Inversion Type:** The participants' attitudes toward inversion types exhibited similarities with those observed in Sections 6.3.1.2 and 6.3.1.3. The trilingual participants demonstrated a remarkably heightened preference for accepting subject-simple verb inversions compared with the bilinguals. Out of 9 stimuli, group divergence was observed in perceiving 4 (D5~D8). In comparison with the group differences in rating stimuli featuring other semantic categories of fronted elements, the group divergence was more pronounced in rating these four stimuli, reflected by the small p-values of the U test. However, when evaluating D9 to D12, the two groups did not exhibit differentiated attitudes ( $p > 0.1$ ), although they also featured subject-simple verb inversion.

Participants' acceptability judgment of subject-auxiliary inversion was similar to that observed in the preceding sections: no statistically significant group differences were observed. Noticeably, although stimulus D3 *\*Quickly was the problem solved* could be translated directly into German without losing grammatical correctness, as shown in (166), the mean score it received did not deviate much from those assigned to stimuli D1 and D2, whose word orders only partially followed German syntax, as in (167).

|          |                  |          |            |                    |  |                            |
|----------|------------------|----------|------------|--------------------|--|----------------------------|
| (166) D3 | <b>FOREFIELD</b> |          | <b>V2</b>  | <b>MIDDLEFIELD</b> |  | <b>VF</b>                  |
|          | <b>Adv</b>       |          | <b>Aux</b> | <b>S</b>           |  | <b>V<sub>NON-FIN</sub></b> |
|          | Ger.             | Schnell  | wurde      | das Problem        |  | <u>gelöst.</u>             |
|          | Eng.             | *Quickly | was        | the problem        |  | <u>solved.</u>             |

|          |                  |                     |            |                    |                          |                            |
|----------|------------------|---------------------|------------|--------------------|--------------------------|----------------------------|
| (167) D1 | <b>FOREFIELD</b> |                     | <b>V2</b>  | <b>MIDDLEFIELD</b> |                          | <b>VF</b>                  |
|          | <b>Adv</b>       |                     | <b>Aux</b> | <b>S</b>           | <b>DO</b>                | <b>V<sub>NON-FIN</sub></b> |
|          | Ger.             | Immer wieder        | hat        | er                 | <u>den selben Fehler</u> | <i>gemacht.</i>            |
|          |                  | over and over again | has        | he                 | the same mistake         | made                       |

|      |                      |  |            |          |                            |                          |
|------|----------------------|--|------------|----------|----------------------------|--------------------------|
| Eng. | <b>Adv</b>           |  | <b>Aux</b> | <b>S</b> | <b>V<sub>NON-FIN</sub></b> | <b>DO</b>                |
|      | *Over and over again |  | has        | he       | <i>made</i>                | <u>the same mistake.</u> |

|    |      |                  |            |                    |                                               |
|----|------|------------------|------------|--------------------|-----------------------------------------------|
| D2 | Ger. | <b>FOREFIELD</b> | <b>V2</b>  | <b>MIDDLEFIELD</b> | <b>VF</b>                                     |
|    |      | <b>Adv</b>       | <b>Aux</b> | <b>S</b>           | <b>V<sub>NON-FIN</sub></b>                    |
|    |      | Schnell          | hat        | er                 | <i>ein geschlafen.</i>                        |
|    |      | quickly          | has        | he                 | sleep-in                                      |
|    |      | <b>Adv</b>       | <b>Aux</b> | <b>S</b>           | <b>V<sub>NON-FIN</sub> Adj<sub>COMP</sub></b> |
|    | Eng. | *Quickly         | has        | he                 | <i>fallen asleep.</i>                         |

### *Analysis:*

The significant group differences in rating ungrammatical subject-simple verb manner inversions suggested a notable non-facilitative influence from L3 German. The two groups showed particularly distinct acceptance of stimuli D5 to D8, which involved a transitive structure. These sentences adhered to the Adv-V-S-DO-(Ptcl) word order, a syntactic arrangement required by German grammar<sup>86</sup> but ungrammatical in Chinese and English. This contrast has likely elucidated the higher ratings given by the trilingual participants to these stimuli, compared with the lower scores by the bilingual controls.

The most noteworthy observation here regarded the two groups' unanimous ratings for stimuli D9 to D12, although these sentences also involved subject-simple verb inversion. Upon closer examination, it has become evident that it was the bilingual participants who altered their rating patterns, rather than the trilinguals. When the sentences contained a transitive construction (Adv-S-V-DO), the bilinguals' acceptance immediately dropped compared with their acceptance of stimuli with an intransitive structure ( $1.9 \leq M_{D5-D8} \leq 2.13$  vs.  $2.47 \leq M_{D9-D12} \leq 3.03$ ), and the trilinguals' rating patterns remained rather unchanged ( $3.23 \leq M_{D5-D8} \leq 3.53$  vs.  $2.73 \leq M_{D9-D12} \leq 3.6$ ). Although the trilingual participants' acceptance scores slightly decreased in rating

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<sup>86</sup> Stimuli D7 *\*Slowly figures out John the solution* involves a verb-particle construction. However, the German translation for *figure out* is realized by a single verb *lösen* ('to solve'). The sentence still follows the overarching AdvP-V-S-DO word order when translated into German: *Schnell wurde das Problem gelöst.*



stimuli D9 *\*Beautifully sings the opera singer* ( $M1 = 2.97$ ,  $M2 = 2.47$ ;  $p > 0.1$ )<sup>87</sup> and D11 *\*Elegantly talks the movie star* ( $M1 = 2.73$ ,  $M2 = 2.67$ ;  $p > 0.1$ ), they nonetheless maintained their heightened tolerance toward this ungrammatical word order ( $2.73 \leq M1 \leq 3.6$ ).

The presence of a direct object seemed to have influenced the bilinguals' judgment—the word order of Adv<sub>MANNER</sub>-V-S-DO was particularly unacceptable for them, such as in D6 *\*Slowly read the children the text*. Such an outcome finds an explanation in structural disparities between German and English/Chinese. As the Adv<sub>MANNER</sub>-V-S-DO sequence has no syntactic representation in English or Chinese, it is unsurprising that the bilinguals found it even more unnatural than the Adv<sub>MANNER</sub>-V-S alignment. The rating pattern of the trilinguals for subject-simple verb manner inversion was still consistent with that exhibited in the preceding sections. Although the trilinguals did not deem the Adv-V-S(-DO) order grammatical in English, they did not fully reject it. Compared with the bilingual controls, the trilinguals showed more tolerance for the Adv<sub>MANNER</sub>-V-S-DO word order, probably because this alignment is exclusive to German. This outcome offers further evidence of a non-facilitative influence from L3 German.

While trilinguals showed greater acceptance of subject-simple verb inversions that fully adhered to the German word order, their ratings for the subject-auxiliary inversions featuring German syntax have thus far shown a reversed pattern. Again, we answer the question: why did the trilinguals assign lower ratings for the stimuli even if they were written in a word-for-word order as in German (Adv-Aux-S-V)?

In the previous sections, we tentatively explained that the trilinguals might have overgeneralized the ungrammaticality of any English constructions containing an

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<sup>87</sup> Our findings regarding intransitive subject-simple verb inversion diverge from those reported in a comparable study conducted by the author for her master's thesis in 2018. In that earlier study, the acceptance of V2 structure was examined among 40 trilinguals and 40 bilinguals using the stimulus *\*Beautifully sings the opera singer*. Notably, the trilingual group demonstrated significantly higher acceptance scores than the bilingual controls, with mean scores of  $M1 = 4.23$  for the trilinguals and  $M2 = 2.58$  for the bilinguals ( $p = 0.00014$ ).

auxiliary construction due to the salient structural difference between German and English/Chinese. Here, we propose an alternative explanation: the outcome might be related to the influence of the native language, Chinese. In English and Chinese, it is not unusual to front a manner adverbial to the sentence-initial for a marked reading; however, this does not result in an inversion but a V3 position. Unlike English, standard Mandarin Chinese does not use the auxiliary *have* to form perfect tenses.<sup>88</sup> When parsing sentences featuring the Adv-Aux-S-V-Y order, Chinese native speakers might intuitively omit the auxiliary, which only has a grammatical function but carries no lexical meaning. The sentence is directly transformed into an Adv-S-V-Y construction, which has a direct, grammatical word-for-word equivalence in Chinese. For instance, stimuli D1 *\*Over and over again has he made the same mistake* and D2 *Quickly has he fallen asleep* respectively featured the Adv-Aux-S-V-DO and Adv-Aux-S-V-Adj<sub>COML</sub> word order, omitting the auxiliary does not affect the grammaticality of the word order, as shown in (168) and (169). This explains why the two groups did not deviate much from each other in rating these sentences, and the bilinguals did not even consider them as completely ungrammatical (M2<sub>D1</sub> = 3.9, M2<sub>D2</sub> = 3.3).

|       |      |                      |            |          |               |                   |
|-------|------|----------------------|------------|----------|---------------|-------------------|
| (168) | Eng. | <b>Adv</b>           | <b>Aux</b> | <b>S</b> | <b>V</b>      | <b>DO</b>         |
|       |      | *Over and over again | has        | he       | made          | the same mistake. |
|       | Chn. | <b>Adv</b>           | <b>Aux</b> | <b>S</b> | <b>V</b>      |                   |
|       |      | 一次又一次                | ∅          | 他        | 犯 着           |                   |
|       |      | Yíci yòu yíci        | ∅          | tā       | fàn zhe       |                   |
|       |      | over and over again  | ∅          | he       | make PTCL.DUR |                   |
|       |      | <b>DO</b>            |            |          |               |                   |
|       |      | 同样 的 错误。             |            |          |               |                   |
|       |      | tóngyàng de cuòwù.   |            |          |               |                   |
|       |      | same mistake         |            |          |               |                   |

<sup>88</sup> The perfective structure with an auxiliary 有 *yǒu* ('have') also exists in Mandarin, but mostly dialectal. For example: 我最近有去过上海。 *Wǒ zuìjìn yǒu qù guò Shànghǎi*. ('Recently I have been to Shanghai').

|       |            |            |          |      |          |                           |
|-------|------------|------------|----------|------|----------|---------------------------|
| (169) | <b>Adv</b> | <b>Aux</b> | <b>S</b> |      | <b>V</b> | <b>Adj<sub>COMP</sub></b> |
| Eng.  | *Quickly   | has        | he       |      | fallen   | asleep.                   |
| Chn.  | <b>Adv</b> | <b>Aux</b> | <b>S</b> |      | <b>V</b> |                           |
|       | 很快         | ∅          | 他        | 就    | 入        | 睡 了。                      |
|       | Hěnkuaì    | ∅          | tā       | jiù  | rù       | shuì le.                  |
|       | quickly    | ∅          | he       | PTCL | enter    | sleep PTCL.PFV            |

A similar mechanism applies for parsing stimulus D3 *\*Quickly was the problem solved*. In forming passive constructions, English and Chinese share a similar pattern: S-Aux<sub>PASS</sub>-V. However, the passive marker can be omitted when translating D3 into Chinese, as shown in (170). The sentence hence follows a structure of Adv<sub>MANNER</sub>-S-V, which is grammatical in Chinese. This has likely contributed to the null group differences in accepting this stimulus.

|       |           |             |             |          |                |            |
|-------|-----------|-------------|-------------|----------|----------------|------------|
| (170) | <b>D3</b> | <b>AdvP</b> | <b>Aux</b>  | <b>S</b> |                | <b>V</b>   |
| Eng.  | *Quickly  | was         | the problem |          |                | solved.    |
| Chn.  | 很快        |             | 问题          | 就        | 被              | 解决 了。      |
|       | Hěnkuaì   |             | wèntí       | jiù      | <del>bèi</del> | jiějué le. |
|       | quickly   |             | the problem | PTCL     | solve          | PTCL.PFV   |

To this end, we speculate that the overarching word order influences the proficient L2 users' grammaticality judgment of sentences featuring compound tenses, rather than the reliance on exact word-for-word translation. This means the influence of the source language extends beyond mere direct translation; instead, the broader syntactical structure that frequently occurs (such as the SVX word order for Chinese and English) influences participants' intuitive grammatical judgment. The structural similarities

between L1 Chinese and English might neutralize the influence of L3 German. To validate this hypothesis, research tailored to investigate this aspect is required.

#### 6.1.3.5 Frequency Adverbials

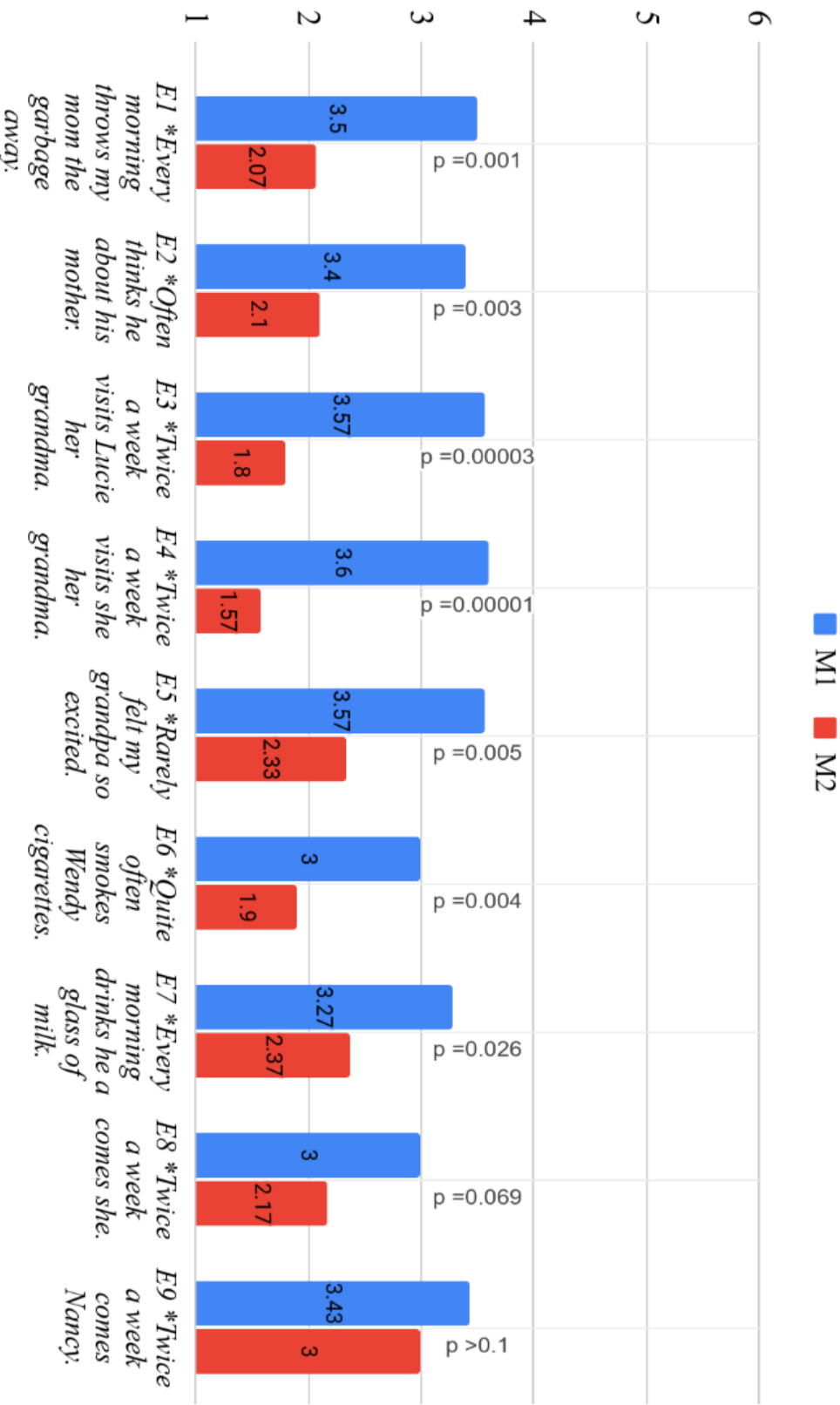
Figure 29 (next page) displays participants' ratings for ungrammatical inversions with a fronted adverbial of frequency. All the stimuli featured the subject-simple verb inversion and adhered to the German word order.

**Grammaticality Judgment:** Both groups exhibited a consistent pattern in their ratings. The trilingual participants showed greater tolerance for these ungrammatical stimuli, with their mean ratings for all the sentences exceeding the threshold of 3 points ( $3 \leq M1 \leq 3.6$ ). Conversely, the bilingual participants held a different view. The bilinguals deemed none of the stimuli grammatically acceptable, as reflected by the low acceptance scores ( $1.57 \leq M2 \leq 2.37$ ). This contrast suggested that the bilinguals adhered to English grammatical norms more strictly than the trilinguals and could better distinguish the ungrammaticality.

**Group differences:** Out of e8 stimuli, statistically significant group dissimilarity was observed in rating 7 (E1~E7;  $p < 0.05$ ). For stimuli E1, E3, and E4, the extremely low p-values ( $p \leq 0.001$ ), coupled with a substantial mean rating gap, yield overwhelming statistical evidence for a group difference: when the subject-simple verb inversion featured a direct object (Adv-V-S-DO), the attitudes of trilinguals and bilinguals diverged significantly, with trilinguals demonstrating significantly greater acceptance.

Additionally, a marginally significant p-value ( $p = 0.069$ ) was obtained for the group comparison on stimulus E8, *\*Twice a week comes she*, which featured an intransitive construction (Adv-V-S), with trilinguals providing higher ratings.

Figure 29: Two Groups' Mean Ratings for Inversions with Fronted Frequency AdvPs



### *Analysis:*

The results provided further evidence for a non-facilitative backward influence from participants' L3 German. The stimuli were organized in a direct, word-for-word translation that mirrored the German word orders, i.e., Adv-V-S, Adv-V-O, and Adv-V-S-DO-Ptcl, as exemplified in (171). In turn, the trilingual participant considered the stimuli as being more natural-sounding, while the bilinguals did not.

|          |                  |  |           |                    |                         |               |
|----------|------------------|--|-----------|--------------------|-------------------------|---------------|
| (171) E2 | <b>FOREFIELD</b> |  | <b>V2</b> | <b>MIDDLEFIELD</b> |                         |               |
|          | <b>Adv</b>       |  | <b>V</b>  | <b>S</b>           | <b>O<sub>PREP</sub></b> |               |
| Ger.     | Oft              |  | denkt     | er                 | an                      | seine Mutter. |
| Eng.     | *Often           |  | thinks    | he                 | about                   | his mother.   |

|      |                      |  |           |                    |              |  |
|------|----------------------|--|-----------|--------------------|--------------|--|
| E4   | <b>FOREFIELD</b>     |  | <b>V2</b> | <b>MIDDLEFIELD</b> |              |  |
|      | <b>Adv</b>           |  | <b>V</b>  | <b>S</b>           | <b>DO</b>    |  |
| Ger. | Zweimal in der Woche |  | besucht   | sie                | ihre Oma.    |  |
| Eng. | *Twice a week        |  | visits    | she                | her grandma. |  |

Again, most stimuli involved the presence of an object. Considering previous findings, the bilinguals showed less acceptance of the Adv-V-S-DO word order, likely because it conforms neither to English nor Chinese syntax rules. German, with the Adv-V-S-DO being a default at frequency adverbial fronting, has increased the acceptability of the trilinguals toward this word order.

Regarding the role of L1 Chinese, fronting frequency adverbials does not lead to inversion in Chinese. This accounts for why the bilinguals consistently rejected the grammaticality of the given stimuli. The structural similarities between English and Chinese in this case might have exerted a positive influence on bilinguals' judgment.

In summary, the syntactic feature of L3 German, again, acted as a source of language transfer. Nonetheless, the transferring effect was negative, as the trilingual speakers could not discern grammaticality as well as the bilinguals. The German word order has neutralized the potential positive influence of L1 Chinese.

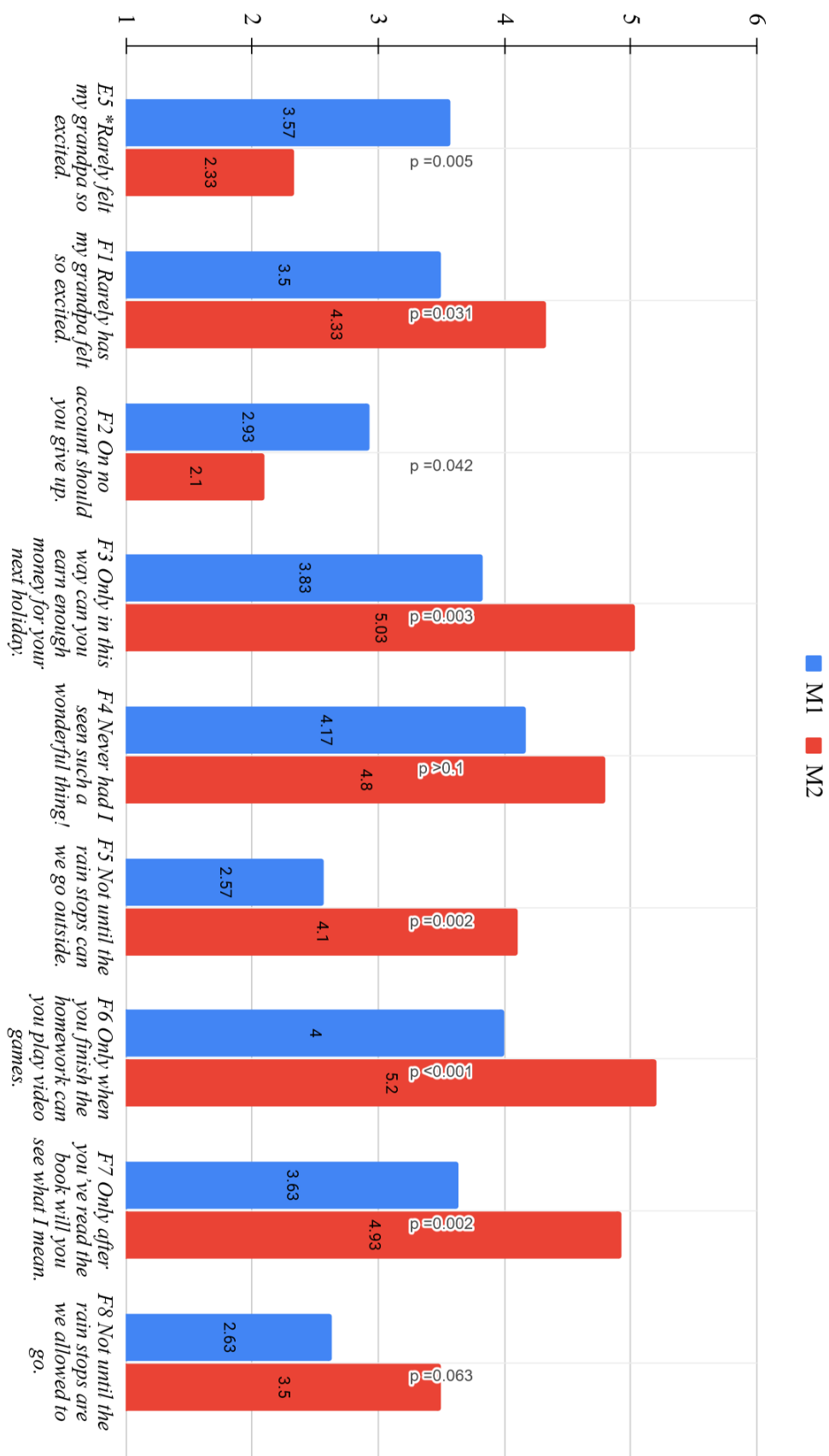
### 6.1.3.6 Negative/Restrictive Adverbials

Figure 30 (next page) demonstrates the participants' meaning ratings for inverted stimuli with fronted negative or restrictive adverbials. A subject-auxiliary inversion is obligatory in this case, and stimuli F1 to F8 were grammatical. In contrast, the case with subject-simple verb inversion was ungrammatical (E5).

**Grammaticality Judgment:** In the sub-scenario of negative/restrictive inversion, the bilingual participants demonstrated a strong propensity for accepting grammatical stimuli, except for F2 *On no account should you give up* ( $M2_{F2} = 2.1$ ). For other stimuli (F1, F3~F8), the scores assigned by the bilinguals consistently surpassed 4 points ( $4.1 \leq M2 \leq 5.2$ ). They fully accepted the grammaticality of stimuli F3, F4, F5, and F7. They appeared to have acquired the grammar rule that only subject-auxiliary inversion is permitted when the fronted element has a negative/restrictive meaning, as evidenced by the low ratings to E5 *\*Rarely felt my grandpa so excited*, the trilinguals assigned higher scores than the bilinguals ( $M2_{E2} = 2.33$ ). These results indicated bilingual speakers' adeptness in distinguishing grammatical constructions in this context and their robust integral knowledge regarding negative/restrictive inversion.

On the contrary, the rating patterns exhibited by the trilingual participants varied. While they assigned higher scores to stimuli like F3, F4, and F6, they allocated lower ratings for others, such as F2, F5, and F8, although these sentences were grammatical. Unlike the bilinguals, the trilinguals did not fully accept the grammaticality of these grammatical sentences, as none of the scores exceeded 5 points. Again, the trilinguals were outperformed by the bilinguals.

**Figure 30: Two Groups' Mean Ratings for Inversions with Fronted Negative/Restrictive Adverbials**





***Inversion Type and Group Differences:*** The rating patterns of the trilingual group exhibit consistency with those observed in previous sub-scenarios. Statistically significant group differences were observed in the ratings for almost all the instances. Compared with the bilingual controls, the trilinguals displayed greater acceptance of the subject-simple verb inversion (E5) and lower acceptance of those subject-auxiliary inversions (F1, F3~F8), even if the latter type of inversion is grammatical in this case.

***Analysis:***

The trilingual participants' greater acceptance of the single case (E5) involving subject-simple verb inversion is consistent with our previous observations, wherein trilinguals consistently rated this inversion type more positively, albeit ungrammatical. This experiment outcome can be attributed to the non-facilitative transfer effect from their dominant foreign language, L3 German.

As mentioned earlier, trilinguals' tendency to rate lower the subject-auxiliary inversion may result from the perceptual salience of certain syntactic features of German. During the acquisition process, the trilinguals likely noticed the distinction between German and English/Chinese regarding the verb positions in sentences with compound tenses. Upon seeing sentences featuring X-Aux-S word order, they might immediately consider such a configuration as a distinct characteristic of German syntax and not for English or Chinese. In other words, the trilinguals had likely made an overgeneralization that any X-Aux-S sequence would be ungrammatical in English, assigning lower acceptance scores to the stimuli featuring subject-auxiliary inversion than bilinguals. Thus far, the semantic category of the fronted elements did not show a correlation to trilinguals' grammatical judgment of subject-auxiliary inversion.

The rating pattern of the trilingual group contrasted with that observed in the bilingual group, who seemed to rely more on the acquired English grammar rules when making judgments. We have previously suggested that the influence of L1 Chinese might have positively impacted the bilinguals' implicit English knowledge, as the two languages share the same overarching SVX word order. However, the structural similarities between English and Chinese could not account for bilinguals' successful

distinguishment of grammaticality in this sub-scenario, as fronting restrictive/negative adverbials does not lead to inversion in Chinese. Other factors must have played a role. To this end, we align with the *Scalpel Model* proposed by Slabakova (2017) and posit that foreign language instruction during the language acquisition process may have contributed to the experiment outcome. The bilinguals assigned higher mean scores to the stimuli in this sub-scenario than to those featuring non-restrictive/non-negative subject-auxiliary inversions. Their almost full acceptance of the stimuli indicated that they had successfully acquired the rules regarding negative/restrictive inversion in English. The accuracy of judgment of the trilinguals, nonetheless, was led astray due to the influence of L3 German.

To date, there is ample evidence supporting that the syntactic influence of L3 German has affected the intuitive grammatical judgment of the trilinguals. The word order arrangement in German grammar has provided an additional orientation for judging grammaticality. Nevertheless, this orientation was found to be misleading, as the speakers tended to rely on the general syntactic features rather than the specific grammar rules in assessing sentences.

### ➤ **Additional findings and analysis**

In addition to the main findings discussed above, the results revealed additional observations that warrant analysis.

First, the length of the fronted element might have influenced participants' judgment, as the group divergence became more pronounced when the fronted elements featured longer phrases and clauses (F3, F5, F6, and F7) rather than single words or shorter phrases (F1, F2).

Second, our participants did not exhibit a uniform degree of acceptance when rating stimuli featuring subject-auxiliary inversion, even though all of them share the Adv-V-S word order, a grammatical structure in English in this case. For instance, stimulus F2, *On no account should you give up*, received markedly lower mean scores, while F4, *Never had I seen such a wonderful thing*, and F6, *Only when you finish the homework can you play video games*, were more favorably accepted. This discrepancy was

unexpected, prompting an examination of other variables. It turns out that the correspondence of the fronted element across languages has possibly exerted an influence.

In the context of bilingualism, our data further supported the argument that language influence is more likely to occur when there is a certain overlap between the languages involved (e.g., Gass, 1984, p. 118). Bilinguals showed high acceptance of stimuli F3, F6, and F7 ( $M2_{F3} = 5.03$ ,  $M2_{F6} = 5.2$ ,  $M2_{F7} = 4.93$ ), possibly because the equivalents of the fronted elements in these stimuli exist in L1 Chinese, as exemplified in (172).

|       |    |      |               |             |     |                        |
|-------|----|------|---------------|-------------|-----|------------------------|
| (172) | F6 | Eng. | <i>Only</i>   | <i>when</i> | you | finish the homework... |
|       |    | Chn. | 只有            | 当           | 你   | 做完 作业, ...             |
|       |    |      | <i>Zhǐyǒu</i> | <i>dāng</i> | nǐ  | zuò-wán zuòyè, ...     |
|       |    |      | only          | when        | you | finish homework        |

On the contrary, stimuli F2 and F8 were not fully accepted, plausibly due to differences in how Chinese and English would formulate these expressions. As seen in (173), a word-for-word translation of stimulus F8 into Chinese leads to illogic.

|       |     |      |                                                                        |           |       |      |           |       |      |    |    |
|-------|-----|------|------------------------------------------------------------------------|-----------|-------|------|-----------|-------|------|----|----|
| (173) | F8  | Eng. | Not until the rain stops are we allowed to go.                         |           |       |      |           |       |      |    |    |
|       | cf. | Chn. | ?不                                                                     | 等         | 雨     | 停,   | 我们        | 才     | 被    | 允许 | 走。 |
|       |     |      | ?Bù děng                                                               | yǔ tíng,  | wǒmen | cái  | bèi       | yǔnxǔ | zǒu. |    |    |
|       |     |      | not until                                                              | rain stop | we    | then | PTCL.PASS | allow | go   |    |    |
|       |     |      | lit. 'If we don't wait until the rain stops, we are allowed to leave.' |           |       |      |           |       |      |    |    |

For the multilingual context, our data suggested that L3 German may have potentially nuanced the effects of L1-L2 interaction, and the (dis)parities between syntactic representations for one expression in each language may provide alternative explanations for inconsistent rating patterns by the trilinguals. This impact was

observed in two specific cases: (i) German uses the same construction as English but not as Chinese, as in the case of F2 (*on no account*), and (ii) German uses a completely different expression from both English and Chinese, as in the case of F5 and F8 (*not until*).

**(i) *On no account* + *Aux* + *S***

F2 *On no account should you give up* stood out as the only instance of subject-auxiliary inversion to which the trilinguals gave higher ratings than the bilinguals did. Additionally, compared with other stimuli, it received the lowest mean scores by both groups ( $M_{F2} = 2.91$ ,  $M_{F2} = 2.1$ ;  $p = 0.042$ ).

Initially, we may attribute the low acceptance of both groups of this stimulus to the structural mismatch between L1 Chinese and L2 English. As shown in (174), expressions such as F2 lack a counterpart in Chinese. Chinese expresses the same meaning through double negation. Such a disparity might account for the low acceptance of both groups toward this sentence, particularly the bilinguals.

(174) F2 Eng. *On no account should you give up.*

Chn. 无论 如何, 你 都 不 该 放弃。

**Wúlùn rúhé,** nǐ dōu **bù** gāi fàngqì.

no matter how you PTCL not should give up

lit. ‘On no account shouldn’t you give up.’

The fact that the trilingual group assigned higher scores than the bilingual controls seems contradictory to our prior finding that the trilinguals more strictly rejected the Adv-Aux-S construction. Although the possibility of a coincidental occurrence cannot be entirely excluded, we posit that the trilinguals rated this stimulus higher because the similarities between German and English in this case have bridged the gap due to mismatches between English and Chinese. As shown in (175), German has a grammatical equivalent to stimulus F2—it uses a similar adverbial as *on no account*, and double negation is not required.

- (175) F2 Eng. On no account should you give up.  
 Ger. Auf keinen Fall darfst du aufgeben.  
 on no account should you give up

Another plausible explanation for the experiment outcome is that some participants might not have encountered or mastered the specific construction introduced by *on no account* during their L2 acquisition process. Given the differences in educational backgrounds, learning experiences, and frequency of target language input, it is conceivable that some learners lack full mastery of the rules for expressions that trigger English inversion, particularly those that are less common in everyday speech than in formal or literary contexts. In this case, the structural similarities between English and German might have coincidentally exerted a facilitative influence on the trilingual participants' judgment.

**(ii) *Not until...+ Aux + S***

It is noteworthy that stimuli F6 *Only when you finish the homework can you play video games* and F8 *Not until the rain stops are we allowed to go* also received notably lower mean scores by the trilingual group ( $M_{F5} = 2.57$ ,  $M_{F8} = 2.63$ ) compared with other stimuli, falling below the 3-point threshold. In contrast, bilingual participants awarded relatively high scores to these two sentences ( $M_{F5} = 4.1$ ,  $M_{F8} = 3.5$ ).

A unique aspect of these two stimuli is their use of the English negative subordinating conjunction *not until*. However, German employs restrictive conjunctions such as *erst wenn* and *nur wenn*, which are better-suited for such contexts. The corresponding German translations for F5 and F8 are, respectively, *Erst wenn der Regen aufhört, können wir nach draußen gehen* and *Erst wenn der Regen aufhört, dürfen wir gehen*. This disparity in word choice may have contributed to the trilingual participants' lower acceptance of these stimuli.

In contrast, the German translation for other fronted adverbials aligns more closely with their English counterparts, as shown in Table 42. This possibly explains why

stimuli such as E5, F3, F4, and F7 received scores higher than 3 points ( $M1_{F1} = 3.5$ ,  $M1_{F3} = 3.83$ ,  $M1_{F4} = 4.17$ ,  $M1_{F7} = 3.63$ ).

**Table 42:** *Structural Overlaps Between English and German in Subordinating Conjunctions in Conditional Clauses*

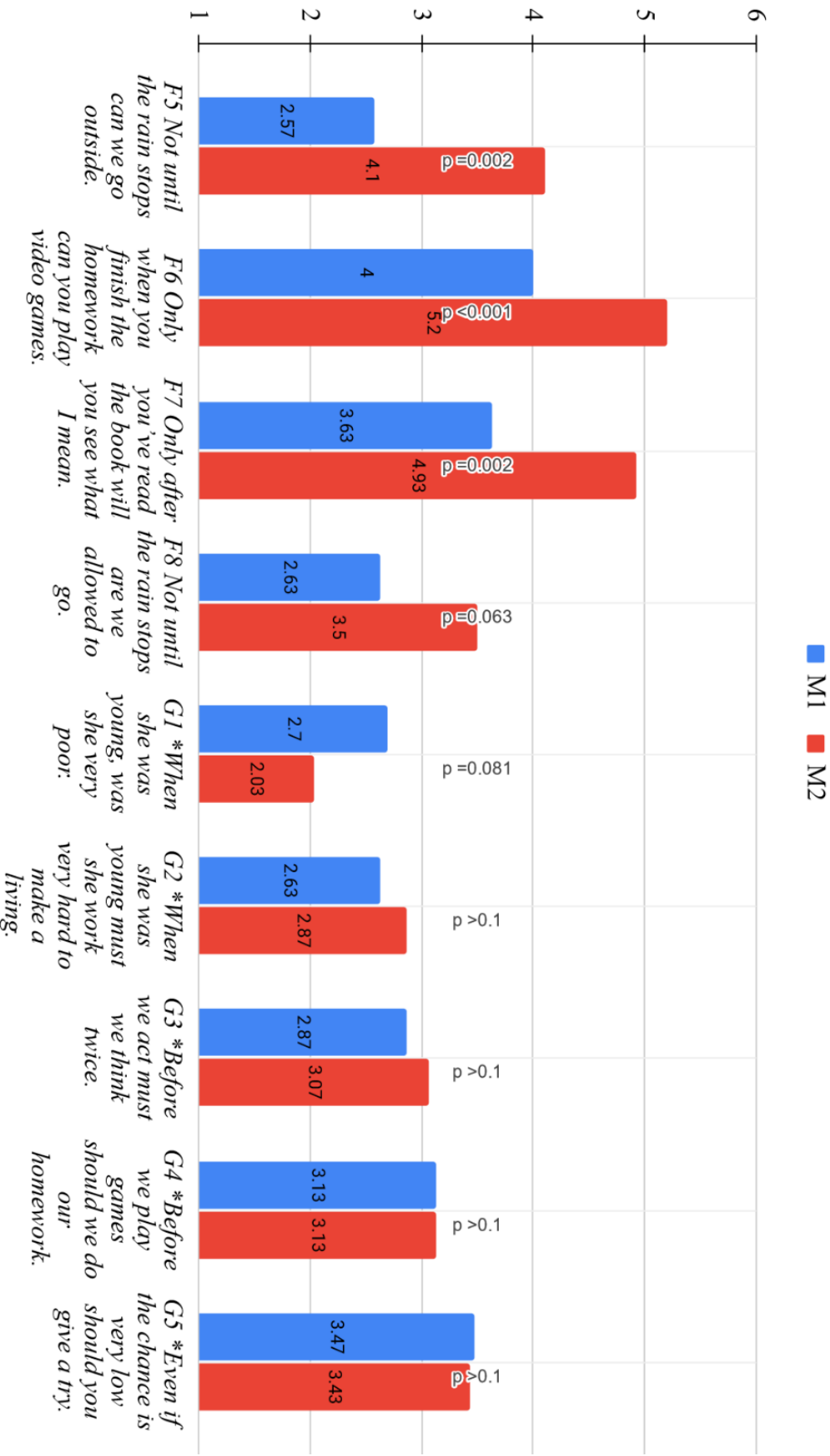
| <i>English</i>                      | <i>German</i>                    | <b>Structural Overlap</b> |
|-------------------------------------|----------------------------------|---------------------------|
| only in this way<br>only when/after | nur auf diesem Wege<br>erst wenn | ✓                         |
| never/rarely                        | nie/selten                       | ✓                         |
| not until                           | *erst bis                        | ×                         |

#### 6.1.3.7 Adverbial Clauses

Figure 31 (next page) demonstrates the mean scores assigned to the inverted stimuli with a fronted adverbial clause as well as group differences in rating.

**Grammaticality Judgment:** Stimuli F5 to F8 featured conditional clauses, the fronting of which leads to an obligatory inversion. Stimuli G1 to G5 were ungrammatical, as the fronted clause did not carry a restrictive meaning. When distinguishing inversions featuring the fronting of an adverbial clause, both groups of participants distinguished the grammaticality, as they assigned lower scores to the ungrammatical ones than the grammatical ones. However, the bilinguals had better performances, as they better differentiated the grammaticality of the stimuli, by assigning higher scores to the grammatical restrictive inversion and lower scores to the ungrammatical one. Such a polarized rating pattern was not observed within the trilingual group, as the mean scores assigned to all the stimuli revolved around 3 points.

Figure 31: Two Groups' Mean Ratings for Inversions with Fronted Adverbial Clauses



**Group Differences:** As mentioned in the preceding section, the group differences in rating grammatical inversions were pronounced. Regarding the judgment of ungrammatical stimuli, statistically significant group differences were not observed. Both groups showed a consistent pattern in judging the ungrammatical adverbial clause-inversions, deeming them rather grammatically unacceptable. This result was similar to those obtained in previous sections.

### ***Analysis:***

The results provided further evidence that the bilinguals made judgments based on the acquired grammar, whereas trilingual individuals overgeneralized the ungrammaticality of the X-Aux-S arrangement. The trilinguals assigned low scores to any stimuli arranged in subject-auxiliary inversion without being able to consider the language-specific rules supporting this inversion type. As explained earlier, the X-Aux-S order is required by the V2 constraint of German, which might have prompted the trilingual speakers to recognize its departure from the typical word order in English and Chinese, where the auxiliary comes after the subject. Consequently, they instantly perceived subject-auxiliary inversion as grammatically unacceptable for English. Again, the trilinguals' rejection of subject-auxiliary inversion did not show a correlation with the semantic type of the fronted element.

We continue to ask whether the native language influences participants' judgment in this sub-scenario. In Chinese, declarative sentences typically follow a V3 structure when an adverbial clause is fronted, and any V2 arrangement would be ungrammatical. Although this might account for the consistent low tolerance exhibited by trilingual participants toward the given stimuli featuring the fronting of adverbial clauses, it does not explain bilinguals' better performance in recognizing the grammatical ones (F5~F8). Hence, we further ascribe the bilingual's performance to the successful acquisition of English inversion rules.

Regarding trilinguals' performance, we further posit that the successful acquisition and frequent exposure to L3 German have deteriorated their implicit understanding of L2 English grammar. While the trilinguals may have initially learned the grammar rules

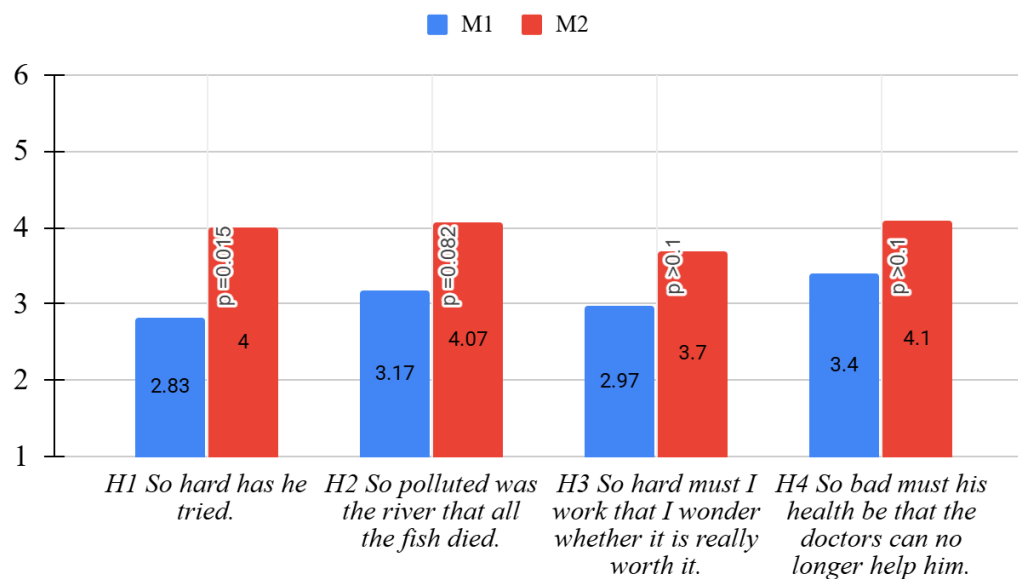


regarding English inversion, the subsequent acquisition and use of L3 German grammar might have interfered with their previously acquired English grammar or even resulted in L2 forgetting. In turn, they might oversimplify the ungrammatical subject-auxiliary inversion under any circumstance. This indicates a phenomenon akin to language attrition, especially the attrition of school-learned foreign languages that lack daily practice (see Kuhberg, 1992 and Jessner et al., 2021).

### 6.1.3.8 *So + Adj/Adv Inversion*

Figure 32 displays the ratings for stimuli with *so + adj/adv* inversion. The *so*-clauses were arranged entirely in German word order: *So-Adj/Adv-V-S* or *So-Aux-Adj/Adv-S-V<sub>NON-FIN</sub>*. These constructions would be grammatically acceptable in English and German but ungrammatical in Chinese.

**Figure 32:** *Two Groups' Mean Ratings for So + Adj/Adv Inversions*



**Grammaticality Judgment:** The mean scores for stimuli H1 to H4 fell within the middle range, indicating that they were not fully accepted by our participants. The bilinguals assigned scores around 4 points, which is understandable, as the expressions are non-canonical and mainly seen in written English.

**Group Differences:** The trilinguals tended to rate the sentences lower, although a statistically significant group difference was observed for only one stimulus and a marginally significant difference was noted for another.

***Analysis:***

Once again, the results were contrary to our anticipation, as we expected that the trilingual group would exhibit higher acceptability toward clauses following German word order. We further argue that trilinguals overgeneralized the ungrammaticality of the subject-auxiliary inversion when making judgments, wherein any English sentence featuring the German X-Aux-S-V pattern was immediately deemed grammatically less acceptable. This indicated a non-facilitative influence of L3 German, as the trilinguals rejected grammatically acceptable constructions.

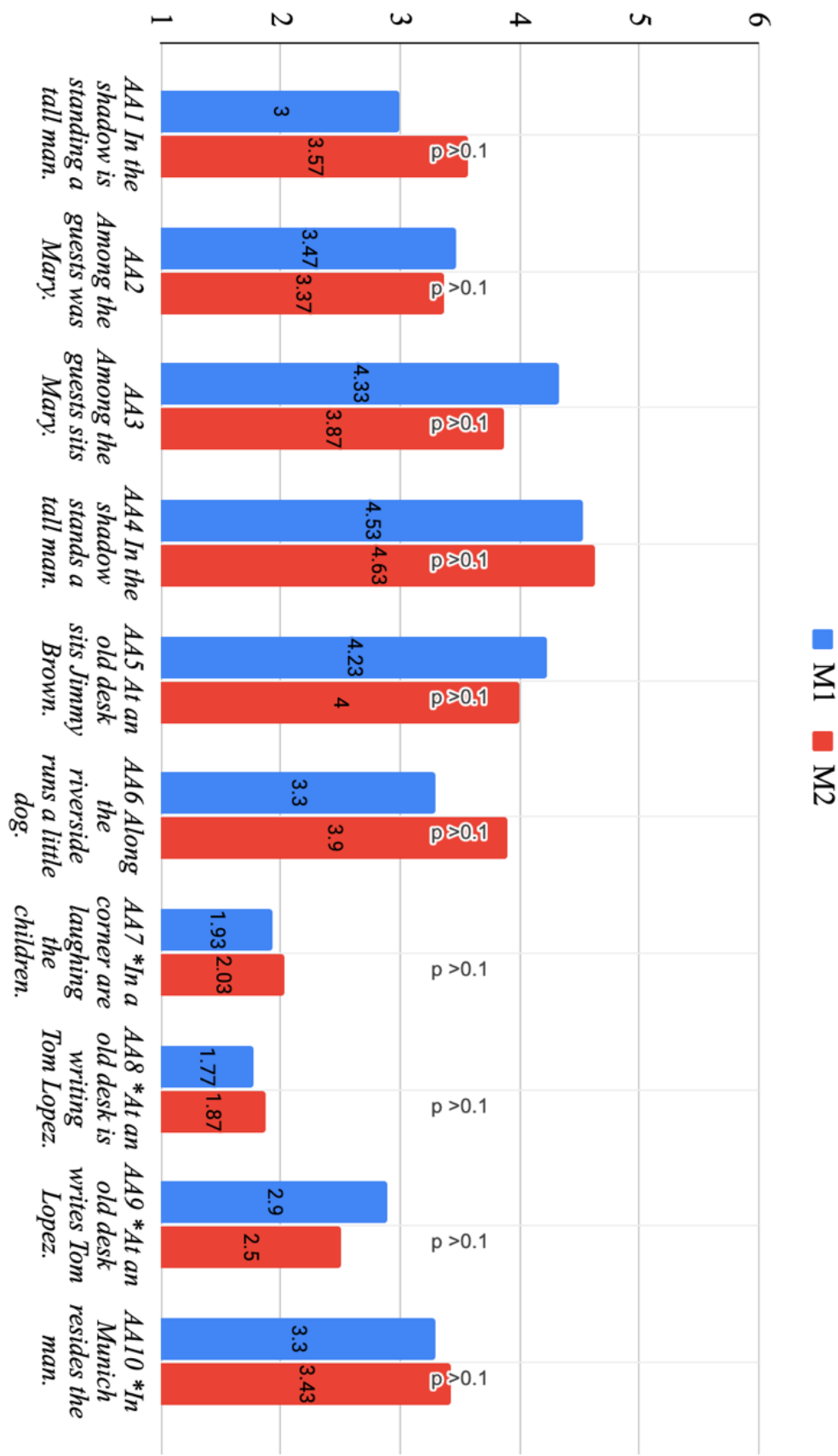
#### **6.1.3.9 Other Scenarios**

No discernible group differences were evident in the rating of inversions under two specific circumstances: locative inversion and inversion after a direct quote, discussed in the following.

✧ ***Locative inversion***

**Grammaticality Judgment:** Figure 33 (next page) shows the participants' ratings for locative inversions. Both groups demonstrated consensus in their acceptability judgments. They effectively distinguished the ungrammatical stimuli featuring non-motion verbs (AA7~AA10). As for the grammatical sentences (AA1~AA6), while not deemed fully acceptable, they were assigned higher scores than the ungrammatical ones, surpassing the 3-point threshold, and some were rated higher than four.

Figure 33: Two Groups' Mean Ratings for Locative Inversions



Additionally, participants showed differing attitudes toward the grammatical locative inversions. In the same semantic context, they showed a preference for the variants written in the simple present tense over those using the progressive form; compare the rating for stimulus AA1 *In the shadow is standing a tall man* ( $M1_{AA1} = 3$ ,  $M2_{AA2} = 3.57$ ) with AA4 *In the shadow stands a tall man* ( $M1_{AA4} = 4.53$ ,  $M2_{AA4} = 4.63$ ), and that for stimulus AA8 *\*At an old desk is writing Tom Lopez* ( $M1_{AA8} = 1.77$ ,  $M2_{AA8} = 1.87$ ) with AA9 *\*At an old desk writes Tom Lopez* ( $M1_{AA9} = 2.9$ ,  $M2_{AA9} = 2.5$ ).

### ***Analysis:***

L3 German did not exert a discernible influence on participants' assessments of locative inversion. This is likely because locative inversion entails grammatical constructions shared by German, English, and Chinese. Thus far, it appears that the trilinguals were more influenced by German syntax when judging ungrammatical expressions, rather than the grammatical ones. This was evidenced by their heightened acceptance of ungrammatical subject-simple verb inversions with the fronting of non-directional, non-locative, and non-restrictive/non-negative adverbials, as discussed in Sections 6.1.3.2 to 6.1.3.5. In other words, when a specific syntactic structure (e.g., locative inversion) is seen in English grammar, the trilinguals could still recognize the grammaticality and make relatively accurate judgments (see Section 6.1.3.1 for participants' performance in rating grammatical directional inversions).<sup>89</sup>

Here, the native language, Chinese, might have played a role. As introduced in Section 4.2.3, locative inversion belongs to the very few inversion types permitted in Chinese grammar, and its grammaticality is restricted by the same linguistic configurations in English and Chinese. Non-motion verbs such as *laugh* and *write* do not support locative inversion in Chinese; compare the direct translation of AA4 and AA7 into Chinese, as shown in (176). This explains why both groups of participants rejected the grammaticality of stimuli AA7 to AA9 while accepting AA1 to AA6. Due

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<sup>89</sup> This is more reflected in participants' ratings for subject-simple verb inversion. When accepting grammatical subject-auxiliary inversions featuring the fronting of restrictive/negative adverbials, trilinguals' attitudes still differed from those of bilinguals.

to the similarities between English and Chinese in locative inversion, the participants could effectively distinguish the grammaticality of these sentences. Hence, L1 Chinese likely exerted a facilitative influence in this case.

- (176) AA4 Eng. In the shadow *stands* a tall man.  
 Chn. 在阴影中 站 着 一 个 高 个 子 男 人。  
 Zài yīnyǐng zhōng zhàn zhe yí gè gāo gèzi nánren.  
 in the shadow stand PTCL.DUR one CL tall man
- AA7 Eng. \*In a corner are *laughing* the children.  
 Chn. \*在角落里 笑 着 孩 子 们。  
 \*Zài jiǎoluò lǐ xiào zhe háizimen.  
 in corner laugh PTCL.DUR children

Moreover, we expected the bilinguals, if not to favor such structures, at least to show a similar level of acceptance toward the variants featuring the present progressive—for example, in AA1 *In the shadow is standing a tall man* and AA8 *\*At an old desk is writing Tom Lopez*. Meanwhile, we anticipated a reduction in the trilinguals' acceptability of these two stimuli. The reason is that the construction of *be + gerund* in English lacks a structural representation in German but has a similar counterpart in Chinese: 正-V-着 *zhèng-V-zhe* ('right-V-Ptcl<sub>DUR</sub>'), as exemplified in (177).

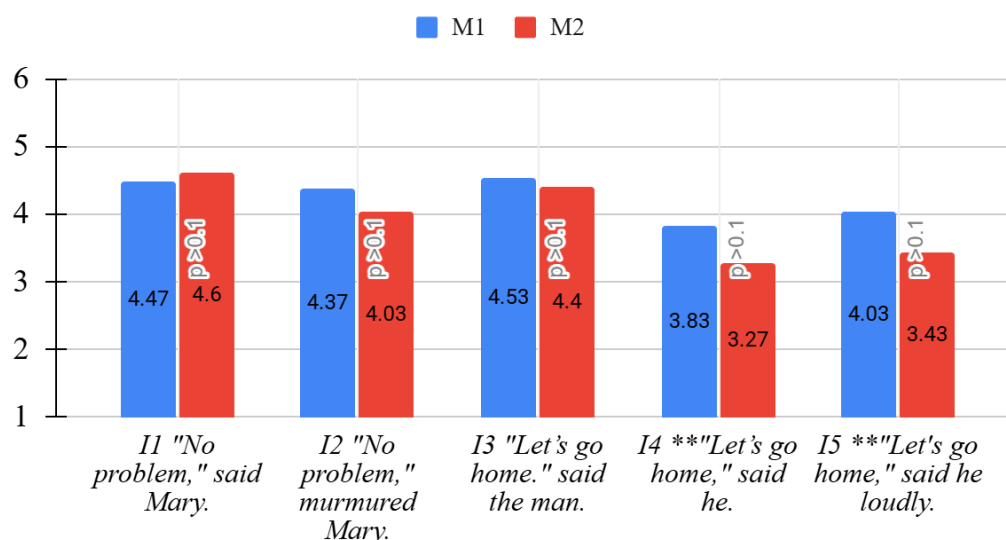
- (177) AA1 Eng. In the shadow **is** **standing** a tall man.  
 Chi. 在阴影中 **正** **站-着**  
 Zài yīnyǐng zhōng **zhèng** zhàn-zhe  
 in the shadow right stand-PTCL.DUR  
 a tall man.  
 一 个 高 个 子 男 人。  
 yí gè gāo gèzi nánren.  
 one CL tall man

However, all participants assigned higher scores to the variants with simple tenses (AA4, AA9), and the rating patterns of the trilinguals did not differ significantly from those of the bilinguals. In terms of this outcome, we propose that pedagogical instruction during L2 English acquisition has played a role. All participants have successfully learned the rules for locative inversion in English, and their judgments were less susceptible to the potential influence of features in other languages.

#### ✧ *Inversion after a direct quote*

**Grammaticality Judgment and Group Differences:** Figure 34 shows participants' ratings for inversions after a direct quote. Both groups exhibited a preference for stimuli featuring nominal subjects (I1~I3). The acceptance scores dipped slightly when the subject was a light-weighted pronoun (I4~I5). Interestingly, the discrepancy in acceptance between the two groups became larger when evaluating stimuli I4 and I5 ( $MD_{I4} = 0.4$ ,  $MD_{I5} = 0.55$ ), with trilinguals assigning higher scores compared with the bilingual controls. Nevertheless, the U test revealed no significant group differences in rating.

**Figure 34:** Two Groups' Mean Ratings for Inversions After a Direct Quote



Moreover, in accepting the two control stimuli featuring the canonical V3 word order,<sup>90</sup> our participants rated them above 5 points.

### ***Analysis:***

The results indicated a robust understanding among participants regarding the rules about inversion after a direct quote. This was evidenced by a hierarchical rating pattern that conformed to the frequency of distribution of word order in the presence of a direct quote in English usage. Participants showed the highest acceptance of the canonical V3 word order, reduced acceptance of non-canonical V2 variants featuring non-pronominal subjects, and the least acceptance of V2 stimuli with pronominal subjects, which is uncommonly used due to the light end weight.

Our data did not reveal a direct influence of L3 German syntax in this scenario. Despite the stimuli aligning with the V2 position in German, the trilinguals did not demonstrate a disadvantage compared with the bilingual controls in accepting V3 variants. German appears to have exerted an indirect influence. This is evidenced by the trilinguals' slightly higher acceptance of less grammatically acceptable stimuli, I4 \*\**"Let's go home," said he* (M1<sub>I4</sub> = 3.83, M2<sub>I4</sub> = 3.27; MD = 0.56) and I5 \*\**"Let's go home," said he loudly* (M1<sub>I5</sub> = 4.03, M2<sub>I5</sub> = 3.43; MD = 0.6). This may be attributed to the greater frequency of this word order in German. This rating pattern aligns with our previous findings indicating that the trilinguals were particularly inclined toward accepting subject-simple verb inversion, a common arrangement in German. However, caution must be exercised in drawing firm conclusions, as the observed tendency lacked statistical significance in this sub-scenario.

We further argue that backward transfer from L3 German occurs less likely when English and German share a syntactic representation. English supports both locative inversion and inversion after a direct quote; however, the overlap between German and English has not particularly reinforced these syntactic structures in a trilingual mind, as

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<sup>90</sup> Results for rating V3 stimuli:

- I6' *"No problem," Mary said.* (M1 = 5.33, M2 = 5.20;  $p = 0.895 > 0.1$ )
- I7' *"Let's go home," he said.* (M1 = 5.57, M2 = 5.57;  $p = 0.647 > 0.1$ )

suggested by the statistically insignificant group differences. The group differences turned more pronounced only when an inversion type was grammatical exclusively to German grammar. To this end, we speculate that once a grammar rule in L2 has been successfully acquired, it is less susceptible to CLI from additional foreign languages and that the transfer effect from L3 has rather an indirect nature.

L1 Chinese appears not to have exerted any non-facilitative influence in rating the V2 structure after a direct quote. On the one hand, despite Chinese not permitting the V2 arrangement when a direct quote is fronted, both groups did not reject this word order. Participants' ability to recognize the grammaticality of V2 stimuli can be attributed to the pedagogical instruction during L2 acquisition. On the other hand, they assigned high mean scores to the canonical V3 variants, possibly due to the overlap between English and Chinese. This structural similarity might allow Chinese learners of English to master the related grammar rules quicker.

#### **6.1.4 Revisiting Backward Transfer in Relation to Inversion Type**

Let's revisit our primary sub-hypothesis concerning trilingual participants' attitudes toward subject-verb inversion:

- ✧ *Compared with bilinguals, trilingual participants will show greater acceptance of stimuli in subject-verb inversion, whether grammatical or not.*

The hypothesis has been validated only in the context of subject-simple verb inversion, but not subject-auxiliary inversion. Our results indicated that the X-V-S-(Y) structure supported by German grammar had elevated its user's acceptance of English stimuli featuring the same structure, whereas the X-V-Aux-(Y) structure has not manifested transferability. In the following, we will synthesize the results and analyze the characteristics of backward transfer from German manifested in the scenario of subject-verb inversion.



#### 6.1.4.1 Acceptability of Subject-Simple Verb Inversion

German syntactic rules for simple-tense clauses exhibit a strong transferability to its speakers' perception of English word order. When judging a total of 51 subject-simple verb inversions, the trilingual participants assigned higher scores to most of them ( $N = 39$  out of 51, 72.5%). Among these 39 stimuli, statistically significant group differences were observed in the ratings of 23 ( $0.001 < p \leq 0.05$ , 60%), including 9 stimuli where the ratings reflected extremely remarkable group differences ( $p \leq 0.001$ , 23.1%). Besides, marginally significant differences were observed in the ratings for 3 sentences ( $0.05 < p \leq 0.1$ , 7.7%). These stimuli were arranged consistently with German word order, including various sentence patterns following the X-S-V-(Y) sequence, as shown in Table 43. X stands for the fronted element, mostly an adverbial; Y stands for a component apart from the subject and verb: a direct object, a prepositional object, a particle, a PP complement, or an adverbial adjunct.

**Table 43:** *Sentence Patterns of Stimuli Featuring Subject-Simple Verb Inversion in the ATJ*

| Sentence Patterns             | Example Stimuli                                                                                                                                                                                                                |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>X-V-S</b>                  | <p>A8: <i>Into the North Atlantic Ocean sank Titanic.</i><br/>(Ger. In den Nordatlantik sank die Titanic.)</p> <p>B6: <i>*In my opinion is the answer correct.</i><br/>(Ger. Meiner Meinung nach ist die Antwort richtig.)</p> |
| <b>X-V-S-DO</b>               | <p>C7: <i>*Probably likes she this feeling.</i><br/>(Ger. Wahrscheinlich mag sie dieses Gefühl.)</p> <p>D6: <i>*Slowly read the children the text.</i><br/>(Ger. Langsam lesen die Kinder den Text.)</p>                       |
| <b>X-V-S-O<sub>PREP</sub></b> | <p>E2: <i>*Often thinks he about his mother.</i><br/>(Ger. Oft denkt er an seine Mutter.)</p>                                                                                                                                  |

| Sentence Patterns              | Example Stimuli                                                                                                                                                                                                                                          |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>X-V-S-DO-Ptcl</b>           | <p>B8: <i>*In his notebook writes the student everything down.</i><br/>(In sein Notizbuch schreibt der Schüler alles auf.)</p> <p>E1: <i>*Every morning throws my mom the garbage away.</i><br/>(Ger. Jeden Morgen wirft meine Mutter den Müll weg.)</p> |
| <b>X-V-S-PP<sub>COMP</sub></b> | <p>B9: <i>*At nine o'clock goes Nick to bed.</i><br/>(Ger. Um neun Uhr geht Nick ins Bett.)</p> <p>D4: <i>*Quickly ran the children into the classroom.</i><br/>(Ger. Schnell rannten die Kinder in das Klassenzimmer.)</p>                              |
| <b>X-V-S-Adv</b>               | <p>B11: <i>*To me means this present a lot.</i><br/>(Mir bedeutet dieses Geschenk viel.)</p>                                                                                                                                                             |

Most stimuli featured ungrammatical subject-simple verb inversions (see Appendix 4 for the ratings for all subject-simple verb inversions). While the German structural counterparts of these ungrammatical stimuli are grammatical, the Chinese ones are not. The overall outcome indicated a stark, non-facilitative transfer from German syntax.

Notice that two stimuli featuring subject-simple verb inversion did not entirely align with German word order: C9 *\*Largely depends it on his decision* and D7 *\*Slowly figures out John the solution*. The structural counterpart of C9 in German would be *Weitgehend hängt es von seiner Entscheidung ab*. The sentence involves a particle verb, *von...ab|hängen* ('to depend on...'), whose particle, *ab*, occupies the clause-final position as a postverb. This expression does not necessitate a verb-particle construction in English; nonetheless, the word order still conforms to the Adv-V-S-OPREP order. Different from its German counterpart, in stimulus D7, *Langsam findet John die Lösung heraus*, the particle is not placed at the clause-final position. Despite these structural discrepancies, the trilingual participants still assigned significantly higher scores to these two stimuli than the bilinguals. This further corroborates our finding that the overarching X-V-S word order in German exhibits stark transferability.

#### 6.1.4.2 Acceptability of Subject-Auxiliary Inversion

Our sub-hypothesis does not hold for subject-auxiliary inversion. Initially, we expected that the trilingual group would demonstrate greater acceptance of stimuli as soon as the stimulus involved an X-Aux-S-(Y) pattern. The results, however, revealed the opposite. The trilinguals consistently rated these stimuli lower than the bilinguals. Out of 37 stimuli featuring subject-auxiliary inversion, they rated only 7 instances higher than the bilingual controls; however, the mean deviation was minimal (see Appendix 5 for ratings for all subject-auxiliary inversions). Among the 30 sentences where trilinguals assigned lower mean scores than bilinguals, statistically significant group differences were observed for 9 sentences ( $p \leq 0.05$ ; 30%); marginally significant group differences were observed for an additional 3 stimuli ( $0.05 < p \leq 0.1$ ; 10%).

Two subtypes of subject-auxiliary inversion were arranged in the ATJ. The first subtype involved stimuli whose word order fully overlapped with how German grammar arranges sentences (hereafter: full subject-auxiliary inversion). A full subject-auxiliary inversion occurs when the stimulus contains only the fronted element, the subject, the auxiliary, and the non-finite verb. In their German word-for-word translation, the middlefield is empty, so the German counterpart has a full structural overlap with the English stimulus (X-Aux-S-V, e.g., Eng. *\*Into the house must the boys run*—Ger. *Ins Haus müssen die Jungen rennen*).

The second subtype of subject-auxiliary inversion, if translated into German also using X-Aux-S word order, matched the German counterpart only in the inversion of the subject and the auxiliary, but not in the rest of the sentence. We refer to this subtype as *partial subject-auxiliary inversion* and the involved stimuli as *hybrid stimuli*. In our dataset, partial subject-auxiliary inversion mainly occurred when verb complementation was present (e.g., a direct object, Eng. *Never had I seen such a wonderful thing!*—Ger. *Nie hatte ich so eine wunderbare Sache gesehen!*) or when the stimulus was a complex sentence (e.g., adverbial clause, Eng. *\* Only after you've read the book will you see what I mean*—Ger. *Nur nachdem du das Buch gelesen hast, wirst du sehen, was ich meine*).

The patterns of subject-auxiliary inversions in the ATJ are listed in Table 44 (see Appendix 6 for respective ratings for each type of subject-auxiliary inversion). We anticipated a stark transferability of the V2 constrain; namely, the trilingual participants will show higher acceptance for any stimuli featuring the X-Aux-S arrangement, even if the word order of the rest of the sentence does not completely conform to German syntax rules.

**Table 44:** Sentence Patterns of Stimuli Featuring Subject-Auxiliary Inversion in the ATJ

| <b>Full Subject-Auxiliary Inversion with German</b>                     |                                     |                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sentence patterns</b>                                                |                                     | <b>Example Stimuli</b>                                                                                                                                                                                                          |
| <b>X-Aux-S-V</b>                                                        |                                     | A1 <i>*Into the house must the boys run.</i><br>(Ger. Ins Haus müssen die Jungen rennen.)                                                                                                                                       |
|                                                                         |                                     | B2 <i>*With him should you talk.</i><br>(Ger. Mit ihm sollst du reden)                                                                                                                                                          |
|                                                                         |                                     | D3 <i>*Down the hill has the football rolled.</i><br>(Ger. Schnell wurde das Problem gelöst.)                                                                                                                                   |
|                                                                         |                                     |                                                                                                                                                                                                                                 |
| <b>Partial Subject-Auxiliary Inversion with German (Hybrid Stimuli)</b> |                                     |                                                                                                                                                                                                                                 |
| <b>Sentence Patterns</b>                                                |                                     | <b>Example Stimuli</b>                                                                                                                                                                                                          |
| <b>X-Aux-S-V-Y</b>                                                      | <b>X-Aux-S-V-DO</b>                 | C1 <i>*Probably has he forgotten us.</i><br>(Ger. Wahrscheinlich hat er <del>vergessen</del> uns vergessen.)<br>F4 <i>Never had I seen such a wonderful thing!</i><br>(Nie hatte ich <del>gesehen</del> so eine wundere Sache!) |
|                                                                         | <b>X-Aux-S-V-Ptcl</b>               | B5 <i>*At 7:00 must I get up.</i><br>(Ger. Um 7:00 muss ich <del>stehen auf</del> aufstehen)<br>F2 <i>On no account should you give up.</i><br>(Ger. Auf keinen Fall darfst du <del>geben auf</del> aufgeben.)                  |
|                                                                         | <b>X-Aux-S-V-Adj<sub>COMP</sub></b> | D2 <i>*Quickly has he fallen asleep.</i><br>(Ger. Schnell ist er eingeschlafen.)                                                                                                                                                |
|                                                                         | <b>X-Aux-S-VP<sub>IDIOM</sub></b>   | C4 <i>*Absolutely should you take a rest.</i><br>(Ger. Unbedingt sollst du <del>machen</del> eine Pause machen. <sup>91</sup> )                                                                                                 |

<sup>91</sup> A more natural way to express the sentence in German would be *Du sollst unbedingt eine Pause machen*, but the inverted word order is still grammatically correct.

|                          |                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Complex Sentences</b> | <p>F5 <i>Only after you've read the book will you see what I mean.</i><br/> (Ger. Nur nachdem du <del>hast</del> <del>gelesen</del> das Buch gelesen hast, wirst du sehen, was ich meine.)</p> <p>G3 <i>*Even if the chance is very low should you give a try.</i><br/> (*Auch wenn die Chance <del>ist</del> sehr gering ist, sollst du es versuchen.)</p> |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The results did not meet our initial expectations. Both groups rated the partial subject-auxiliary inversions higher than the full subject-auxiliary inversions. Specifically, when rating ungrammatical subject-auxiliary inversions, the overall mean score by the trilinguals for full inversion was 2.51, and by bilinguals, 2.89. The overall ratings assigned to ungrammatical partial subject-auxiliary inversions were slightly higher, with the mean score assigned by the trilinguals being 2.91 and that by the bilinguals being 3.01. When rating grammatical partial subject-auxiliary inversions, the mean score by the trilingual group was 3.3, and by bilinguals, 4.12. Significant group differences were observed in merely 3 cases for full subject-auxiliary inversion and 6 for partial subject-auxiliary inversion.

Of particular interest here is that our participants unanimously rejected the grammaticality of full subject-auxiliary inversions, which can be translated into German word-for-word without losing grammaticality. There must be other factors that contributed to such an outcome. We speculate that the perceptual salience of the X-Aux-S-V word order has resulted in the low acceptance of the trilinguals toward the full subject-auxiliary inversion, as the structure is noticeable to them as a syntactic feature exclusive to German.

Moreover, it turns out that when rating the hybrid stimuli, the low acceptance of the trilinguals is not because the non-finite verb does not occupy the clause-final position, a requirement by German syntax. Rather, the structural salience of subject-auxiliary inversion has played a role. As explained in Section 6.1.3.3, when rating sentences arranged in the X-S-Aux-Y-V word order, such as *\*Probably has he us forgotten*, which has an identical surface syntax to German, the trilingual group even more strictly rejected the grammaticality. In fact, when rating filler sentences featuring

the VF position of the non-finite verb, the trilinguals consistently showed lower acceptance, assigning mean scores below three, as shown in Table 45. This provides further evidence that the German syntax rule mandating the non-finite verb at the VF position of the verbal bracket does not have a strong transferability; otherwise, the trilinguals would have rated these fillers higher (see Appendix 12 for ratings for fillers in the ATJ).

**Table 45:** *Participants’ Ratings for Filler Sentences Featuring the VF Position of Non-Finite Verbs*

| No.  | S                   | Aux           | X                                        | V <sub>NON-FIN</sub>     | M1   | M2   | p-value     |
|------|---------------------|---------------|------------------------------------------|--------------------------|------|------|-------------|
| (2)  | <i>*The boys</i>    | <i>must</i>   | <i>into the house</i>                    | <i>run.</i>              | 1.97 | 2.23 | $p = 0.89$  |
| (4)  | <i>*The farmer</i>  | <i>has</i>    | <i>back to the village</i>               | <i>come.</i>             | 2.63 | 2.13 | $p = 0.52$  |
| (5)  | <i>*Titanic</i>     | <i>has</i>    | <i>Into the North<br/>Atlantic Ocean</i> | <i>sunk.</i>             | 2.53 | 2.27 | $p = 0.957$ |
| (16) | <i>*All parents</i> | <i>should</i> | <i>with the class<br/>teacher</i>        | <i>talk.</i>             | 2.03 | 2.33 | $p = 0.308$ |
| (22) | <i>*Probably</i>    | <i>has</i>    | <i>he us</i>                             | <i>fortgott-<br/>en.</i> | 2.07 | 1.37 | $p = 0.086$ |

Taken together, regarding the influence of German syntactic properties in constructing compound tenses—the X-Aux-S word order due to the V2 constraint and the VF position of the non-finite verb—do not impact its speakers’ perception of English word order. Backward transfer does not always occur word-for-word on surface syntax. Other factors, such as structural complexity, syntactic salience, and instructions, may influence the manifestation of syntactic transfer.

Finally, we proceed to the question of why the partial subject-auxiliary inversions even received slightly higher mean scores than the full subject-auxiliary inversions. A plausible explanation is that in the hybrid stimuli, the sentence segment after the auxiliary still conforms to the canonical SVX word order for English and Chinese. This possibly has added to the naturalness of the sentence. After all, all participants have an English proficiency of at least B2, and they can discern the basic word order of

the language. Therefore, their implicit English knowledge is not as easily completely reshaped by additional foreign languages.

#### **6.1.4.3 Analysis: Inversion Types and Transferability**

It prompts several tentative explanations as to why trilingual participants exhibited greater acceptance of subject-simple verb inversion but lower acceptance of subject-auxiliary inversion, even when in situations where the sentences completely adhered to German syntax.

Perceptual linguistic salience emerges as a potential factor. Unlike simple tenses, constructing compound tenses in German involves a word order that diverges notably from English and Chinese. Specifically, the final position of the non-finite verb (SOV) contravenes the SVO constraints in English and Chinese. This salient distinction may have prompted the trilingual participants to oversimplify the rules for constructing compound tenses and consider any structures involving auxiliary use in English as instantly less grammatically acceptable.

Another factor is structural complexity. Sentences involving fewer elements, such as subject-simple verb inversions, require less cognitive effort to parse. The trilingual participants may consequently rely on their familiarity with German syntax to swiftly evaluate sentences and make quick judgments. When encountering more complex structures, such as those featuring auxiliary constructions, the speakers might inadvertently generalize the incompatibility of German and English/Chinese syntax to reduce cognitive load when processing sentences.

Furthermore, factors external to languages, such as language proficiency and foreign language instruction, warrant consideration. The trilingual participants reported slightly lower English proficiency compared with the bilingual controls. This may explain their tendency to assign even lower ratings for sentences featuring more complex grammatical inversions, such as those featuring the fronting of negative/restrictive adverbial phrases and clauses. It is plausible that the related grammar rules were not extensively emphasized during trilinguals' English acquisition.

Additionally, their frequent exposure to the German language may have limited their encounters with specific grammatical structures of English, such as subject-auxiliary inversion in non-canonical expressions, literary contexts, or for prosody purposes, which are less common in colloquial use.

### **6.1.5 Revisiting German Transfer in Relation to Semantic Categories of Fronted Elements**

As the grammaticality of inversion largely depends on the semantic category of the fronted element, stimuli with various categories of fronted elements were arranged in the ATJ. The aim was to investigate whether the degree of transferability of German syntax would vary as the category of fronted elements changed.

Integrating the results from Sections 6.1.3.1 to 6.1.3.9, it becomes apparent that it is not specific semantic categories of fronted elements that influence the manifestation of backward transfer; instead, it is the grammaticality of stimuli that has affected the occurrence of CLI. This conclusion is evidenced by the trilingual group's significantly greater acceptance of ungrammatical stimuli containing fronted non-directional PP adverbials (instrumental, comitative, temporal), adverbials of manner and frequency, and stance adverbials (adverbs of evaluation, attitude, and probability). The distinction between S-adverbs and VP-adverbs did not impact judgment consistency, nor did the internal structure of the fronted element. In some cases, the length of the fronted element might have influenced the grammatical acceptability of the sentence or the degree of divergence between groups, but not the occurrence of transfer. The trilingual participants consistently exhibited higher tolerance toward these ungrammatical stimuli, whether the fronted adverbial involved single, short adverbs or longer phrases. In contrast, regarding the evaluation of grammatical stimuli featuring inversion after directional phrases, locative phrases, *so + adj/adv*, negative/restrictive adverbials, and direct quotes, transfer was either not seen, or the group differences were inconsistently manifested.



We attribute this outcome to the direct impact of the semantic type on the grammaticality of the stimuli. In English and Chinese, any inversion after the fronting of instrumental, comitative, temporal, frequency, manner, probability, attitude, and degree adverbials is ungrammatical, whereas in German, subject-verb inversion is obligatory due to the V2 constraint. Not having encountered these ungrammatical inversions during English acquisition and use, the bilinguals found these ungrammatical inversions unnatural and strictly rejected their grammaticality. In contrast, the trilinguals have been frequently exposed to German and encountered the syntactic representation of the X-S-V-(Y) structure during their language use. This explains their inclination toward tolerating ungrammatical stimuli in our experiment, considering the structure rather natural-sounding. For stimuli featuring grammatical inversions, both groups have acquired the rules for inversion during their English acquisition and have likely encountered similar structures during their English input. This may have led to less consistent and less pronounced group discrepancies in their judgments. In general, participants demonstrated an ability to discern the grammaticality of the stimuli in the scenario of inversion. Although the trilinguals showed heightened acceptance of the ungrammatical inversions than the bilinguals, they did not regard them as being fully grammatically acceptable.

#### **6.1.6 Participants' Attitudes Toward V2-V3 Contrast**

In our preceding discussion, the primary focus was on investigating whether structural (dis)similarities between the two syntactic systems induced a cross-linguistic impact. Specifically, an exploration was conducted to ascertain whether trilingual speakers transferred German syntax to their perception of English word order. For this part of the experiment, the second objective was to assess whether the V2 constraint observed in German affects the perception of already acquired English grammar, particularly the subject-verb constraint of English. To address this, 52 V3 stimuli were arranged in addition to their V2 counterparts, forming 52 pairs of V2-V3 contrasts. Let's now revisit the first sub-hypothesis:

- ✧ *Compared with bilingual participants, the trilingual participants will show lower acceptance toward the respective V3 counterparts of the stimuli in subject-verb inversion.*

**Acceptability Judgment:** In comparison with the bilinguals, the trilinguals assigned slightly lower ratings for 33 out of 52 V3 stimuli. At first glance, this might be attributed to the German influence of disallowing the V3 position. However, the group differences in the ratings between the two groups were not statistically significant (see Appendix 7 for the complete dataset of ratings for V2-V3 counterparts). Different attitudes between the two groups were observed in evaluating merely 7 stimuli, accounting for 13.5% of the total ( $N = 7$  out of 52). Among these instances, only 3 reflected statistically significant group differences, while the remaining 4 showcased marginally significant differences, as listed in Table 46. It is noteworthy that the trilinguals did not consistently assign lower scores to these V3 stimuli: when rating sentences featuring the fronting of a conditional adverbial clause, they actually assigned higher ratings than the bilinguals did ( $M1_{F4'} = 5$ ,  $M2_{F4'} = 4.27$ ;  $p = 0.043$ ;  $M1_{F7'} = 5.17$ ,  $M2_{F7'} = 3.73$ ;  $p = 0.0004$ ). Interestingly, they also demonstrated greater acceptance toward V3 stimuli involving the presence of an auxiliary, as evidenced by the ratings for B2', F4', and F7'. This rating trend appeared to complement the one observed for assessing the V2 variants, where the trilinguals assigned lower mean scores to the V2 variants with an auxiliary.<sup>92</sup>

**Table 46:** *Group Differences in Accepting V3 Stimuli Featuring X-S-V/Aux Word Order*

| Stimuli in V3 |                                                        | M1   | M2   | p-value     |
|---------------|--------------------------------------------------------|------|------|-------------|
| A8'           | <i>In he came.</i>                                     | 1.47 | 2.03 | $p = 0.055$ |
| B2'           | <i>With the class teacher all parents should talk.</i> | 3.07 | 2.4  | $p = 0.072$ |
| B12'          | <i>For three hours the movie lasted.</i>               | 2.77 | 3.47 | $p = 0.091$ |

<sup>92</sup> However, specialized future investigation with larger datasets is necessary to explore the complementarity of rating patterns observed between perceiving V2 and V3 structures regarding the presence or absence of an auxiliary. This observed pattern is only an initial, incidental finding that warrants specialized future study.

| Stimuli in V3 |                                                                           | M1   | M2     | p-value      |
|---------------|---------------------------------------------------------------------------|------|--------|--------------|
| D4'           | <i>Quickly the children ran into the classroom.</i>                       | 3.4  | < 4.53 | $p = 0.035$  |
| F4'           | <i>*Only in this way you can earn enough money for your next holiday.</i> | 5    | > 4.27 | $p = 0.043$  |
| F7'           | <i>*Only when you finish the homework you can play video games.</i>       | 5.17 | > 3.73 | $p = 0.0004$ |
| H2'           | <i>*So polluted the river was that all the fish died.</i>                 | 2.9  | < 3.67 | $p = 0.067$  |

### ***Analysis:***

The trilingual participants were outperformed by the bilinguals in discerning the grammaticality of V3 word order. First, it is not surprising that these stimuli received relatively low scores by both groups, given their characteristics of either featuring ungrammatical expressions or adhering to non-canonical arrangements rarely encountered in daily speech. In comparison with the bilingual controls, the trilingual participants showed stricter and more rigid judgments. They rejected the non-canonical but still grammatical V3 stimuli (e.g., A8', B2', B12', D4') while almost fully accepting the ungrammatical inversions formed by the fronting of a conditional clause. However, our data could not conclusively demonstrate a direct influence from L3 German, as significant group differences were observed in only very few instances.

Particularly noteworthy is that the trilinguals assigned extremely high scores to stimuli F4' and F7' (Table 46), and the bilinguals also did not deem them entirely unacceptable. Two factors might have accounted for the results. First, it is plausible that not all participants have encountered or been instructed on the grammar rules about inversion in the presence of an adverbial clause. The trilingual individuals, in particular, have reported lower English proficiency compared with the bilinguals, which might have contributed to a misunderstanding of grammar or even a lack of grammar input,

Furthermore, the participants' native language, Chinese, has likely influenced their judgments. In Chinese, as the fronting of negative/restrictive adverbials does not lead to inversion, the sequence of Adv<sub>CLAUSE</sub>-S-Aux might sound more natural to our participants. In fact, the V2 word order is only permitted in the cases of locative and

directional inversion. Like English, the fronting of a non-subject element typically leads to a V3 word order but not V2. This parallel between Chinese and English may have contributed to the absence of significant group differences in perceiving most V3 stimuli in the ATJ. As for the trilinguals' heightened acceptance of stimuli F3' and F7', we previously suggested that they might have overgeneralized the ungrammaticality of any V2 structures involving an auxiliary due to the noticeable disparities in word orders between English and German in this context. This continues to explain the data presented here. To sum up, the overgeneralization and oversimplification of grammar rules potentially influence language users' implicit knowledge of syntax.

After integrating the results, our first sub-hypothesis was rejected due to insufficient evidence and mixed rating patterns. Statistical analysis revealed that differences in perception of V3 word order between the bilingual and trilingual individuals were only significant in merely 3 cases (5.9%), with the trilingual group assigning lower ratings for only one V3 stimulus out of 51 (1.9%).

We made a second sub-hypothesis to explore potential disparities between the two groups in perceiving V2-V3 contrasts. If the influence of the V2 constraint in German grammar significantly alters the implicit English grammar of the trilinguals, we anticipate that the two groups will show reverse rating patterns when assessing V2 and V3 counterparts, as follows:

- ✧ *Trilinguals will allocate higher scores to any V2 variant and lower ratings for the corresponding V3 variant, while bilinguals will exhibit the opposite pattern.*

A Wilcoxon signed-rank test was conducted to assess the statistical significance of the differences in the same group's ratings for V2 and V3 variants within each pair.

The hypothesized rating patterns were not observed in the ATJ. Both participant groups could well distinguish the grammaticality of the V3 stimuli. Only in rating three pairs of stimuli (5.9%) did the trilingual group assign higher acceptance scores to the V2 variant than to the V3 counterpart, as listed in Table 47. However, the bilinguals showed similar rating patterns for these stimuli as the trilinguals. This outcome is

predictable, as in these three cases, the V2 variants were grammatical, whereas the V3 variants were either ungrammatical or grammatically less acceptable. These results indicated that, despite its existence, the influence of the V2 constraint in German was not robust enough to completely reshape trilinguals' implicit English knowledge.

**Table 47: Trilinguals' Higher Ratings for V3 Variants**

| Pair | No.  | Sentence Pairs with V2 and V3 Variants              | M1                               | M2                   |
|------|------|-----------------------------------------------------|----------------------------------|----------------------|
| (8)  | AA2  | V2 <i>Among the guests was Mary</i>                 | 3.47                             | 3.37                 |
|      | AA2' | V3 <i>*Among the guests Mary was.</i>               | 2                                | 2.3                  |
|      |      |                                                     | <i>MD = 2.47</i>                 | <i>MD = 1.9</i>      |
|      |      |                                                     | <b>WSR test</b> <i>p = 0.002</i> | <i>p = 0.006</i>     |
| (9)  | AA3  | V2 <i>Among the guests sits Mary</i>                | 4.33                             | 3.87                 |
|      | AA3' | V3 <i>?Among the guests Mary sits.</i>              | 3.57                             | 3.87                 |
|      |      |                                                     | <i>MD = 0.76</i>                 | <i>MD = 0</i>        |
|      |      |                                                     | <b>WSR test</b> <i>p = 0.101</i> | <i>p = 0.948</i>     |
| (38) | F5   | V2 <i>Never had I seen such a wonderful thing!</i>  | 4.17                             | 4.8                  |
|      | F5'  | V3 <i>*Never I had seen such a wonderful thing!</i> | 3                                | 2.9                  |
|      |      |                                                     | <i>MD = 1.17</i>                 | <i>MD = 1.9</i>      |
|      |      |                                                     | <b>WSR test</b> <i>p = 0.004</i> | <i>p &lt; 0.0001</i> |

Additionally, we expected the bilinguals to show greater discernment in differentiating the stimuli in each pair where the V2 variant is ungrammatical while the V3 counterpart is grammatical. A total number of 30 pairs of stimuli with such a constellation were included in the ATJ (see Appendix 7 for the entire dataset). We identified cases where a statistically significant difference in ratings between the V2 and V3 variants was evident only in the assessments by the bilingual group. The Wilcoxon signed-rank test showed such a rating pattern in just three pairs ( $N = 3$  out of 30, 10%), as listed in Table 48.

**Table 48: Instances Showcasing Bilinguals' Greater Discernment of V2-V3 Contrast**

| Pair No. | Sentence Pairs with V2 and V3 Variants                     | M1          | M2           | p-value<br>(U test) |
|----------|------------------------------------------------------------|-------------|--------------|---------------------|
| (21)     | B11 V2 <i>*To me means this present a lot.</i>             | 3.5         | 1.47         | $p = 0.000005$      |
|          | B11' V3 <i>To me this present means a lot.</i>             | 4.57        | 5.1          | $p > 0.1$           |
|          |                                                            | MD = -1.07  | MD = -3.63   |                     |
|          | <b>WSR test</b>                                            | $p = 0.074$ | $p < 0.0001$ |                     |
| (22)     | B12 V2 <i>*For three hours lasted the movie.</i>           | 2.37        | 2.47         | $p > 0.1$           |
|          | B12' V3 <i>For three hours the movie lasted.</i>           | 2.77        | 3.47         | $p = 0.091$         |
|          |                                                            | MD = -0.4   | MD = -1.0    |                     |
|          | <b>WSR test</b>                                            | $p = 0.317$ | $p = 0.007$  |                     |
| (29)     | D4 V2 <i>*Quickly ran the children into the classroom.</i> | 3.1         | 2.57         | $p > 0.1$           |
|          | D4' V3 <i>Quickly the children ran into the classroom.</i> | 3.4         | 4.53         | $p = 0.035$         |
|          |                                                            | MD = -0.87  | MD = -1.96   |                     |
|          | <b>WSR test</b>                                            | $p = 0.54$  | $p < 0.0001$ |                     |

The bilingual participants exhibited more differentiated attitudes toward the two word order variants compared with the trilinguals. While all participants tended to assign higher ratings for the V3 stimuli and lower ratings for the V2 variants, the bilinguals showed even greater polarity in their ratings. This polarity could be attributed to several factors, including the structural overlap between L1 Chinese and L2 English and the successful acquisition of English grammar. In contrast, the trilinguals displayed a smaller discrepancy in distinguishing V2-V3 contrasts, indirectly suggesting a potential neutralizing effect of German syntax, which only supports the V2 word order. However, the limited data available prevents us from drawing a definitive conclusion regarding direct transfer from L3 German.

The analyses of participants' evaluation of V3 constructions and their attitudes toward V2-V3 contrast lead us to a conclusion: while German syntax serves as a potent source of backward transfer, its influence is predominantly indirect. It appears

insufficient to fundamentally alter the established grammatical system of L2 English, instead primarily affecting the passive perception of English word order.

### 6.1.7 Interim Summary: Inversion

The selection of the clause-initial element is governed by grammatical constraints inherent to languages. In English, the default word order is SVX, and fronting a non-subject element results in non-canonical word orders, either topicalization (V3) or inversion (V2) (Speyer, 2004, p. 520). In contrast to English, the subject-verb word order is not compulsory in German, and the subject does not hold a privileged position to appear in the forefield over other constituents (Rambow, 1993, as cited in Speyer, 2004, pp. 520–521). When topicalizing a non-subject element, inversion is the natural outcome due to the V2 constraint. Unlike English, where inversion is grammatical only under certain circumstances, most instances featuring the X-V-S and X-Aux-S word orders are grammatical in German (see Frey, 2006, for a detailed discussion of the movement to the forefield).

Corpus analysis has revealed a higher frequency of placing non-subject elements in the forefield in German, resulting in an X-V-S word order. For instance, Doherty's (2005) examined the German translations of pragmatically neutral texts originally written in English. She found that the topicalization of arguments in German translations occurs nine times more frequently than in English texts, and the topicalization of adjuncts or copula sentences occurs twice as often (p. 192). In fact, subject-verb inversion is commonly used when translating English SVX sentences into German, as evidenced by her example in (177).

(177) *One potential problem has arisen with the  $\alpha_2$ .*

|      | FOREFIELD                                                              | V2    | MIDDLEFIELD                  |
|------|------------------------------------------------------------------------|-------|------------------------------|
| Ger. | <Im Hinblick auf $\alpha_2$ >                                          | ergab | sich <ein größeres Problem>. |
| Eng. | <With the $\alpha_2$ > has <one potential problem> arisen. (inversion) |       |                              |

Considering the grammatical validity and higher frequency of occurrence of subject-verb inversion in German, we hypothesized that trilingual participants would show greater acceptability to inverted stimuli compared with the bilingual controls, particularly in contexts devoid of pragmatic requirements, such as in the controlled setting of AJTs. Additionally, we posited a preference among the trilinguals for the V2 variant over the V3 variant within a pair.

However, the outcomes of the experiment only partially corroborated these sub-hypotheses. While the trilinguals demonstrated the expected inclination toward accepting subject-simple verb inversion (X-S-V), they exhibited an opposite rating pattern when evaluating subject-auxiliary inversion (X-Aux-S-V), even when the stimuli adhered to the German word order. Notably, significant disparities between the groups emerged, particularly when judging ungrammatical stimuli featuring subject-simple inversion. The fronting of the non-subject constituent in these stimuli does not require inversion in English or Chinese, but it does in German.

Upon comprehensive analysis, it became apparent that trilingual participants lagged behind the bilingual controls. They displayed a greater tolerance for the ungrammatical stimuli and a diminished acceptance of the grammatical ones, such as those subject-auxiliary inversions containing negative or restrictive adverbials. Compared with the bilinguals, they demonstrated a lesser ability to discern grammaticality. Furthermore, in differentiating between V2-V3 contrasts, the trilingual participants did not exhibit a discernible preference for the V2 variants. These findings answer our general research questions regarding the manifestation and characteristics of backward transfer: the influence from L3 German syntax occurs, at least in the case of inversion. Thus far, it has manifested in a non-wholesale and non-facilitative manner.

Moving forward, our focus shifts to understanding the nature of syntactic transferability: the mechanisms through which backward transfer may occur and the unexpected characteristics of transfer effects. Our major findings elucidate the following aspects: (1) structural similarities serve as a source of transfer; (2) different syntactic structures exhibit varying degrees of transferability; (3) backward transfer is



indirect; and (4) various additional factors may play a role in determining the extent of CLI.

✧ *Structural similarities as a potential source of transfer*

The dataset provides evidence that structural overlaps are potent sources for backward transfer. In our experiment, we designed artificial settings that reflected the structural similarities: the word order of English stimuli simulated German syntax. When assessing these stimuli, the trilinguals perceived a resemblance to German word order; as a result, they showed greater acceptance toward these sentences.

It is important to note that the trilinguals transferred the German V2 constraint in perceiving English mostly when faced with ungrammatical stimuli, such as those featuring the fronting of non-directional, non-locative, and non-restrictive/non-negative adverbials. These sentences, being artificially constructed and ungrammatical, appeared as new entities in the participants' English repertoire. For the trilinguals, German has naturally become the source language, as it employs similar word order alignments as the stimuli. The bilinguals, unsurprisingly, rejected the ungrammatical inversions, as no other language in their linguistic repertoire has a grammatical counterpart for these sentences. Instead, they relied on the acquired English grammar rules when making judgments. However, when the inverted stimuli were grammatical, the trilinguals also did not significantly show a preference, although German employs the same structure. In this case, they could use the already-established English grammar to make judgments instead of transferring linguistic properties from German grammar.

In a sense, how linguistic similarities contribute to the occurrence of backward transfer resembles how they function at the initial stage of foreign language acquisition, where forward transfer is often observed. During the process of foreign language acquisition (FLA), when two languages have the same or similar structural representation for one grammar entity, learners may take advantage of this similarity to facilitate the learning of the TL's grammar. For backward transfer, similarities thus far have played a role only when the speakers encounter brand-new constructions (e.g.,

those ungrammatical inversions), but not when they perceive sentences whose word orders conform to the grammar of the recipient language, English.

Finally, structural similarities between languages are not the premise of backward transfer. Trilinguals did not show greater preferences for sentences featuring subject-auxiliary inversion or VF position, although they share similarities with German. There must be other factors influencing the occurrence of transfer or the degree of transferability, discussed in the following.

#### ✧ *Varying degrees of transferability*

Thus far, backward transfer appears more pronounced in speakers' evaluation of ungrammatical stimuli, which lack a syntactic representation in real English grammar. Also, the degree of transferability is related to the specific syntactic structure. Certain structures appear to transfer more easily, while others exert a lesser transferability to the implicit grammar of other languages.

The best evidence is that subject-simple verb inversion exhibits a greater transferability than subject-auxiliary inversion. The structure overlap between German grammar and English stimuli in our experiment alone does not fully account for the polarity in the trilinguals' performance in accepting these two types of inversion. In this regard, we propose that CLI across languages occurs more readily in simpler constructions that contain fewer sentence elements, such as those not involving the use of auxiliaries. The complexity of a syntactic structure potentially affects cognitive resources and processing demands. Due to the greater cognitive effort needed to parse the syntactic intricacies and analyze information structure, subject-auxiliary inversion might be more salient to language users compared with subject-simple verb inversion. Consequently, it exhibits greater resilience to influence from L3 German word order arrangements.

Furthermore, the presence of an auxiliary may accentuate structural disparities between German and English/Chinese, as only in German does the non-finite verb move to the postverb position of the verbal bracket, i.e., the clause's final. This sharp contrast may lead trilingual speakers to perceive differences more distinctly, even

oversimplifying or overgeneralizing the X-Aux-S-V word order as immediately ungrammatical in English, without considering specific grammar rules applied. As a result, they assigned lower acceptance scores for subject-auxiliary inversions.

The VF position of the non-finite verbs in the German verbal bracket equally does not exhibit transferability. A possible explanation is the sharp structural disparity between German and English/Chinese. The clause-final position of the non-finite verb makes the X-Aux-S-(Y)-V sequence particularly noticeable to trilinguals, leading to immediate rejection of the stimuli involving such a structure.

Noteworthy is the great transferability observed in constructions involving an object, mostly a direct object. The X-V-S-O<sup>93</sup> word order garnered significant acceptance from the trilinguals. As shown in Table 49, despite being grammatically unacceptable in both English and Chinese, the trilinguals did not strictly reject their grammaticality as the bilinguals did, as indicated by the mean scores shown in Table 49. These results are attributed to the substantial structural overlap between these stimuli and their grammatical, frequently used syntactic representations in German.

**Table 49: Acceptability Judgment of Subject-Simple Inversions Containing an Object**

| No. | Stimuli                                                        | M1   | M2   | p-value (U test) |
|-----|----------------------------------------------------------------|------|------|------------------|
| (1) | A14 *On each wall hangs Bill <u>a large picture</u> .          | 2.97 | 2.23 | $p = 0.075$      |
| (2) | A13 *On each wall hangs Bill <u>it</u> .                       | 2.4  | 1.5  | $p = 0.024$      |
| (3) | B8 *In his notebook writes the student <u>everything</u> down. | 3.53 | 1.87 | $p = 0.0006$     |
| (4) | C8 *Probably likes she <u>this feeling</u> .                   | 2.93 | 2.1  | $p = 0.042$      |

<sup>93</sup> As elucidated in Section 6.1.4.1, it is likely that the overarching word order of X-V-S-DO influenced the trilinguals' judgment, rather than the literal word-for-word translation. For example, the grammatical German translation for stimulus D7 \*Slowly figures **out** John the solution should be *Langsam fand er die Lösung **heraus***, where the particle of the particle verb is placed at the VF position. However, the DO-Ptcl word order did not significantly affect the trilinguals' judgment, as they still overrated this stimulus. For a more comprehensive analysis focusing on the judgment pattern regarding continuous and discontinuous word order in VPCs, please refer to Section 6.2.

| No.  | Stimuli                                                          | M1   | M2   | <i>p</i> -value ( <i>U</i> test) |
|------|------------------------------------------------------------------|------|------|----------------------------------|
| (5)  | C9 * <i>Largely depends it <u>on his decision</u>.</i>           | 3.33 | 2.27 | <i>p</i> = 0.017                 |
| (6)  | D5 * <i>Quickly put the firefighter <u>the fire</u> out.</i>     | 3.5  | 2.07 | <i>p</i> = 0.001                 |
| (7)  | D6 * <i>Slowly read the children <u>the text</u>.</i>            | 3.53 | 2.07 | <i>p</i> = 0.001                 |
| (8)  | D7 * <i>Slowly figures out John <u>the solution</u>.</i>         | 3.23 | 1.9  | <i>p</i> = 0.001                 |
| (9)  | D8 * <i>Easily solved the team <u>the problem</u>.</i>           | 3.4  | 2.13 | <i>p</i> = 0.004                 |
| (10) | E1 * <i>Every morning throws my mom <u>the garbage</u> away.</i> | 3.5  | 2.07 | <i>p</i> = 0.001                 |
| (11) | E2 * <i>Often thinks he <u>about his mother</u>.</i>             | 3.4  | 2.1  | <i>p</i> = 0.003                 |
| (12) | E3 * <i>Twice a week visits Lucie <u>her grandma</u>.</i>        | 3.57 | 1.8  | <i>p</i> = 0.00003               |
| (13) | E4 * <i>Twice a week visits she <u>her grandma</u>.</i>          | 3.6  | 1.57 | <i>p</i> = 0.00001               |
| (14) | E6 * <i>Quite often smokes Wendy <u>cigarettes</u>.</i>          | 3    | 1.9  | <i>p</i> = 0.004                 |
| (15) | E7 * <i>Every morning drinks he <u>a glass of milk</u>.</i>      | 3.27 | 2.37 | <i>p</i> = 0.026                 |

#### ✧ *Indirect nature of backward transfer*

Our third finding is that backward transfer demonstrates an indirect nature, and we base this argument on two reasons. First, German influence is particularly pronounced when a specific syntactic representation prevails in L3 but is absent in L2. Second, while German syntax may alter its users' passive perception of English word order, its impact on previously acquired L2 grammar is proven to be minimal.

At first glance, participants' performances appear to correlate with the semantic type of the fronted element, with greater group discrepancies observed when stimuli contained adverbials of time, frequency, manner, attitude, probability, degree, etc., as compared with other semantic types of elements. However, upon closer examination, the real determinant lies not in the semantic type of fronted elements but rather in whether a corresponding representation of the involved construction exists in the grammar of the recipient language. We intentionally arranged ungrammatical stimuli according to German word order, particularly subject-simple verb inversions featuring the types of fronted elements, revealing a significant influence from L3 German. However, this influence waned when the stimuli involved grammatical inversions, such

as directional inversion, locative inversion, and inversion after a direct quote. In conclusion, although German exerts significant influence only in the perception of ungrammatical stimuli, this influence diminishes once a corresponding representation of the involved construction exists in the real grammar of L2 English. This finding suggested an indirect nature of backward influence.

Moreover, trilingual participants displayed minimal influence on accepting grammatical V2 and V3 stimuli. Despite the violation of the V2 constraint in German, their acceptance of the V3 variant did not significantly differ from that of the bilingual controls. In terms of grammaticality judgment, although the trilingual individuals exhibited higher tolerance to ungrammatical structures, they did not rate these stimuli as fully grammatical by assigning extremely high scores such as 5 or 6 points. These findings collectively suggest that the influence of German syntax properties on overall language perception, while present, remains indirect. Importantly, while trilingual individuals perceive English V2 order somewhat differently from bilinguals, it does not necessarily imply active usage of this word order in their English output. Further research is warranted to explore this aspect.

#### ✧ *Additional factors*

The experiment outcome should be interpreted within the context of the interplay between German syntactic influence and other factors, such as pedagogical instruction, language proficiency, and language exposure.

Given that our participants are upper-intermediate to advanced users of English, it is reasonable to assume that they have been taught the relevant rules of inversion or encountered these structures during L2 English acquisition. We contend that once a new rule is successfully acquired, it becomes less susceptible to backward influence. This could explain why the trilingual participants demonstrated comparable performance when accepting the grammatical inversions.

On the other hand, we should also consider the phenomenon of L2 forgetting due to insufficient language exposure. Given that the trilinguals are more frequently and widely exposed to L3 German than to L2 English, they are likely to have forgotten the

grammar rules of English and thus be more susceptible to structures that align with German syntax more naturally. Therefore, we have ample reasons to associate the results with the influence of language dominance. It is not the sequence of acquisition that determines the direction of transfer, but rather variables related to language dominance: proficiency, frequency of contact, and magnitude of language use.

## **6.2 Word Order Variation in Verb-Particle Constructions**

In examining participants' rating patterns concerning the variation in the word order of verb-particle constructions (VPCs), two sub-hypotheses were formulated:

- ✧ *Compared with the bilingual participants, the trilingual participants will exhibit less acceptance toward stimuli written in discontinuous order and greater acceptance toward those written in continuous order.*
- ✧ *Within the same stimuli pair, the trilinguals will prefer the discontinuous variant over the continuous one, while the bilinguals will prefer the reverse.*

This section commences by evaluating the grammatical judgments of both groups. First, the group disparities in attitudes toward the continuous and discontinuous order are assessed. Subsequently, we examine whether the same group demonstrated a discernible preference for a type of word order. A further focus is laid on participants' rating patterns concerning the semantic type of the VPCs. The results yield five prominent findings regarding the reverse influence of L3 German and its interplay with L1 Chinese.

### **6.2.1 Overall Performance in Acceptability Judgment**

Participants assigned acceptance scores to 21 pairs of stimuli, comprising 21 instances arranged in the discontinuous word order and their corresponding continuous variants. The stimuli encompass ten pairs of sentences featuring directional particle verbs, six

pairs with aspectual particle verbs, and five pairs with idiomatic particle verbs. Table 50 shows the overall mean scores assigned to each word order.

**Table 50:** *Mean Ratings of the Discontinuous and Continuous VPC Stimuli by Both Groups*

|                    | <i>Discontinuous Order</i> | <i>Continuous Order</i> |
|--------------------|----------------------------|-------------------------|
| <b>Trilinguals</b> | 4.79                       | 5.18                    |
| <b>Bilinguals</b>  | 4.76                       | 5.54                    |

➤ **Finding 1: Participants’ Accurate Grammaticality Judgment of English VPCs**

**Results:** Regarding the overall assessment of grammatical sentence constructions, all participants demonstrated a high level of acceptance of both types of word order. An overwhelming majority of the stimuli (N = 40 out of 42 stimuli, 95.24%) received mean scores of over 4 points by both groups, indicating a high level of acceptance (see Appendix 8 for ratings for VPCs featuring two types of word orders). Additionally, more than half of the stimuli (N = 24 out of 42, 57.14%) were assigned mean scores exceeding 5 points by both groups, further indicating a strong consensus on the grammatical accuracy of the sentences. As seen in Table 50, the average scores assigned to the discontinuous VPCs approached 5 points, while those assigned to the continuous order even exceeded this threshold.

Despite the overall high acceptance of both variants, our dataset suggested a general preference for the continuous word order. However, when zooming into the dataset, the performance of the two groups exhibited distinctive features in several contexts. These aspects are detailed in the following sections.

***Analysis:***

The high level of acceptability of both word order variants suggested that neither L1 Chinese nor L3 German exerted significant non-facilitative influences on participants’ implicit knowledge of forming English VPCs. First, it comes as no surprise that both groups assigned high acceptance scores to the continuous order, a construction

consistently found in L1 Chinese. Second, although Chinese may exert a stronger influence on participants' perception of the continuous order, it does not seem to have impeded the bilinguals in recognizing the discontinuous order. The discontinuous structure is likely to be retained independently, as it represents a novel syntactic representation in the repertoire of L1 Chinese learners of L2 English. Third, the anticipated non-facilitative influence of L3 German, which only allows for the discontinuous order, has not undermined the trilingual participants' grammaticality judgment for the continuous variants. The trilinguals still assigned high scores to the continuous variants, indicating a resilient acceptance of this word order.

### **6.2.2 Group Differences in Judging the Same Type of Word Order**

Now let's revisit the first sub-hypothesis in this scenario:

- ✧ *Compared with the bilingual participants, the trilingual participants will exhibit lower acceptance toward stimuli written in discontinuous order and higher acceptance toward those written in continuous order.*

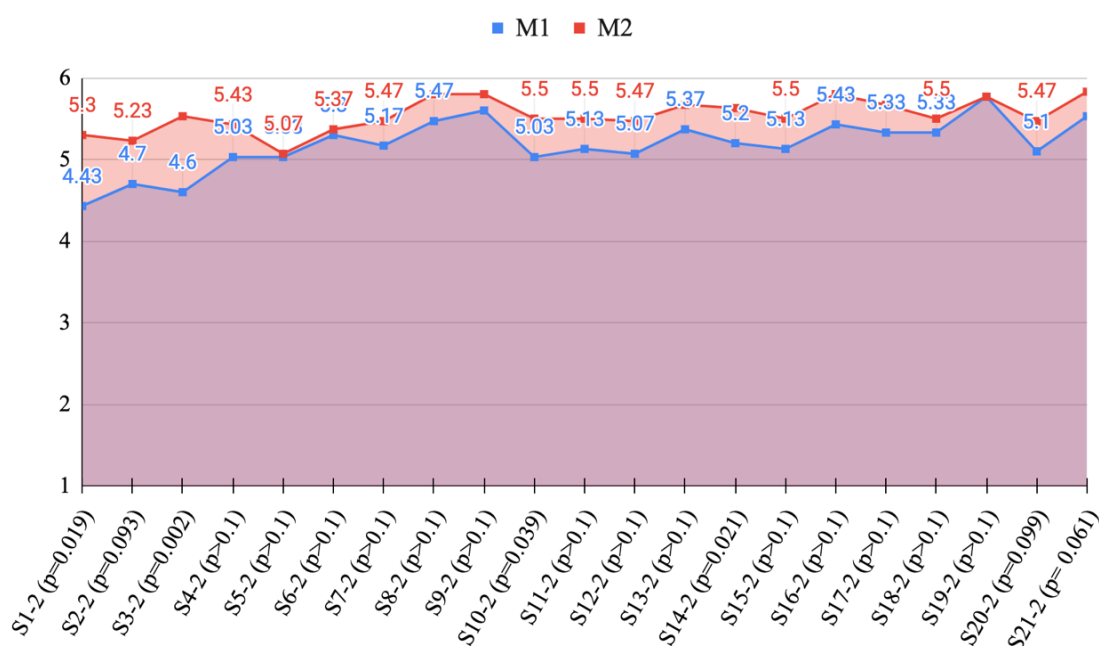
This sub-hypothesis was only partially supported by the dataset. The trilingual participants generally assigned lower scores to the continuous variants, and some group differences were observed; nonetheless, these differences were statistically significant only in a few instances. In terms of the acceptance of discontinuous variants, no remarkable group differences were found. The results are delineated and discussed in Findings 2 and 3 in the following.

#### **➤ Finding 2: Subtle Group Differences in Accepting the Continuous Order**

Figure 35 presents participants' mean scores assigned to each stimulus written in the continuous word order as well as the group differences in accepting this word order.



**Figure 35: Mean Ratings for the Continuous Word Order by Trilinguals and Bilinguals**



**Results:** Both groups showed a proximal tendency to accept the continuous variants, with the bilingual group displaying higher acceptance than the trilingual group. The results of the U test indicated significant group differences in rating 5 specific stimuli pairs (N = 5 out of 21, 23.82%). Of these 5 stimuli, 4 featured the continuous order (S1-2, S3-2, S10-2, S14-2), and 1 involved the discontinuous order (S4-1). A marginally significant difference was observed in the judgment of 2 sentences arranged in continuous order (in sentence pairs 20 and 21). Although the trilinguals deemed this word order variation grammatically acceptable and gave it high scores ( $M1 \geq 4.43$ ), they assigned lower scores to these sentences than the bilinguals did.

#### **Analysis:**

The results fall short of providing compelling evidence for a significant transfer effect from L3 German. Notably, remarkable group differences in rating the discontinuous VPCs were observed in only one instance out of 21, thereby excluding a direct and strong influence from German syntax.

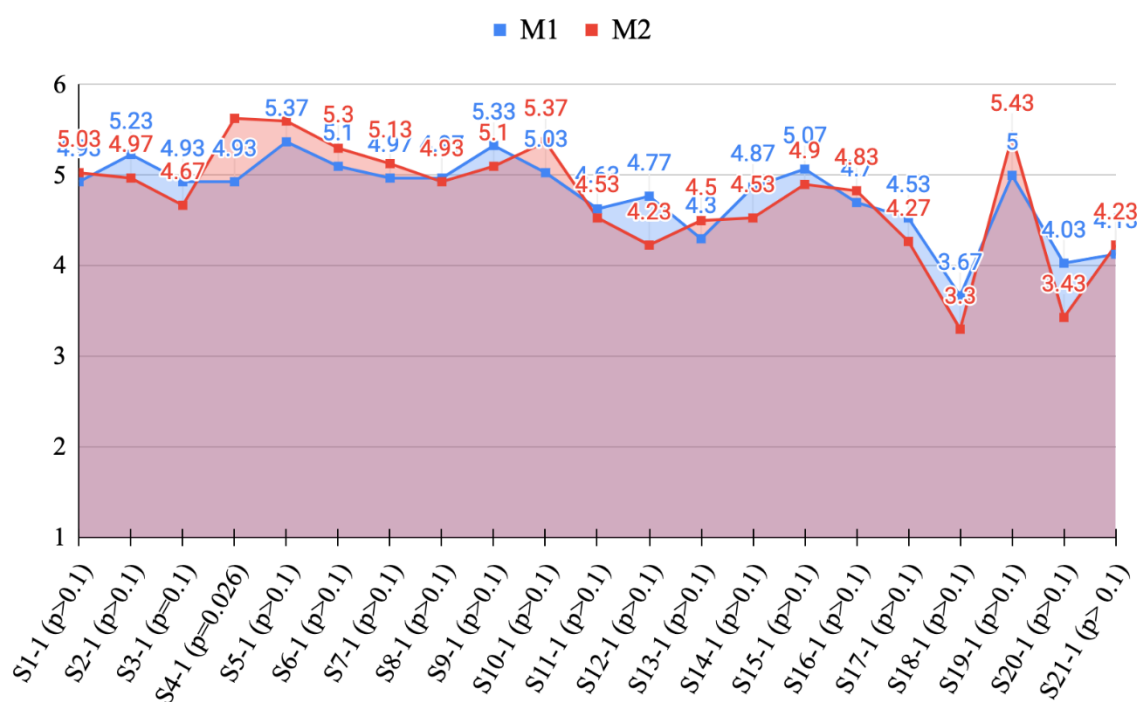
Rather, the non-facilitative influence of German manifested in an indirect and exceedingly subtle manner, partially mitigating the impact of L1 Chinese, which

strongly favors the continuous order. Remarkable group differences were seen in the ratings for a limited percentage of stimuli ( $N = 4$  out of 21 pairs, 19.05%), solely involving the continuous word order. In these instances, the trilingual participants assigned lower acceptance scores compared with the bilinguals. Despite this, it is noteworthy that the trilinguals did not reject the grammaticality of these stimuli, as evidenced by their high mean scores assigned to these continuous variants:  $S1-2 = 4.43$ ,  $S3-2 = 4.6$ ,  $S10-2 = 5.03$ , and  $S14-2 = 5.03$ .

➤ **Finding 3: Null Group Differences in Accepting the Discontinuous Word Order**

Figure 36 presents the participants' ratings of each stimulus written in the discontinuous order as well as the disparities between the two groups in making judgments.

**Figure 36:** Mean Ratings for Discontinuous Word Order by Trilinguals and Bilinguals



**Results:** The trilinguals did not perform differently from the bilinguals in accepting the discontinuous VPCs. The obtained results contradict our initial sub-hypothesis, which predicts higher ratings for stimuli in discontinuous order by trilingual participants,

given its conformity with the German word order. Group differences were seen in the ratings of only one stimulus (S4-1); however, in this case, the trilinguals even gave lower ratings than the bilinguals ( $M1 = 4.93$ ,  $M2 = 5.63$ ;  $p = 0.026$ ). A part of our sub-hypothesis that “compared with the bilingual participants, the trilingual participants will exhibit lower acceptance toward stimuli written in discontinuous order” is rejected.

### ***Analysis:***

The above results further rule out the direct impact of L3 German syntax and the potential negative impact of L1 Chinese. Interestingly, while Chinese might exert a stronger influence on how participants perceive the continuous order in English VPCs, it does not seem to impact their perception of the discontinuous order. During L2 English acquisition, the discontinuous order is learned as a new grammar rule, and this rule is likely to be retained independently. Therefore, we further speculate that once a new syntactic representation is successfully acquired, it remains less susceptible to the influence of a subsequently learned foreign language.

Particularly noteworthy are the rating patterns for those stimuli featuring a heavier object, such as in stimuli pairs 3, 6, 12, 18, and 20, listed in Table 51.

**Table 51: Acceptability Judgments of Stimuli with a Longer Direct Object**

| No.             | Word Order    | Paired Stimuli                                             | M1        | M2          | p-value<br>(U test) |
|-----------------|---------------|------------------------------------------------------------|-----------|-------------|---------------------|
| (3)             | Discontinuous | They bring <u>three bowls of strawberries</u> in.          | 4.93      | 4.67        | $p = 0.1$           |
|                 | Continuous    | They bring in <u>three bowls of strawberries</u> .         | 4.6       | 5.53        | $p = 0.002$         |
| <b>WST test</b> |               |                                                            | $p > 0.1$ | $p = 0.006$ |                     |
| (6)             | Discontinuous | They took <u>the very expensive ruby necklace</u> away.    | 5.1       | 5.3         | $p > 0.1$           |
|                 | Continuous    | They took away <u>the very expensive ruby necklace</u> .   | 5.3       | 5.37        | $p > 0.1$           |
| <b>WST test</b> |               |                                                            | $p > 0.1$ | $p > 0.1$   |                     |
| (12)            | Discontinuous | <b>**</b> The boy ate <u>a big bowl of tomato soup</u> up. | 4.77      | 4.23        | $p > 0.1$           |
|                 | Continuous    | The boy ate up <u>a big bowl of tomato soup</u> .          | 5.07      | 5.47        | $p > 0.1$           |
| <b>WST test</b> |               |                                                            | $p > 0.1$ | $p = 0.001$ |                     |

| No.             | Word Order    | Paired Stimuli                                                     | M1          | M2          | <i>p</i> -value<br>( <i>U</i> test) |
|-----------------|---------------|--------------------------------------------------------------------|-------------|-------------|-------------------------------------|
| (18)            | Discontinuous | <b>**</b> <i>He looks <u>the answer to the question</u> up.</i>    | 3.67        | 3.3         | $p > 0.1$                           |
|                 | Continuous    | <i>He looks up <u>the answer to the question</u>.</i>              | 5.33        | 5.5         | $p > 0.1$                           |
| <b>WST test</b> |               |                                                                    | $p < 0.001$ | $p < 0.001$ |                                     |
| (20)            | Discontinuous | <b>**</b> <i>They leave that <u>not well-written part</u> out.</i> | 4.03        | 3.43        | $p > 0.1$                           |
|                 | Continuous    | <i>They leave out <u>that not well-written part</u>.</i>           | 5.1         | 5.47        | $p = 0.099$                         |
| <b>WST test</b> |               |                                                                    | $p = 0.004$ | $p = 0.002$ |                                     |

The discontinuous order, though grammatical, is uncommonly applied to these instances due to the principle of end weight. Since German does not allow for the continuous arrangement, we expected the trilingual participants to show a higher level of acceptability for the discontinuous variants than the bilingual individuals. However, no group difference was observed. When rating S18-1 **\*\****He looks the answer to the question up* and S20-1 **\*\****They leave that not well-written part out*, our participants even expressed a dislike for the discontinuous variant, assigning mean scores below a threshold of 4 points. Conversely, they accepted the variants written in the continuous order. These results suggested that both trilingual and bilingual groups have a good command of the word order variation in constructing English VPCs. Especially, the trilinguals did not undergo a direct impact of the L3 German syntax.

Summarizing Findings 1~3 prompts contemplation on whether newly acquired syntactic features, once internalized, exhibit resistance to influence from subsequently learned languages. Linguistic properties distinctive to those from one's mother tongue might appear particularly salient to foreign language learners, potentially facilitating earlier memorization. In our case, the discontinuous order of English VPCs is nearly absent in the grammar of L1 Chinese, which predominantly uses the continuous order or adopts the OV sequence (see Section 4.3.3 for resultative verbal compounds "RVCs" in Chinese grammar). Anticipating that the bilinguals might underperform the trilinguals due to the absence of a representation of the discontinuous order, we observed an unexpected convergence of group performance. Contrary to our

expectations, both groups demonstrated an identical tendency to rate all the stimuli. Noticeably, they could differentiate the specific linguistic context that necessitates word order variation, disfavoring discontinuous word order when the weight principle plays a role.

The null disparity between the two groups in accepting the discontinuous word order refutes the potency of structural overlap—the structural similarity between English and German in this case did not culminate in a discernible preference of the trilinguals for the discontinuous variants. These findings, on the one hand, provide evidence for our earlier observation that, despite structural similarities being the potential source of transfer, different word orders exhibit different degrees of transferability. On the other hand, the data robustly support the other speculation that newly required linguistic knowledge (to be prudent, those distinct from the L1) is less susceptible to CLI.

### **6.2.3 Within-Group's Attitudes Toward Discontinuous and Continuous Orders**

Upon first inspection, it appears that both groups leaned toward a preference for the continuous word order. This observation relates to our second sub-hypothesis, which states:

- ✧ *Within the same stimuli pair, the trilinguals will prefer the discontinuous variant over the continuous one, while the bilinguals will prefer the reverse.*

To delve deeper into this aspect, we conducted a detailed analysis using the Wilcoxon signed-rank test to examine whether within-group attitudes differed toward the two orders. Figure 37 illustrates whether the trilingual participants showed statistically different attitudes toward the two variations, and Figure 38 depicts the attitudes within the bilingual group. Our second sub-hypothesis is rejected.

**Figure 37: Trilinguals' Acceptance of Discontinuous and Continuous Order**

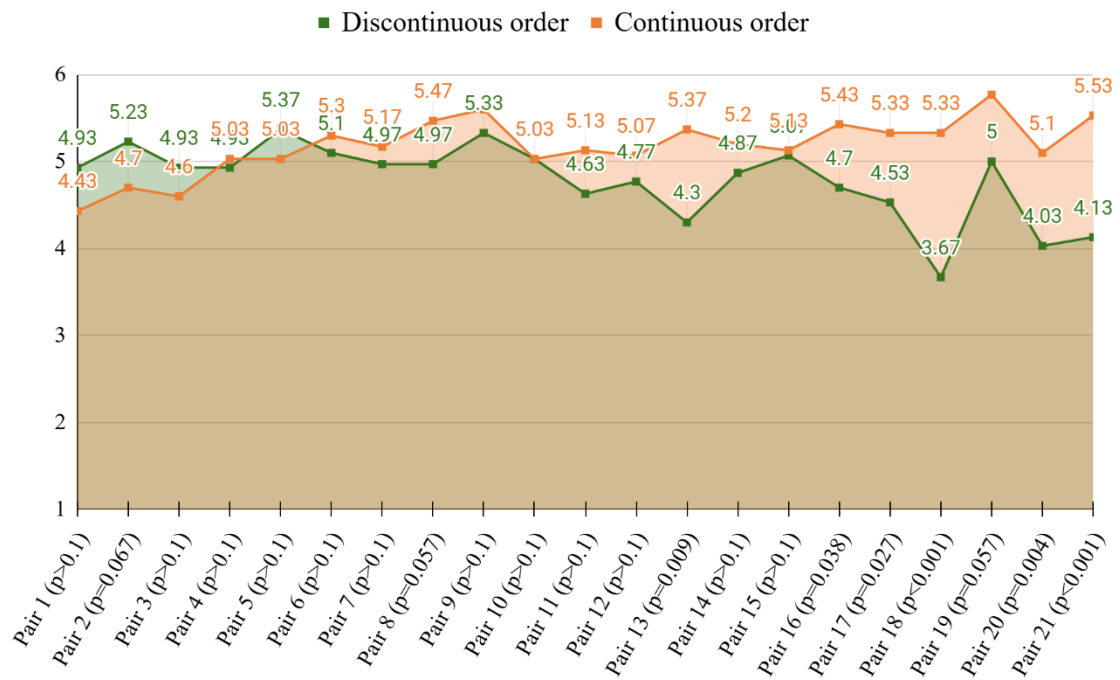
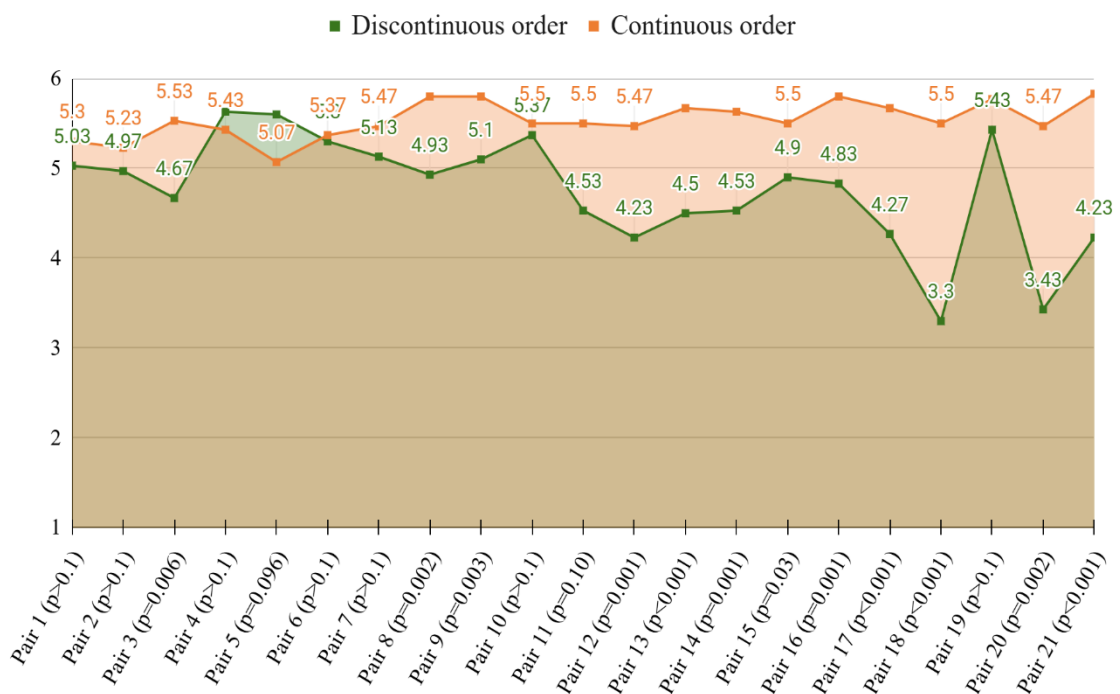


**Figure 38: Bilinguals' Acceptance of Discontinuous and Continuous Order**



➤ **Finding 4: Participants’ Stronger Preference for the Continuous Order over the Discontinuous Order**

**Results:** The data revealed a notable inclination among our participants, particularly bilingual individuals, toward the continuous order in comparison with the discontinuous one, although both word orders are grammatically acceptable in English.

The trilingual group showed a higher level of acceptance of the continuous order in 17 out of 21 stimulus pairs (80.95%). Within this set, significant preferences for the continuous variant were observed in 7 cases ( $p < 0.05$ ; 33.33%), and marginal preferences in 2 ( $0.05 \leq p < 0.1$ ; 9.52%). In parallel, the bilingual group exhibited high acceptance of the continuous order in 19 out of 21 pairs (90.48%). Among these instances, statistically significant preferences for the continuous order emerged in the ratings of 13 sentence pairs (61.9%), and a marginal preference was noted in 1 case (4.76%). These results indicated that our participants, especially the bilinguals, exhibited a more pronounced attitudinal distinction in discerning word order variation of English VPCs. The tendency is further reflected by the different proximity of the two lines in Figure 37 and Figure 38, where the disparity in perceiving word order variation appears more nuanced among the trilinguals compared with that among the bilinguals.

Table 52 shows the mean deviation between the participant groups in rating the same word order, as well as the mean deviation within the same group in judging the two orders. Both groups showed a preference for the continuous order, with the bilingual participants exhibiting a slightly stronger preference for this word order than the trilinguals.

**Table 52:** *Participants’ Mean Ratings for Discontinuous and Continuous VPCs and Mean Deviations*

|                    | <i>Discontinuous Order</i> | <i>Continuous Order</i> | <i>MD</i> |
|--------------------|----------------------------|-------------------------|-----------|
| <b>Trilinguals</b> | 4.79                       | 5.18                    | -0.39     |
| <b>Bilinguals</b>  | 4.76                       | 5.54                    | -0.78     |
| <b>MD</b>          | 0.03                       | -0.36                   |           |

### *Analysis:*

These results can be interpreted in two ways. First, the higher acceptance of the continuous word order than the discontinuous one, especially by the bilingual group, could be attributed to the potential influence of L1 Chinese. The continuous word order mirrors the structure of Chinese resultative verbal compounds (RVCs); as a result, it might sound more natural to the ears of our participants. During the learning process of English VPCs, this word order might be more economical for Chinese learners of English, as it aligns with a representation already existing in their linguistic repertoire.

A continuous RVC may appear in two positions in a Chinese sentence: S-V-Ptcl-DO or S-bǎ-DO-V-Ptcl. The former fully corresponds to the word order in an English sentence with a transitive VPC, and the latter only overlaps with the VPC, but not the entire sentence, due to the position of the object. In Chinese, only a few particles may separate from the verb and move to a final position, forming a discontinuous alternative as in English. The high frequency of occurrence of the continuous order in Chinese has possibly contributed to our participants' inclination to this word order in English. Interestingly, it appears that the position of the object did not influence the grammatical judgments—the SOV word order of the bǎ-construction did not lead to participants' low acceptance of the continuous VPCs. Hence, we argue that the source of transfer can also be a segment of construction and is not necessarily the entire structure for forming a clause.

Notice that our participants still were able to recognize the grammaticality of the discontinuous stimuli, meaning the structural overlap between L1 and L2, i.e., the continuous order, does not necessarily affect the acquisition of a new structure, in our case, the discontinuous variant.

The second finding pertains to nuanced attitudinal differences among the trilinguals compared with the bilingual controls regarding syntactic variations, wherein the trilinguals demonstrated a lower degree of sensitivity toward the structural distinction between the discontinuous order and the continuous order. In contrast, the bilinguals consistently displayed significantly higher acceptability toward the continuous variant, doing so in 13 instances versus 7 for the trilinguals. Upon



synthesizing rating patterns delineated in Figure 37 and Figure 38 with the average scores shown in Table 52, a discernible pattern emerges: the trilinguals exhibited a pronounced reduced divergence in accepting the word order variants, not because of heightened acceptability for the discontinuous variation, but because of their diminished favorability toward the continuous word order compared with the bilingual controls ( $M1_{CON} = 5.18$ ,  $M2_{CON} = 5.54$ ). Regarding the rating patterns for the discontinuous word order, both groups assigned comparable scores ( $M1_{DISC} = 4.79$ ,  $M2_{DISC} = 4.76$ ). This issue will be detailed in Section 6.2.4.

The finding corresponds with the analysis presented in the preceding section (Findings 2 and 3). Consequently, we attribute this outcome to the indirect influence of L3 German. Given that German exclusively permits the discontinuous order, and it holds prominence as the dominant foreign language of the trilinguals, it is reasonable to posit that this word order becomes the more frequently employed one. The German grammar's prohibition of the continuous order, along with the dominant use of the discontinuous order, has led to the trilinguals displaying slightly lower acceptance of the continuous variants in our experiment. However, as previously mentioned, the impact of German syntactic property, in this case, was indirect and weak, as the trilinguals exhibited proficiency in discerning the grammaticality of both orders and even demonstrated a higher acceptance of the continuous order. In instances involving heavy direct objects, they adeptly selected the more suitable word order variation.

#### ➤ *Revisiting the surface structural overlap hypothesis*

The surface structural overlap hypothesis proposed by Hulk and Müller (2000) argues for two conditions for linguistic transfer: (i) syntax-pragmatics interface and (ii) surface structural overlap between the target language and one of the syntactic representations in the source language (see Section 2.1.1 for *surface structural overlap*). Our experiment results have provided ample grounds for believing that the structural overlap between a native language and a foreign language has a more significant and positive cross-linguistic impact in comparison with the overlap between two later-acquired foreign languages.

English has two syntactic representations for arranging a direct object in a transitive VPC: the continuous order and the discontinuous order. Chinese overlaps with English in the continuous order, and German overlaps with English in the discontinuous order. As the surface structural overlap hypothesis states that the overlap between surface structures reinforces the syntactic representation for language learners, we initially expected the bilinguals to prefer the continuous VPCs and the trilinguals the discontinuous VPCs. The results deviate from our expectations. Both groups accurately accepted the grammaticality of the continuous VPCs, and they did not generalize the grammaticality of the discontinuous ones. Only the trilinguals showed slightly lowered acceptance of the continuous variants; nonetheless, they still considered the word order fully acceptable.

The mismatch between L1 Chinese and L2 English in the continuous order has not exerted a negative influence on Chinese speakers' acquisition of the discontinuous order. Given that the participants, especially the bilinguals, accurately judged the grammaticality of the continuous VPCs, we may conclude that the overlap between Chinese and English has facilitated the acquisition of this grammar. In this regard, our results provide further evidence for the surface structural overlap hypothesis in the bilingual context. However, the hypothesis cannot be validated in the multilingual scenario, at least in backward transfer. The structural overlap between L3 German and L2 English has not directly affected the participants' acceptability judgments, as the two groups did not exhibit significantly different attitudes toward the grammaticality of discontinuous VPCs. Although German exclusively permits the discontinuous order, the trilinguals could differentiate the situation in which the discontinuous order was less suitable. The structural overlap between German and English has merely neutralized the influence of Chinese in a weak manner, as evidenced by the trilinguals' slightly lowered acceptance of the continuous VPCs. The transferring mechanism between forward transfer in the bilingual context and backward transfers in the multilingual scenario thus manifested differently.

Furthermore, our data suggests that the interface between syntax and pragmatics does not form a necessary condition for syntactic transfer. Although the ATJ did not

involve pragmatic variables, a facilitative influence of the syntactic overlap between L1 and L2 was observed.

#### 6.2.4 Correlation Between Transferability and Structural Overlap in Each Semantic Category

Figure 39 and Figure 40 display the mean scores assigned respectively to the discontinuous and continuous VPCs across three semantic categories.

**Figure 39:** *Trilinguals' Overall Rating Patterns Across Semantic Categories*

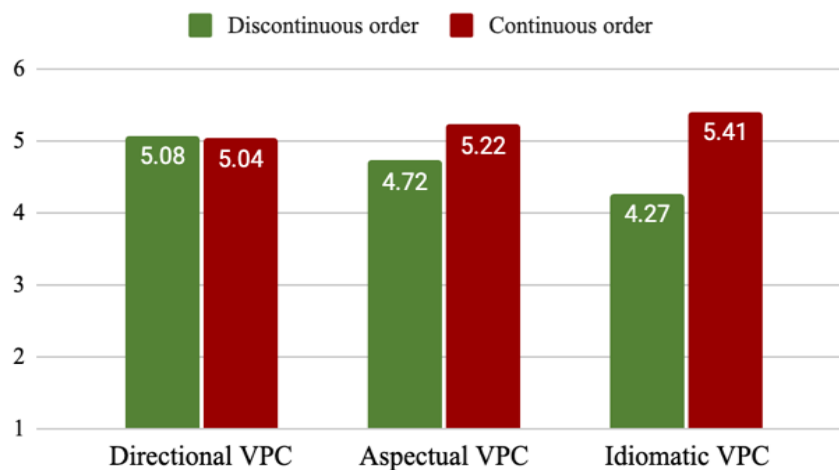
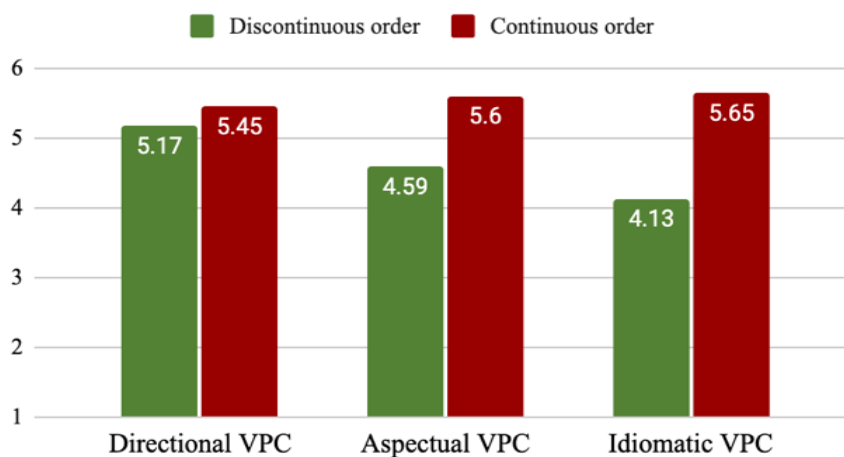


**Figure 40:** *Bilinguals' Overall Rating Patterns Across Semantic Categories*



➤ **Finding 5: Acceptance of Word Order Variation Related to Semantic Categories and Syntactic Representations in Each Language**

**Results:** Participants exhibited differential acceptance across three semantic categories of VPCs. Notably, both participant groups reached a consensus when rating idiomatic VPCs, consistently opting for the continuous order while favoring less the discontinuous variation.

When accepting directional VPCs, the two groups also demonstrated unanimous rating patterns. They assigned high scores to both word orders ( $M1 > 5$ ,  $M2 > 5$ ). The bilingual participants discerned word order differences in 3 out of 10 stimuli pairs (Pairs 3, 8, and 9; see Appendix 8 for the outcome of the Wilcoxon signed-rank test); among these instances, they assigned higher scores to the continuous word order.<sup>94</sup> The trilingual group displayed similar attitudes toward both word orders, with only one case (Pair 2) showing a marginally significant difference, where the discontinuous word order received a slightly higher mean score. However, these isolated instances do not suffice to conclusively establish that participants held distinct attitudes toward word order variation. Overall, both groups displayed balanced rating patterns for both word order variants of directional stimuli, indicating a high acceptance of both word orders.

In contrast to the consistent patterns observed in rating idiomatic and directional VPCs, a subtle group difference emerged when assessing word order variation of aspectual VPCs. Specifically, the bilinguals assigned significantly higher scores to all 6 continuous variants than their discontinuous counterparts. While the trilinguals also rated the continuous variants higher than the discontinuous ones, statistically significant differences were observed only in the ratings of two instances (S13-1, S16-1). Such a contrast indicated that compared with the trilinguals, the bilinguals were more sensitive to word order variation in aspectual VPCs.

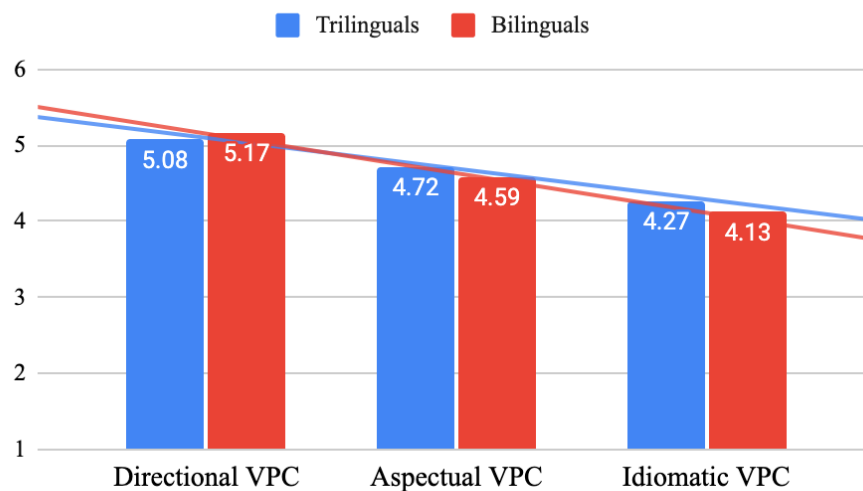
In analyzing the correlation between word order variation and semantic categories within participants' rating patterns, both groups displayed a similar rating tendency for

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<sup>94</sup> However, in the case of stimulus S3-1 *They bring in three bowls of strawberries*, the preference for the continuous word order could also be ascribed to the presence of the heavy object.

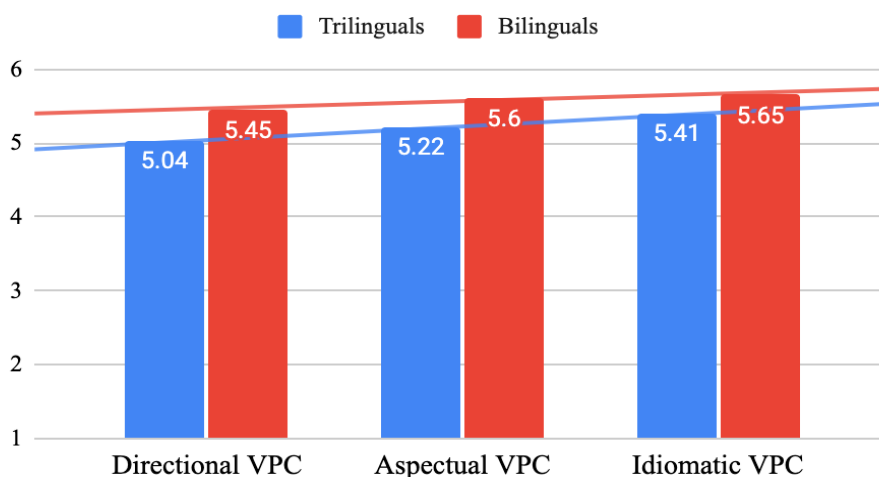
the discontinuous order. This tendency manifested with the highest acceptance of the discontinuous directional VPCs and the lowest acceptance of the discontinuous idiomatic VPCs. The corresponding rating patterns are presented in Figure 41.

**Figure 41:** *Rating Correlation: Discontinuous Word Order and VPC Semantic Categories*



Regarding the ratings for the continuous order, such a tendency turned less pronounced. Both groups exhibited more balanced attitudes for each semantic type of stimuli, fully accepting the grammaticality of the continuous VPCs in each category, as illustrated in Figure 42.

**Figure 42:** *Rating Correlation: Continuous Word Order and VPC Semantic Categories*



### ***Analysis:***

Two main questions arise. First, why did the discontinuous order elicit different attitudes from participants across semantic categories, while the continuous order did not? Second, in discerning word order variation, why did the two groups show similar rating patterns for directional and idiomatic VPCs but not for aspectual VPCs? From a purely syntactic perspective, we argue that the degree of structural overlap between languages, particularly between L1 and L2, plays a crucial role. Specifically, the more the syntactic arrangement of L1 resembles that of L2, the more likely that the language user is inclined to accept this word order.

As presented in the preceding section, German has exerted minimal influence on speakers' perception of English VPCs. Therefore, our primary focus here is the syntactic transfer from L1 Chinese, where we closely examine properties shared by English and Chinese as well as the contrasts. The presence of a structural correspondence in L1 Chinese to the English clause featuring VPCs varies across semantic categories.

#### **✧ *Idiomatic VPCs***

As outlined in Section 4.3, while German and English have a range of idiomatic VPCs, Chinese lacks structural equivalents, at least for the stimuli in our experiment. The three idiomatic VPCs involved—*make up*, *leave out*, and *look up*—have their structural and semantic counterparts in German: *aus|denken*, *aus|lassen*, and *nach|schlagen*. However, in Chinese, these expressions solely involve the use of single verbs or verb-verb compounds: 编 *biān* ('to make up, to invent'), 省略 *shěng-lüè* ('to save-ignore'), 查找 *chá-zhǎo* ('to search-search'). Verb-verb compounds in Chinese function as single, uninterrupted verbs and are identical to single lexical verbs, which do not carry a particle. Therefore, Chinese uses the S-V-DO sequence to form a sentence involving transitive idiomatic VPCs. In essence, Chinese does not entertain discussions of word order variation because it does not employ VPCs for translating English idiomatic particle verbs; see the Chinese translation for *He made up a story*, (178). Consequently,

a discontinuous representation is lacking in Chinese counterparts for the stimuli in the experiment, leading to lower acceptance of this word order by both groups.

- (178)           他    编            了           一   个    故事。  
                  Tā   **biān**         le           yí   gè    gùshi.  
                  he    make up   PTCL.PFV   one CL    story  
                  cf. Eng. ‘He **made up** a story.’

In contrast, a transitive continuous VPC in English exhibits an analogous syntactic function to that of a single transitive verb: the particle sticks to the verb and takes up a direct object (continuous VPCs are hence referred to as *complex verbs*, as noted by Ramchand & Svenonius, 2002, p. 388). In this context, the distinction between the S-V-DO structure and the S-VPC-DO structure is minimized; compare *He made up a story* and *He invented a story*. Consequently, our participants uniformly assigned elevated mean scores to the continuous idiomatic stimuli.

In this scenario, the influence of L1 Chinese emerged as a contributing factor in shaping perceptions of the English VPC word order variation, while an impact of L3 German was notably absent, as the trilinguals did not exhibit a preference for the discontinuous word order.

#### ✧ *Directional VPCs*

In contrast to the structural absence of idiomatic particle verbs in Chinese, there is a structural correspondence in Chinese for directional particle verbs. The only circumstance in Chinese that allows for the use of discontinuous word order is when a compositional VPC carries the directional particle 来 *lái* (‘to come’) or 去 *qù* (‘to go’), denoting the direction of the motion. In cases without these two particles, the discontinuous arrangement is prohibited; compare the Chinese translation of the directional stimulus S1-1 and the aspectual stimulus S13-1, as shown in (179) and (180).

|       |       |      |        |                       |                 |                         |
|-------|-------|------|--------|-----------------------|-----------------|-------------------------|
| (179) | S1-1  | Eng. | They   | <b>bring</b>          | the food        | <b>in.</b>              |
|       |       | Chn. | 他们     | 端                     | 食物              | 进-来/进-来。                |
|       |       |      | Tāmen  | <b>duān</b>           | shíwù           | <b>jìn-lái/ jìn-qù.</b> |
|       |       |      | they   | hold                  | food            | come in/come go         |
| (180) | S13-1 | Eng. | We     | <b>used</b>           | our supplies    | <b>up.</b>              |
|       |       | Chn. | *我们    | 用 了                   | 补给              | 完/光。                    |
|       |       |      | *Wǒmen | <b>yòng le</b>        | bǔjǐ            | <b>wán/guāng.</b>       |
|       |       |      | we     | use                   | PTCL-PFV supply | over/over               |
|       |       | but: | 我们     | 用-完/光                 | 了               | 补给。                     |
|       |       |      | Wǒmen  | <b>yòng-wán/guāng</b> | le              | bǔjǐ.                   |
|       |       |      | we     | use up                | PTCL-PFV supply |                         |

The existence of a discontinuous order for directional VPCs in Chinese serves as a plausible explanation for the elevated acceptability observed among our participants when rating their English counterparts. This stands in stark contrast to their ratings for idiomatic VPCs.

#### ✧ *Aspectual VPCs*

Transitive aspectual VPCs in English do not support the discontinuous order in Chinese. A compelling question thus arises: why did the mean ratings for the discontinuous variants of the aspectual VPCs still surpass those for the idiomatic ones?

Our contention posits that the elevation in participants' acceptance is rooted in a partial overlap in word order placement between English and Chinese. While Chinese solely uses non-particle verbs for translating idiomatic VPCs, it does use particles to express aspectual information (see Section 4.3.3). This establishes some correspondence with English—Chinese has a structural counterpart of English aspectual VPCs. Two permissible word orders exist in Chinese for placing an aspectual VPC in a clause: S-bǎ-DO-V-Ptcl and S-V-Ptcl-DO. The latter mirrors the continuous



word order in English. While the former lacks a structural counterpart in English due to the position of the direct object, it still has a structural similarity to English in that the particle occupies the clause-final position, as exemplified in (181). This partial overlap has likely contributed to the higher acceptance of the discontinuous aspectual VPCs compared with their acceptance of the discontinuous idiomatic VPCs, whose Chinese counterparts have null overlaps with English.

(181) Eng. We **used** our supplies **up**.

Chn. 我们 把 补给 用 光 了。

Wǒmen bǎ bǔjǐ yòng guāng le.

We PTCL.IO supply use up PTCL.PFV

Moreover, the S-bǎ-DO-V-Ptcl structure is commonly used in Chinese. The high frequency of occurrence may further enhance participants' acceptance of the particle's clause-final position. Nonetheless, due to the partial nature of the overlap in this case, its influence might be less pronounced compared with full overlap, as in the case of directional VPCs. This elucidates why discontinuous directional VPCs received higher mean scores than discontinuous ones.

Thus far, the answer to the first question has become clear. *Why did the discontinuous order elicit different attitudes from participants across semantic categories, while the continuous order did not?* Due to the continuous word order being universally permissible in Chinese and not contingent on the semantic category of the particle, our participants assigned high acceptance scores to all three categories of continuous VPCs. In contrast, the grammaticality of the discontinuous order in Chinese is possibly tied to the semantic category of the particle, leading to variations in rating patterns across semantic types. A synthesis of our findings reveals a hierarchical relation, showcasing the influential power of structural similarities. A full overlap between L1 and L2 exerts the most profound influence, followed by partial overlap, while null overlap diminishes the accuracy of acceptability judgments. In the scenario

of perceiving word order variation in VPCs, this hierarchical influence was reflected in participants' varying acceptance of discontinuous order across semantic categories. The discontinuous order was found the least acceptable in idiomatic VPCs, mirroring the complete structural void in Chinese due to the absence of particle verbs for such expressions. In contrast, participants' acceptance increased for aspectual VPCs, where the presence of the particle, positioned at the clause-final position, allows for a partial overlap between Chinese and English. Directional VPCs experienced the highest acceptance, benefitting from the full structural overlap between the two languages.

*In discerning word order variation, why did the two groups show similar rating patterns for directional and idiomatic VPCs, but not for aspectual VPCs? When evaluating aspectual VPCs, the bilingual participants exhibited more polarized attitudes toward word order variation, whereas such a tendency was not seen in the ratings by the trilingual group, as shown in Figures 43 and 44.*

**Figure 43: Trilinguals' Ratings for Aspectual VPCs**

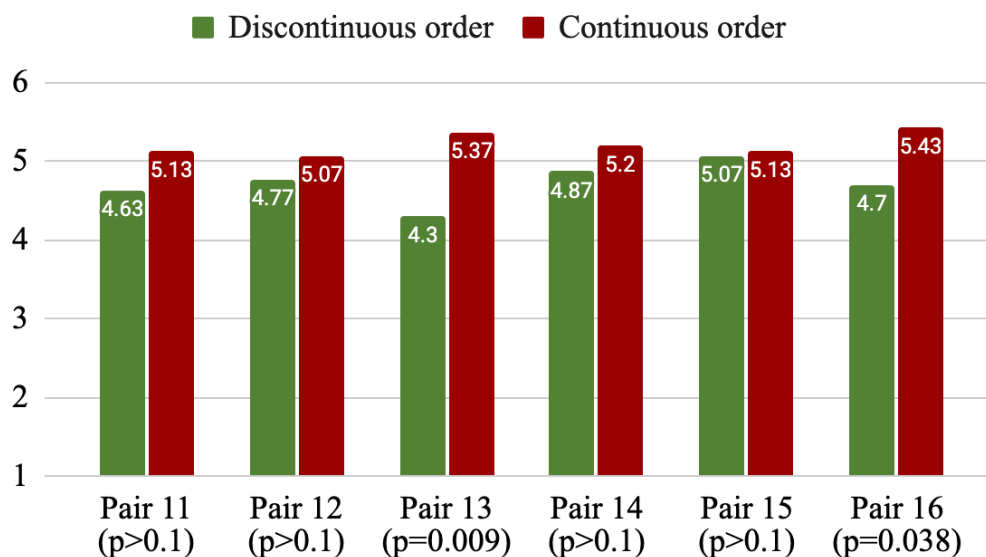
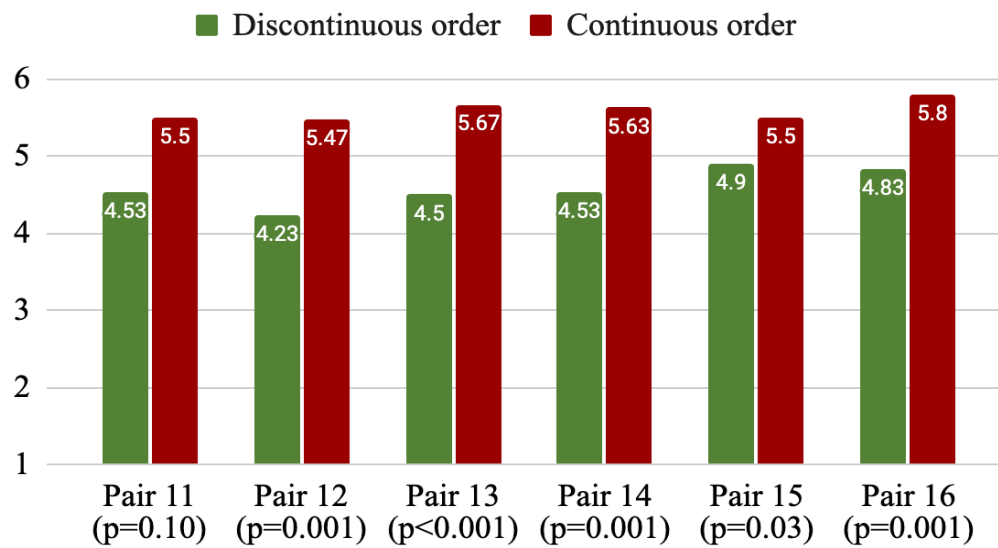


**Figure 44:** *Bilinguals' Ratings for Aspectual VPCs*



This disparity can be attributed to the interplay between L1 Chinese and L3 German. In general, both groups tended to favor the continuous order over the discontinuous one, with L1 Chinese appearing to exert a more substantial influence. However, regarding aspectual VPCs, German and Chinese syntactic properties pose a conflict, as German exclusively supports the discontinuous order, while Chinese supports only the continuous word order. In our experiment, the trilinguals assigned slightly higher mean scores to the discontinuous word order than bilinguals in most cases and gave lower scores to continuous stimuli in all instances. Nonetheless, the results of the U test did not indicate significant group differences in accepting the discontinuous order. There was only one case reflecting marginally significant differences for the continuous order. Despite such results, it is plausible to ascribe the aggregating effect of the simultaneous increase in acceptance of the discontinuous order and decrease in acceptance of the continuous order among trilingual groups to their nuanced attitudinal differences toward word order variation.

Conversely, Chinese and German syntax do not directly conflict in the other two scenarios, so the trilinguals discerned the word order variation similarly to the bilinguals. Chinese and German overlap each other in allowing for the discontinuous order for directional VPCs; therefore, both trilinguals and bilinguals showed similar

rating patterns for this word order. As Chinese lacks a structural representation for the discontinuous word order, there is a void in the direct source of transfer, leading to both groups' less preference for the discontinuous idiomatic VPCs. It is crucial to note that the forward influence from L1 Chinese takes precedence over the backward transfer from L3 German. The structural overlap between German and English in the discontinuous variation did not result in a pronounced preference for this word order among the trilinguals.

Lastly, considering the relatively small number of stimuli involved in exploring the relationship between semantic types and syntactic transfer, it is advisable to collect additional quantitative data and undertake a more specialized study for a more comprehensive understanding of these issues.

### **6.2.5 Interim Summary: Word Order Variation in VPC**

In this part of the experiment, we examined participants' performance in evaluating word order variation. Our results have proven that the proximity of syntactic features between two languages serves as a potential source of transfer, and transfer can be bidirectional: from L1 to L2 and from L3 to L2. Both groups showed strong performance, and we attribute this to the facilitative transfer effect from L1 Chinese to L2 English due to structural overlap. Backward transfer from L3 German to L2 English manifested in an indirect and weak way, showing that the structural overlap between English and German is a catalyst but not a necessary condition for transfer to occur. Furthermore, we assessed the validity of surface structural overlap and determined its better suitability for the scenario of bilingualism.

Our data analysis leads to three further speculations on the characteristics and mechanisms of transfer: (1) the degree of structural overlap between L1 and L2 has a positive correlation with the degree of transferability, and partial overlap might influence the occurrence of CLI; (2) a syntactic property employed in  $L_n$  (e.g., discontinuous order) can stand in competition with another property used in L1 (e.g., continuous order) for representing the same grammar entity (e.g., word order in

transitive VPCs). This potentially influences speakers' perception of the already established syntactic representation; however, the impact is indirect and subtle; and (3) the grammar rule of the L2, which is absent in the L1 grammar, once successfully acquired, becomes less susceptible to backward influence from a later-acquired foreign language.

✧ *Correlation between L1-L2 structural overlap and transferability*

Our first finding pertains to the context of bilingualism. We argue that the structural similarities and overlaps between L1 and L2 serve as an important source of transfer, and the more similarities the two languages share, the more likely they are to facilitate L2 acquisition.

In this experiment part, our participants showed a certain preference for constructions that reflected a full overlap between English and Chinese. First, the correspondence between Chinese and English in the continuous arrangement of transitive VPCs has led to participants' greater preference toward this word order over the discontinuous variant. The degree of structural overlap might influence language users' perception, as evidenced by their greater acceptance of discontinuous order for directional VPCs, which can also be found in Chinese. Moreover, even if a certain structure is missing in L1, learners may opt for a structure in L2 that has more similarities with L1, such as in the case of idiomatic VPCs, where Chinese seldomly uses particle verbs for idiomatic expressions but fully overlaps with English in the overarching word order of S-V-DO.

Additionally, we believe that transfer might occur when two languages partially overlap. Partial overlap may exert a lesser influence compared with full overlap. Specifically, the bilinguals showed slightly lower acceptance of the discontinuous aspectual VPCs than the discontinuous directional VPCs, likely because Chinese partially overlaps with English in the clause-final position of aspectual particles.

Notice that we did not systematically explore the correlation between the level of structural overlap and the degree of transferability in the bilingual setting. Our

argument is based on the initial data observations, but further studies are warranted to confirm our speculation.

#### ✧ *Interaction between L1 and L3*

It is important to note that the structural overlap between L3 German and L2 English did not exert a stark influence in this scenario. Although German and English employ the discontinuous word order and share more semantical and structural correspondences of VPCs, our trilingual participants did not exhibit a significantly increased preference for the discontinuous variant. This indicated that the structural overlap between L1 and L3 did not reinforce the shared syntactic representation in multilingual minds.

On the other hand, the trilinguals still showed a certain degree of diminished acceptance of the continuous word order compared with the bilinguals. This outcome suggested an indirect, non-facilitative transfer effect from L3. In this case, the syntactic feature of German is not strong enough to thoroughly reshape the already acquired grammar rules regarding word order variation of English VPCs. Nevertheless, it has to some extent neutralized the forward, facilitative influence of L1 Chinese. In short, backward transfer from L3 German in this scenario only manifested in how it interacted with L1 Chinese.

#### ✧ *Resilience of newly acquired grammar against backward transfer*

We further argue that once newly acquired grammar rules, which are different from those in the grammar of the mother tongue, are well-established, they become less susceptible to potential linguistic influence from the subsequently acquired language.

Although the discontinuous order is greatly restricted in its productivity in L1 Chinese, the bilingual participants did not reject its grammaticality for English VPCs. Instead, they had a good command of relevant grammar rules; for instance, they could well discern concrete situations where the continuous order would be more proper, such as sentences featuring a longer object and an idiomatic expression. The impact of external facts provides a pertinent explanation for this outcome. The pedagogical

instructions during language acquisition and the internalization of grammar rules in language practice might have reduced the potential negative transfer resulting from structural mismatches. Instead, disparities between languages likely have raised learners' attention when learning grammar rules, facilitating the acquisition process. Moreover, having reached at least the upper-intermediate level of English, our participants must have successfully internalized the rules for English transitive VPCs and are adept at distinguishing the proper use of word order variation.

This finding aligns with the one presented in the experiment part regarding inversion. Backward transfer from German became less pronounced when the participants assessed the grammatically inverted stimuli because these structures do have grammatical representations in English grammar. This perspective sheds light on why the transfer effect from L3 German was weak and indirect when judging VPCs—both word orders have a grammatical syntactic representation in English grammar and are instructed during the SLA process.

Lastly, we would like to emphasize the different patterns of L3 German influence between the scenarios of judging subject-simple verb inversions and assessing word orders for VPCs. The trilingual participants underwent a strong influence from German when they evaluated the subject-simple verb inversions, whereas the influence was less apparent when they judged VPCs. Despite the seemingly contradictory results, the underlying mechanism of German influence differs fundamentally. In the case of inversion, the trilinguals were tasked with rating ungrammatical stimuli, the structures of which lacked syntactic representations in the “real English grammar.” This led to a strong inclination toward the syntactic features of German, which served as the sole source of transfer. Conversely, with VPCs, the scenario dealt with word order variation, meaning that both word orders are supported in English grammar and have been successfully acquired by the participants. In this case, the influence of L3 German on L2 English reasonably decreased, even when the two languages share structural similarities.

To this end, we conclude that backward transfer from L3 occurs more prominently when the syntactic property of L3 is absent in the grammars of any earlier-acquired languages. This, to some extent, resembles the CLI patterns observed in the initial stages of FLA, where the learners have not yet established the grammar system of the target language and learn the new language holistically based on the already established linguistic representations in their repertoire.

### 6.3 Adverbial Placement in SV Clauses

Another sharp contrast between German and English/Chinese arises in the adverbial placement within SV declarative clauses. In German, adverbials typically appear after the verb within the middlefield, and their position relative to other elements adheres to a syntactic hierarchy, as elucidated in Section 4.4. In English and Chinese, adverbials canonically appear in a position before the finite lexical verb. Based on this contrast, we made the main sub-hypothesis:

- ✧ *Compared with the bilinguals, the trilingual participants will assign higher acceptance scores to stimuli with the word orders of S-V-Adv-DO, S-V-Adv-Ptcl, S-V-(Adv)-DO-Adv-Ptcl, and S-V-Adv-PP.*

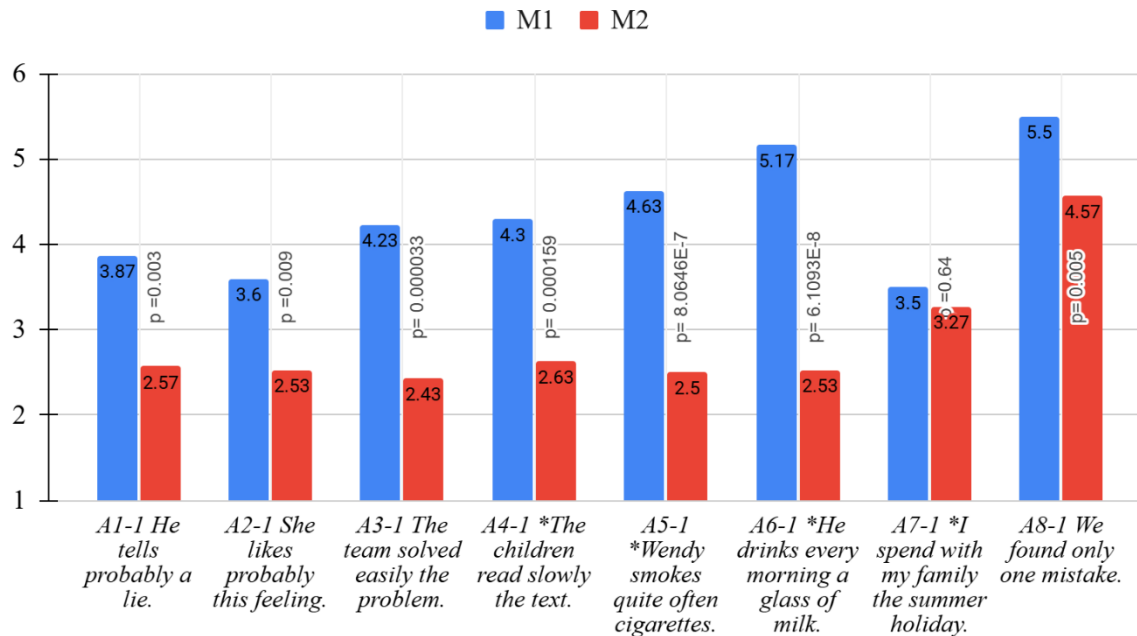
The ensuing sections present the findings of participants' ratings for stimuli organized in S-V-Adv-X word order, with X denoting a direct object (Section 6.3.1), a particle of the particle verb (Section 6.3.2), or a prepositional complement (Section 6.3.3). These rating patterns are then compared with those for the corresponding V3 variants, most of which were arranged according to the conventions of English/Chinese grammar (Section 6.3.4).



### 6.3.1 Adverbial Placement in Stimuli with V-DO Constructions

Figure 45 presents the mean scores and group differences in rating stimuli featuring the S-V-Adv-DO word order.

**Figure 45:** Comparison of Two Groups' Ratings for Stimuli in S-V-Adv-DO Word Order<sup>95</sup>



**Grammaticality Judgment:** The trilingual participants provided mean scores ranging from 3.5 to 5.5, with half surpassing 4 points. This indicated a noticeable tendency of trilinguals toward accepting the S-V-Adv-DO order and their great tolerance of the ungrammatical position of the adverbial.

In contrast, bilingual participants' scores ranged from 1.9 to 4.57. Only one stimulus (A8-1) received a mean score exceeding 4 points from the bilinguals, and this

<sup>95</sup> A filler sentence containing a number agreement error was arranged in the ATJ: *\*Wendy smokes often cigarette* (M1 = 3.97, M2 = 1.9;  $p = 0.000014$ ). Compare the ratings for this filler sentence with those for *A5-1 \*Wendy smokes quite often cigarettes* (M1 = 4.63, M2 = 2.5;  $p = 8.0646E-7 < 0.000001$ ). The lower ratings assigned to the erroneous filler sentence compared with those to A5-1 by both participant groups can be attributed to the incorrect singular form of the object noun *cigarette*. Nonetheless, compared with the bilinguals, the trilinguals still exhibited significantly higher tolerance toward the filler. This result provides additional evidence of how the S-V-Adv-DO structure in German influences its speakers' perception of English word order.

was the only stimulus in this set that featured canonical word order. Among 4 grammatical sentences (Stimuli A1-1~A3-1, A8-1), the bilingual group assigned lower scores to 3 of them (Stimuli A1-1~A3-1:  $2.43 \leq M2 \leq 2.57$ ), whereas the trilingual group showed greater acceptance ( $3.6 \leq M1 \leq 4.23$ ). These three instances feature the non-canonical word order of placing the adverb, *probably*, between the verb and the direct object for a focusing purpose. Noticeably, when accepting ungrammatical stimuli, the trilinguals assigned significantly higher scores to all four instances compared with the bilinguals (stimuli A4-1~A7-1:  $3.5 \leq M1 \leq 5.17$ ,  $1.9 \leq M2 \leq 3.27$ ).

The sole instance accepted as being grammatically fully acceptable by both groups was A8-1 *We found only one mistake* ( $M1_{A8-1} = 5.5$ ,  $M2_{A8-1} = 4.57$ ;  $p = 0.005$ ). The restrictive adverb *only* may come between the verb and the direct object without affecting the canonicity of the sentence. This case differed from stimuli A1-1 to A3-1, which, while grammatically acceptable, deviated from the canonical placement of the adverbial.

To sum up, the bilinguals generally rejected the S-V-Adv-DO sequence, unless it involved the canonical word order, whereas the trilinguals showed great acceptance of them. The bilinguals outperformed the trilinguals in discerning the ungrammatical placement of adverbs in transitive constructions.

**Group Differences:** The notably small p-values substantiate our hypothesis that the trilinguals will accept the S-V-Adv-DO word order more readily than the bilinguals. The ratings for 7 out of 8 stimuli demonstrated statistically significant group differences, all featuring ungrammatical/non-canonical positioning of the adverbial. Compared with the bilingual controls, the trilingual participants consistently assigned higher acceptance scores to most of these stimuli, with only one exception ( $M1_{A7-1} = 3.5$ ,  $M2_{A7-1} = 3.27$ ;  $p = 0.64$ ).

Particularly noteworthy is the trilinguals' rating for stimulus A6-1: *He drinks every morning a glass of milk* ( $M1_{A6-1} = 5.17$ ,  $M2_{A6-1} = 2.53$ ;  $p = 6.1093E-8 < 0.000001$ ), which features the ungrammatical positioning of a long adverbial instead of a short adverb before the direct object. The trilinguals found this sentence particularly natural-

sounding, while the bilinguals rejected its grammaticality. However, when judging stimulus A7-1 *I spend with my family the summer holiday*, a sentence whose adverbial adjunct is also a longer AdvP, no statistically significant group difference was observed.

### ***Analysis:***

This outcome can be ascribed to the reverse influence from participants' L3, German. Among the three languages involved, only German allows the adverbial to intervene between the verb and its direct object in the canonical word order, which explains the trilinguals' higher acceptability toward the given stimuli, even considering them grammatical. The influence of German was non-facilitative in this sub-scenario, as it has muddled speakers' grammatical judgment.

It prompts inquiry into trilingual participants' varying attitudes toward stimuli A6-1 *\*He drinks every morning a glass of milk* and A7-1 *\*I spend with my family the summer holiday*. Both sentences feature a longer PP as adverbial. Participants' differentiated rating patterns can be ascribed to stimulus A7-1's deviation from the unmarked basic word order in the German middlefield: adverbials of open class, such as temporal, locative, instrumental, and comitative adverbials, typically follow a definite object but precede an indefinite object (Engel, 1970a, p. 45; see Section 4.4.2.1). The German equivalent of A7-1, *ich verbringe mit meiner Familie die Sommerferien*, deviates from the basic order, as the adverbial precedes the definite object. In contrast, the German counterpart of stimulus A6-1, *Er trinkt jeden Morgen ein Glas Milch*, adheres to the basic word order, as the adverbial precedes an indefinite object. Moreover, in German, temporal adverbials tend to appear before objects (Lenerz, 1977, p. 85), which further explains why stimulus A6-1 received exceptionally high mean scores from the trilingual group.

However, the trilinguals still readily accepted stimuli A3-1 *\*The team solved easily the problem* and A4-1 *\*The children read slowly the text* ( $M1_{A3-1} = 4.23$ ,  $M1_{A4-1} = 4.3$ ), despite their adverbials preceding the definite objects. We may attribute this result to the semantic category of the adverbial: the two stimuli feature manner adverbs, which typically appear either before or after the object, leading to two interpretations (see

Schäfer, 2019, pp. 273–274; Pittner, 2004, pp. 15–16). The flexibility in placing manner adverbs in German likely has contributed to trilinguals’ familiarity with both positions, resulting in consistently high scores for these stimuli.

Regarding the rating patterns for A8-1 *We found only one mistake*, both groups rendered the sentence grammatically acceptable, and the trilinguals rated it even higher ( $M1_{A8-1} = 5.5$ ,  $M2_{A8-1} = 4.57$ ;  $p = 0.005$ ). The elevated mean scores are predictable because the restrictive adverb, *only*, canonically appears between a verb and a light object (Cinque, 1999, pp. 30–31). A possible explanation for trilinguals’ higher ratings for the sentence is the structural overlap between English and German. The stimulus lacks a grammatical structural counterpart in Chinese, as the adverbial must precede the verb in Chinese; compare the translation of stimulus A8-1 in German, English, and Chinese, as in (182). German and English allow for the S-V-*only*-DO arrangement.

- (182) Eng. We found *only* one mistake. (S-V-Adv-DO)  
 Ger. Wir fanden *nur* einen Fehler. (S-V-Adv-DO)  
 Chn. 我们 只 找到 一个 错误。 (S-Adv-V-DO)  
 Wǒmen *zhǐ* zhǎo-dào yí gè cuòwù.  
 we only find-PTCL.PFV one CL mistake

These results further support the argument that structural overlaps between German and the English stimuli, as well as the frequency of occurrence of certain linguistic constructions, play a significant role in manipulating the degree of transferability.

### ➤ Additional findings

The ratings for the four filler sentences (Fillers 59~62) have raised our attention. The first two fillers, *\*You can rebuild in this way your life* and *\*He is telling for sure the truth*, are re-coded as A9-1 and A10-1. These two sentences involve the use of auxiliaries, and the adverbials appear between the non-finite verb and its direct object.

Notice that the word order in A9-1 only partially conforms to the German syntax rule when translated word-for-word.<sup>96</sup> Also, a direct structural equivalence of A10-1 cannot be found in German, as the language does not employ the progressive form *be + gerund*. However, both stimuli feature the S-V-Adv-DO pattern, which resembles the typical adverbial placement in German. In their counterparts, re-coded as A9-2 and A10-2, the adverbial is positioned elsewhere before the non-finite lexical verb. Table 53 shows participants' ratings as well as group differences.

**Table 53:** *Two Groups' Ratings for Stimuli with V-Adv-DO Adv-V-DO Word Orders in Other Relevant Contexts*

| Pair            | Stimuli (Filler)                               | M1               | M2               | <i>p</i> -value<br>(U test) |
|-----------------|------------------------------------------------|------------------|------------------|-----------------------------|
| A9-1            | <i>*You can rebuild in this way your life.</i> | 3.63             | 2.4              | <i>p</i> = 0.009            |
| A9-2            | <i>*You in this way can rebuild your life.</i> | 2.07             | 2.67             | <i>p</i> = 0.055            |
| <b>WSR test</b> |                                                | <i>p</i> = 0.002 | <i>p</i> = 0.388 |                             |
| A10-1           | <i>*He is telling for sure the truth.</i>      | 4.23             | 2.7              | <i>p</i> = 0.0002           |
| A10-2           | <i>He is for sure telling the truth.</i>       | 4.57             | 4                | <i>p</i> = 0.14             |
| <b>WSR test</b> |                                                | <i>p</i> = 0.338 | <i>p</i> = 0.002 |                             |

Once again, the trilingual participants demonstrated significantly higher acceptance of the V-Adv-DO pattern compared with the bilingual participants ( $M1_{A9-1} = 3.63$ ,  $M2_{A9-1} = 2.4$ ;  $p = 0.009$ ;  $M1_{A10-1} = 4.23$ ,  $M2_{A10-1} = 2.7$ ;  $p = 0.0002$ ), indicating an inferior performance in recognizing ungrammatical constructions. When rating the Adv-V-DO variants, both groups were able to distinguish the grammaticality, assigning lower scores to the ungrammatical stimulus ( $M1_{A9-2} = 2.07$ ,  $M2_{A9-2} = 2.67$ ;  $p = 0.055$ ) and higher scores to the grammatical one ( $M1_{A10-2} = 4.57$ ,  $M2_{A10-2} = 4$ ;  $p = 0.14$ ).

<sup>96</sup> In the presence of an auxiliary, the non-finite verb should be moved to the VF position in German. The sentence ‘\*You can in this way your life rebuild’ would be a translation that conforms to German grammar.

### ***Analysis:***

Our additional findings provide further evidence that the trilinguals were particularly sensitive to the word order of an adverbial intervening between a verb and its direct object (V-Adv-DO). This sensitivity persisted even when the word order of the entire sentence did not adhere to the German word order, as in A9-1, or when there lacked a structural representation in German, as in A10-1. Compared with the bilingual individuals, the trilinguals showed great tolerance as soon as the V-Adv-DO sequence appeared. In line with our previous findings, we can attribute this result to the influence of how German places its adverbial adjunct in the middlefield.

Besides, our participants exhibited a solid understanding of adverbial placement in English, even in more complex sentences involving auxiliary constructions (A9-2, A10-2). They appeared to remain unaffected by the potential influence of their L1 Chinese, where adverbials consistently precede modal and aspectual auxiliaries. This result may be attributed to the successful internalization of English grammar.

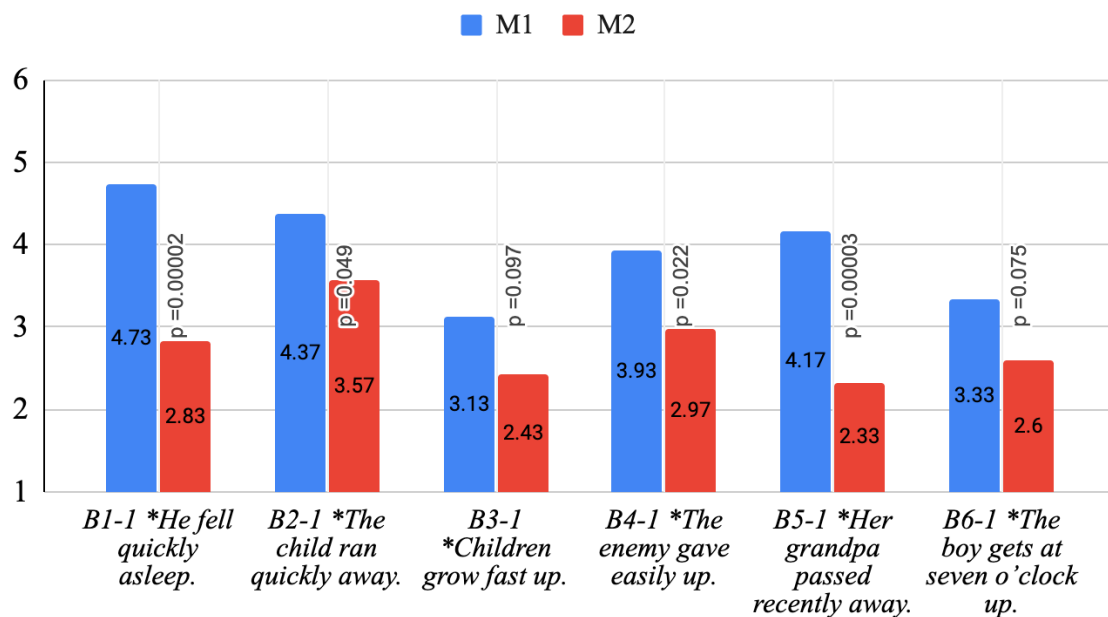
Moreover, the trilingual participants even slightly outperformed the bilinguals in their evaluation of stimulus A9-2 *\*You in this way can rebuild your life*. This can be ascribed to the influence of the German language, which does not permit V3. Due to the scarcity of data, further research is needed to explore this topic in greater depth.

## **6.3.2 Adverbial Placement in Stimuli with Verb-Particle Constructions**

### **6.3.2.1 Adverbial Placement in Intransitive VPCs**

The second sharp contrast between German and English/Chinese is that an adverbial may intervene between the verb and its particle in a VPC. This way of placement is not permitted in English and Chinese. Figure 46 presents two groups' ratings for stimuli arranged in the S-V-Adv-Ptcl sequence.

**Figure 46:** Comparison of Two Groups' Ratings for Stimuli with S-Adv-V-Ptcl Word Order



**Grammaticality Judgment:** The trilingual participants assigned relatively high acceptance scores to these ungrammatical stimuli, with mean scores ranging from 3.13 to 4.73. In certain cases, such as stimuli B1-1 *\*He fell quickly asleep* and B2-1 *\*The child ran quickly away*, their ratings even approached 5 points, suggesting that the group perceived these sentences as highly natural. In contrast, the bilingual group exhibited stricter judgments of this word order. Their ratings, ranging from 2.43 to 3.57, differed by almost one point in mean deviation compared with the mean scores assigned by the trilinguals. This outcome suggested that the bilingual individuals could better recognize the ungrammaticality of stimuli in this setting.

**Group Differences:** The trilingual group demonstrated greater acceptance of the S-V-Adv-Ptcl word order compared with the bilingual controls. Of the 6 stimuli, statistically significant group differences were evident in the ratings of 4 instances and marginally significant differences in 2. The contrast between the two groups' ratings was particularly notable in the ratings for stimulus B1-1 *\*He fell quickly asleep* ( $M1_{B1-1} = 4.73$ ,  $M2_{B1-1} = 2.83$ ;  $p = 0.00002$ ) and B5-1 *\*Her grandpa passed recently away* ( $M1_{B5-1} = 4.17$ ,  $M2_{B5-1} = 2.33$ ;  $p = 0.00003$ ).

$t_1 = 4.17$ ,  $M2_{B5-1} = 2.33$ ;  $p = 0.00003$ ). Though participants exhibited varying attitudes toward individual cases, the overall trend indicated the trilinguals' consistently more positive disposition toward the S-V-Adv-Ptcl pattern.

### ***Analysis:***

The observed higher tolerance among the trilinguals for the ungrammatical structure and the sharp group discrepancy between the two groups can be further attributed to the influence of German syntax. In placing an adverbial adjunct in a VPC, German grammar solely allows for the S-V-Adv-Ptcl arrangement. In this context, German has exerted a negative impact on its users' implicit knowledge of English.

Interestingly, although certain stimuli lack a strict word-for-word translation in German, they were still highly accepted by trilingual participants. For example, while stimulus B4-1 *\*The enemy gave easily up* finds a structural correspondence with German, the translation of B5-1, *\*Her grandpa passed recently away*, does not. In the latter case, the translation of the phrasal verb *pass away* is realized through a single lexical verb in German; compare (183) and (184).

(183) B4-1 Eng. \*The enemy gave easily up.

cf. Ger. Der Feind gab leicht auf.  
the enemy gave easily up

(184) B5-1 Eng. \*Her grandpa passed recently away.

cf. Ger. Ihr Opa ist vor Kurzem verstorben.  
her grandpa AUX recently deceased

Despite such a mismatch, the trilinguals still assigned higher scores to stimuli 5-1. This indicated that it was the abstract syntactic representation, rather than the word-for-word translations, that influenced the trilinguals' judgment. In other words, backward transfer operates on the abstract structural level. Drawing from Westergaard's



terminology (2021a, 2021b), CLI manifests itself as “property-by-property,” extending beyond literature translation. Taken together, our results have underscored the complexity of CLI and its impact on language processing and cognition.

### ➤ Additional findings

An intriguing observation from reviewing ratings for fillers is that the trilinguals showed greater acceptance of the V-Adv pattern, even when the entire sentence structure did not align with German syntax.

Among the fillers, two sentences involve related structure: Filler 29 *\*He has fallen quickly asleep* and Filler 17 *\*They should stay until midnight awake*, re-coded as B7-1 and B8-1 respectively. These sentences contain an adverbial positioning between the lexical verb and the adjective complement. As shown in Table 54, compared with the bilinguals, the trilinguals assigned higher acceptance scores to these sentences, with scores averaging around 4 points.

**Table 54:** Two Groups’ Mean Ratings for S-Aux-V-Adv-Adj<sub>COMP</sub> Word Order

| No.  | Stimuli                                        | M1   | M2   | <i>p-value (U test)</i> |
|------|------------------------------------------------|------|------|-------------------------|
| B7-1 | <i>*He has fallen quickly asleep.</i>          | 3.97 | 3.03 | <i>p = 0.035</i>        |
| B8-1 | <i>*They should stay until midnight awake.</i> | 4.2  | 2.9  | <i>p = 0.005</i>        |

### *Analysis:*

Stimuli B7-1 and B8-1 involve the use of verb-adjective complement constructions, *fall asleep* and *stay awake*. The former is realized by a VPC in German: *ein|schlafen* (lit. ‘in|sleep’), and the latter corresponds to the verb compound: *wach|bleiben*. In a clause with simple tense, the prefixes *ein* and *wach* move to the VF position, functioning as a postverb. The German translation hence contrasts with the canonical English order, as shown in (185). When an auxiliary is present, the entire verb compound moves to the VF position as an uninterrupted unit, and the prefix and the root verb switch positions, whereas in English, it may immediately follow the auxiliary, as in (186).

(185) a. Eng. He quickly **fell asleep**.

|      |                  |                |                    |             |
|------|------------------|----------------|--------------------|-------------|
| Ger. | <b>FOREFIELD</b> | <b>V2</b>      | <b>MIDDLEFIELD</b> | <b>VF</b>   |
|      | Er               | <b>schlief</b> | schnell            | <b>ein.</b> |
|      | he               | slept          | quickly            | PTCL        |

b. Eng. He **stay awake** until midnight.

|      |                  |                |                    |              |
|------|------------------|----------------|--------------------|--------------|
| Ger. | <b>FOREFIELD</b> | <b>V2</b>      | <b>MIDDLEFIELD</b> | <b>VF</b>    |
|      | Sie              | <b>bleiben</b> | bis Mitternacht    | <b>wach.</b> |
|      | they             | stay           | until midnight     | awake        |

(186) a. Eng. He has quickly **fallen asleep** (quickly).

|      |                  |           |                    |                        |
|------|------------------|-----------|--------------------|------------------------|
| Ger. | <b>FOREFIELD</b> | <b>V2</b> | <b>MIDDLEFIELD</b> | <b>VF</b>              |
|      | Er               | ist       | schnell            | <b>ein geschlafen.</b> |
|      | he               | AUX.PFV   | quickly            | PTCL slept.NON-FIN     |

b. Eng. They must **stay awake** until midnight.

|      |                  |           |                    |                      |
|------|------------------|-----------|--------------------|----------------------|
| Ger. | <b>FOREFIELD</b> | <b>V2</b> | <b>MIDDLEFIELD</b> | <b>VF</b>            |
|      | Sie              | müssen    | bis Mitternacht    | <b>wach bleiben.</b> |
|      | he               | must      | until midnight     | awake stay           |

The word order arrangement in stimuli B7-1 and B8-1 is thus a hybrid of English and German word order alignments: the finite verb follows the auxiliary, adhering to English word order; the adverbial separates the verb and the adjective complement, reflecting a structure typically used in German clauses with simple tenses. Two syntactic rules in German grammar conflict here:

*A. In the presence of an auxiliary, the non-finite verb moves to the VF position (Rule A).*

*B. If the lexical verb occupies the V2 position, the particle or the verb-adjective complement moves to the VF position, and the adverbial precedes (Rule B).*

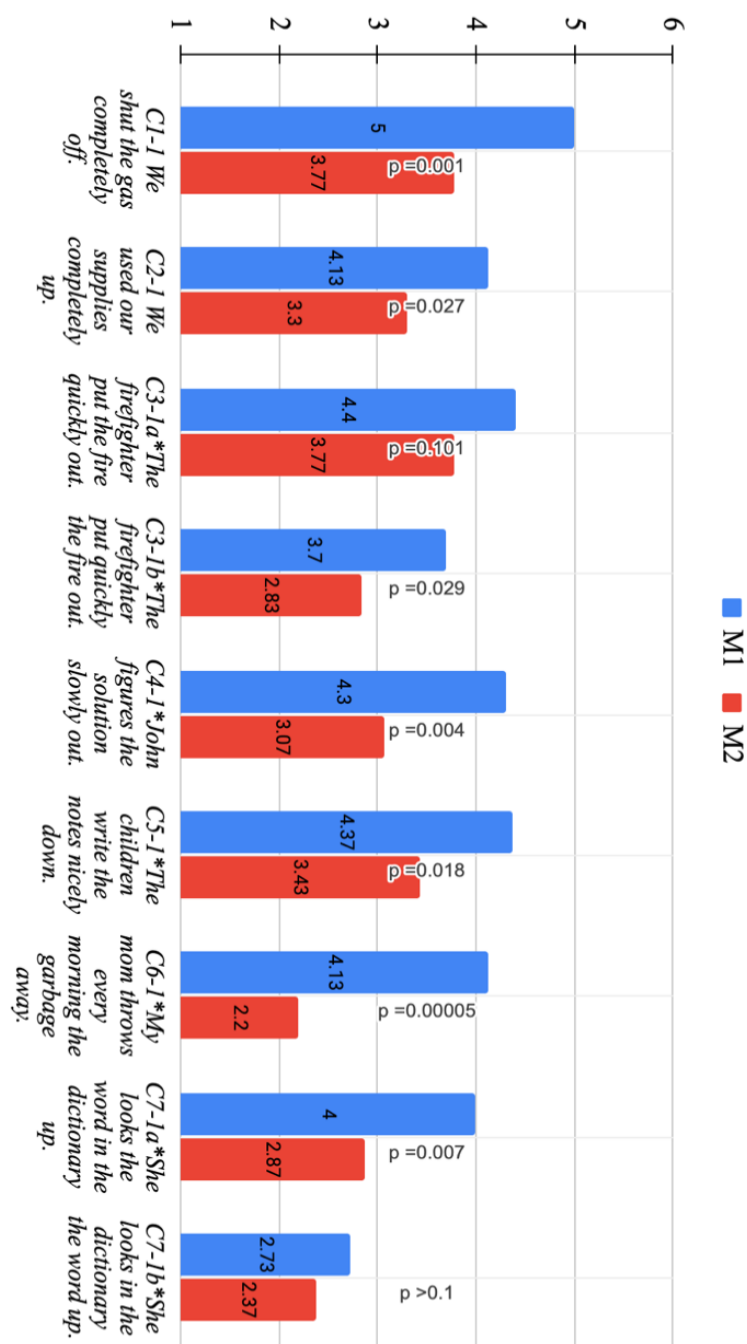
Our previous data have shown that the obligatory VF position of non-finite verbs in German (Rule A) exerts minimal impact on the participant's perception of such structures in English (see Section 6.1.4.2 and Table 45 for an extensive discussion). The ratings for stimuli B7-1 and B8-1 align with our earlier finding: the violation of Rule A did not significantly reduce the trilinguals' acceptance of the entire sentence. To this end, we believe that Rule B, which permits the adverbial to separate the verb and the particle/adjective complement, has resulted in trilinguals' acceptance of the stimuli. Grammar Rule B of German exhibits stronger transferability than Rule A; otherwise, the trilinguals would not have rated the two sentences around the threshold of 4 points. Our data have thus provided additional evidence that different syntactic properties exhibit varying degrees of transferability. Besides, we argue that the transfer does not necessarily occur on the entire clause level. The syntactic properties reflected in the word order in a sentence segment can also influence speakers' language processing. In our case, the segment involves the  $V_{\text{NON-FIN-Adv-Ptcl/AdjCOMP}}$  construction.

Moreover, we believe that the trilinguals intuitively found the closest structure in German to judge stimuli arranged in German word order, and a word-for-word equivalent is not a necessary condition for transfer to occur. For instance, although the expression *fall asleep* is realized through a particle verb (*ein|schlafen*) in German, such a mismatch has not affected the trilinguals' judgment. When evaluating B7-1 *\*He has fallen quickly asleep*, the trilinguals likely underwent the following thought process: they first related the VP to the German semantic equivalent *ein|schlafen*, and then made judgments using the default S-V-Adv-Ptcl/AdjCOMP word order. What has been transferred and has shown stark transferability is the concept that "in German, an adverbial adjunct may intervene between the verb and a verb complement, be it a particle or a direct object or an adjunct complement."

### 6.3.2.2 Adverbial Placement in Transitive VPCs

In a transitive VPC in German, the adverbial and the direct object are bracketed by the finite verb and the particle. As this word order contrasts with English and Chinese, we expected the trilinguals to show higher acceptability to those English expressions arranged in this order.

**Figure 47:** Comparison of Two Groups' Ratings for Stimuli in S-V-(Adv)-DO-Adv-Ptcl Word Order



**Grammaticality Judgment:** Figure 47 illustrates the results of participants' ratings for stimuli featuring either S-V-DO-Adv-Ptcl or S-V-Adv-DO-Ptcl word orders, both of which are grammatical in German. The mean scores assigned by the trilingual participants ranged from 2.73 to 5, with most scores exceeding 4 points. In contrast, the average scores given by the bilinguals did not exceed 4 points, ranging from 2.2 to 3.77. The trilinguals generally exhibited lower performance than the bilingual controls in recognizing grammatically unacceptable stimuli.

Among these stimuli, only C1-1 *We shut the gas completely off*, and C2-1 *We used our supplies completely up* are grammatical. They feature the specific use of the intensifier *completely*, which is permitted to be put left to the particle. The bilinguals did not fully accept the grammatical naturalness of these two instances, while the trilinguals showed higher acceptance of them ( $M1_{C1-1} = 5$ ,  $M2_{C1-1} = 3.77$ ;  $M1_{C2-1} = 4.13$ ,  $M2_{C2-1} = 3.3$ ). The acceptance scores for stimulus C2-1 did not surpass those of other ungrammatical sentences. The ratings to C1-1 and C2-1 are not unexpected, as these sentences do not conform to the default order in English, in which adverbs typically either precede the verb or appear in clause-final position.

**Group Differences:** Striking contrasts in ratings were observed between the two groups. The trilingual group exhibited significantly higher levels of acceptance of these stimuli. Statistically significant differences between the groups were observed in the ratings of 7 out of the 9 stimuli, with a marginally significant difference noted in one. This rating pattern meets our anticipated outcomes.

### **Analysis:**

In line with the results obtained in the preceding two sections, the data provided robust evidence that German syntax influenced how the trilingual participants perceived English word order in the context of adverbial placement in transitive VPCs. Since the S-V-(Adv)-DO-Adv-Ptcl word order is neither canonical in English nor grammatical in Chinese, German emerges as the sole source of transfer. At first glance, the transfer effect appeared positive, as the trilinguals assigned higher ratings for grammatical

stimuli such as C1-1 *They shut the gas completely off* ( $M1_{C-1} = 5$ ,  $M2_{C-1} = 3.77$ ). However, they were unable to accurately identify the ungrammatical stimuli in the set. This suggested that instead of making a competent distinction of word order applicability in individual cases, their judgments were based on an overall sense of naturalness for a particular sentence structure; namely, any adverbial placement consistent with German syntax would make the stimulus sound more natural and thus more acceptable to the trilinguals. They assigned high acceptance scores to C1, not because they acquired the distinct placement of the adverb *completely*, but because the sentence happened to follow the German word order. Therefore, the transfer effect of German syntax is non-facilitative.

The only stimulus viewed as ungrammatical by both groups is C7-1b, *\*She looks in the dictionary the word up* ( $M1_{C7-1b} = 2.73$ ,  $M2_{C7-1b} = 2.37$ ;  $p > 0.1$ ), which was the sole instance where the mean scores given by the trilinguals did not surpass 3 points. This did not occur by chance. The word-for-word translation of this sentence is grammatically less acceptable in German, because a heavier-weighted element, such as the PP adverbial *in the dictionary* in this case, is typically placed after a shorter element in the German middlefield (see Section 4.5.2.1 for *Gesetz der wachsenden Glieder*). Apart from this, the adverbial more commonly appears after a definite direct object, as *the word* in this sentence (see Section 4.4.4.1 for adverbial placement in German SV clauses with transitive VPCs). This plausibly explains why the other word order variant, C7-1a, *\*She looks the word in the dictionary up*, received higher acceptance scores from the trilingual participants ( $M1_{C7-1a} = 4$ ,  $M2_{C7-1a} = 2.87$ ;  $p = 0.007$ ), while C7-1b not; compare the word-for-word translation of the two stimuli variants into German, respectively shown in (187a) and (187b). The lower acceptance of C7-1b hence does not stand out as an exception. It indicated the mechanism of transfer: the more canonical and basic word order is more easily taken as a reference in language processing.

| (187) |      | S    | V       | DO <sub>DEF</sub> | Adv <sub>PP</sub> | Ptel  |
|-------|------|------|---------|-------------------|-------------------|-------|
| C7-1a | Eng. | *She | looks   | the word          | in the dictionary | up.   |
|       | Ger. | Sie  | schlägt | das Wort          | im Wörterbuch     | nach. |

|       |      | <b>S</b> | <b>V</b> | <b>Adv<sub>PP</sub></b> | <b>DO<sub>DEF</sub></b> | <b>Ptcl</b> |
|-------|------|----------|----------|-------------------------|-------------------------|-------------|
| C7-1b | Eng. | *She     | looks    | in the dictionary       | the word                | up.         |
|       | Ger. | ?Sie     | schlägt  | im Wörterbuch           | das Wort                | nach.       |

To conclude, in this sub-scenario, the grammar rules governing the linearization of constituents in the German middlefield have been used as references in processing word orders of the less-dominant foreign language, English. The transfer is non-facilitative.

### 6.3.3 Adverbial Placement in Stimuli with V-PP Constructions

The final sub-scenario examines participants' attitudes toward adverbial placement in constructions involving a prepositional complement. In German, a prepositional complement typically occupies the final position of the middlefield, and an adverbial adjunct precedes it—an arrangement either marked or disallowed in English and not permitted in Chinese. Figure 48 (next page) compares two groups' ratings for stimuli organized in the S-V-Adv-PP word order.

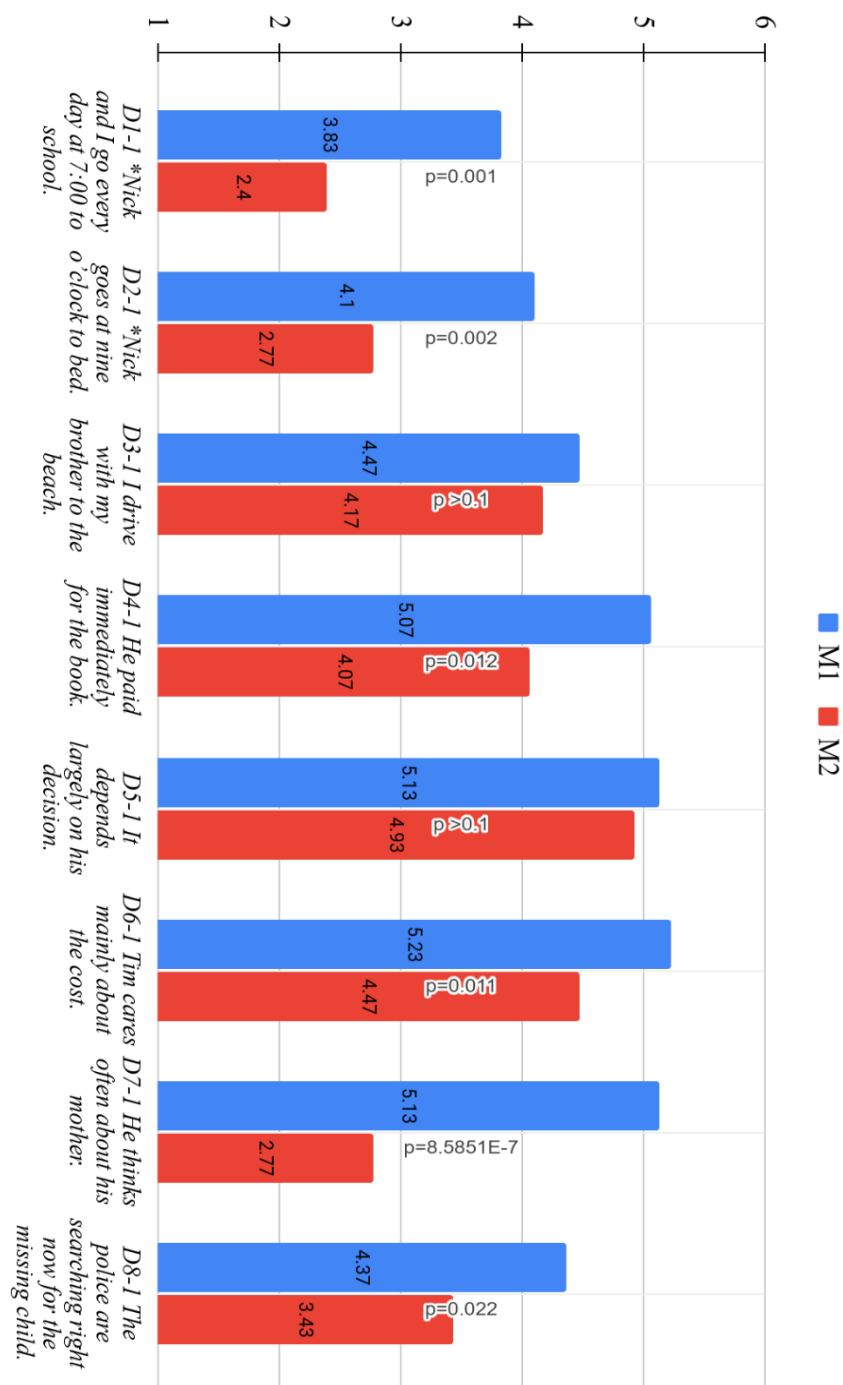
**Grammaticality Judgment:** Both groups exhibited different levels of acceptance toward these sentences. On the one hand, the participants showed high acceptance of stimuli D3-1 to D6-1, with mean scores surpassing 4 points. The way the adverbials are placed in these stimuli is not uncommon in English. In D5-1 *It depends largely on his decision* and in D6-1 *Tim cares mainly about the cost*, the initial end position of the adverbial creates a different grammatical focus. Stimuli D3-1 *I drive with my brother to the beach* and D4-1 *He paid immediately for the book* are grammatical in English. In D4-1, the PP, *for the book*, is interpreted rather as an adjunct than as a prepositional object.<sup>97</sup> Stimulus D3-1 involves a motion verb, *drive*, which supports the initial end

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<sup>97</sup> An example of different ways to interpret a PP: in *He paid for the book immediately*, the PP *for the book* is interpreted as a prepositional object, with the adverb *immediately* following the entire verb-complement construction. In *He paid immediately for the book*, the verb *paid* functions as an intransitive verb, with the adverb *immediately* modifying the manner of payment. In this arrangement, the PP *for the book* is interpreted as an adverbial adjunct rather

position of the adverbial (see Section 4.4.5.2). Though non-canonically used, this position is grammatical. The high mean scores by both groups indicated that our participants were able to identify the grammaticality of these individual cases.

**Figure 48:** Comparison of Two Groups’ Ratings for Stimuli in S-V-Adv-PP Word Order



than a prepositional object, and the adverb *immediately* occupies the initial end position. See Section 4.4.5.2 for discussion.



On the other hand, the bilinguals rejected the grammaticality of other stimuli in the set, such as D2-1 *\*Nick goes at nine o'clock to bed* and D7-1 *He thinks often about his mother* ( $M2_{D2-1} = 2.77 < 3$ ,  $M2_{D7-1} = 2.77 < 3$ ). In contrast, the trilingual participants found these sentences more natural ( $M1_{D2-1} = 4.1 > 4$ ,  $M1_{D7-1} = 5.13 > 4$ ). This suggested that bilinguals made acceptability judgments according to the conventions of English grammar: temporal phrases commonly come after locative phrases, and adverbs do not intervene between the verb and the object. The bilinguals were able to differentiate the grammaticality of individual cases. The trilinguals, again, relied more on a certain syntactic structure and consistently assigned high scores to stimuli following the S-V-Adv-PP order.

**Group Differences:** The trilingual participants consistently exhibited greater acceptance of stimuli with the S-V-Adv-PP order than the bilinguals. Statistically significant differences between the groups were observed in the ratings for 6 out of 8 sentences. Group differences were extremely remarkable, as evidenced by the ratings for D1-1 *\*Nick and I go every day at 7:00 to school* ( $M1_{D1-1} = 3.83$ ,  $M2_{D1-1} = 2.4$ ;  $p = 0.001$ ) and D7-1 *He thinks often about his mother* ( $M1_{D7-1} = 5.13$ ,  $M2_{D7-1} = 2.77$ ;  $p = 8.5851E-7 < 0.000001$ ). These two stimuli contain frequency adverbials. Moreover, group differences were more pronounced when the stimuli featured ungrammatical (D1-1, D1-2) or marked, non-canonical (D7-1) adverbial placement.

### **Analysis:**

In line with our previous findings, in this sub-scenario, the trilinguals underwent the influence of German. The influence comes from the mismatch between English and German in linearizing adverbials and PP complements in the basic word order. In German, a PP complement usually stays at the final slot of the middlefield, followed by other types of constituents (Engel, 1973, p. 180). In English, such an alignment is either marked or ungrammatical. Such a disparity plausibly explains the higher scores consistently assigned by the trilinguals to the S-V-Adv-PP stimuli. The bilingual

participants, without such a structural representation in their minds, reasonably found this word order awkward.

In stimuli D1-1 *\*Nick and I go every day at 7:00 to school* and D2-1 *\*Nick goes at nine o'clock to bed*, the temporal adverbial precedes the locative adverbial complement. This mirrors the typical “time before place” sequence in German, which is the reverse in English grammar, as shown in (188). This contrast explains why the trilinguals favored this arrangement while bilinguals considered it ungrammatical.

(188) Eng. Nick goes to bed at nine o'clock. (*place < time*)

Ger. Nick geht um neun Uhr ins Bett. (*time > place*)

Nick goes at nine o'clock to bed

Stimuli D4-1 *He paid immediately for the book*, D6-1 *Tim cares mainly about the cost*, D7-1 *He thinks often about his mother*, and D8-1 *The police are searching right now for the missing child* align with the German basic word order, in which a prepositional object is placed at the final position of the middlefield, preceded by the adverbial adjunct. This convention contrasts the canonical word order of English, where the prepositional object immediately follows the lexical verb and the adverbial either precedes the verb or moves to the clause-final after the prepositional object; compare the German and English basic order in a sentence with a prepositional object, as in (189). This contrast plausibly has resulted in trilinguals' extremely heightened acceptance and bilinguals' rejection of these stimuli.

(189) a. Eng. He *often* thinks about his mother. (Adv-V-O)

Ger. Er denkt *oft* an seine Mutter. (V-Adv-O)

he thinks often about his mother

b. Eng. The police are searching for the missing child (*V-O-Adv*)  
*right now*.

Ger. Die Polizei sucht *jetzt gerade* nach dem (V-Adv-O)  
the police searches right now after the  
vermissten Kind.  
missing child

The rating pattern for D8-1 *The police are searching right now for the missing child* is particularly notable. The sentence does not have a direct translation into German because the language does not use the *be* + *gerund* form as in English. However, the absence of a direct structural equivalent did not seem to have affected the trilinguals' acceptance of this sentence ( $M1_{D8-1} = 4.37$ ,  $M2_{D8-1} = 3.43$ ;  $p = 0.022$ ). This further provides evidence that certain syntactic properties, such as adverbial placement, are more easily transferred than others, such as constructions expressing aspectual information, as in this case.

The experiment outcome indicated stark transferability of the S-V-Adv-PP word order. The transfer effect is negative, as the trilinguals generalized the grammaticality of any S-V-Adv-PP structures and applied it to situations to which this structure does not commonly apply.

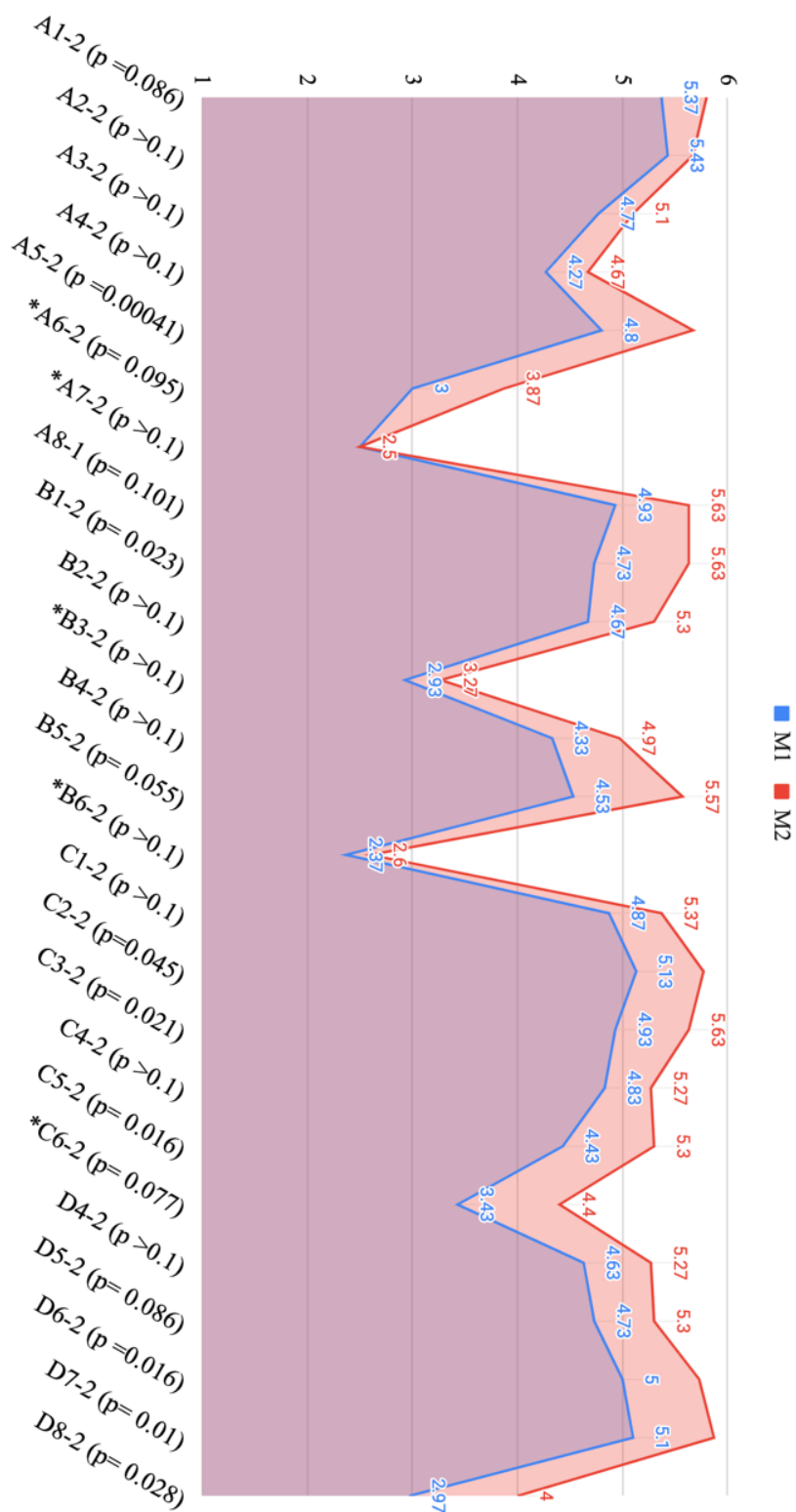
#### 6.3.4 On V2-V3 Contrast in Adverbial Placement in SV Clauses

Thus far, it has been observed that trilingual participants tended to overrate constructions (S-V-Adv-X), an alignment conforming to German syntax, even though they were ungrammatical or non-canonical in English. The findings meet our first expectation. Our second anticipation is that German's prohibition of the V3 position leads to lowered acceptability of any V3 constructions in English, as formulated in our supplementary sub-hypothesis:

- ✧ *Compared with the bilinguals, the trilingual participants will assign significantly lower acceptance scores to stimuli featuring the S-Adv-V order, being grammatical or not.*

Two groups' ratings for stimuli featuring the S-Adv-V word order are illustrated in Figure 49 (see Appendix 10 for ratings for stimuli with the S-Adv-V word order).

**Figure 49:** Two Groups' Ratings for SV Stimuli Featuring S-Adv-V Word Order



**Grammaticality Judgment:** The two groups exhibited unanimous grammaticality judgments, as indicated by the positive correlation between mean scores as shown in Figure 49. The two trajectories show the same fluctuation: both groups assigned high acceptance scores to the grammatical stimuli and low scores to the ungrammatical ones.

Out of 25 stimuli, 5 feature the ungrammatical placement of the adverbial. Among them, stimuli A6-2 *\*He every morning drinks a glass of milk*, A7-2 *\*I with my family spend the summer holiday*, B6-2 *\*The boy at seven o'clock gets up*, and C6-2 *\*My mom every morning throws away the garbage* involve pre-verbal position of a longer comitative or temporal PP, which is not permitted in English basic word order. The adverb *fast*, as in stimulus B3-2 *\*Children fast grow up*, should not precede the verb. The other 20 sentences are grammatical, most of which involve the canonical pre-verbal position of manner, probability, frequency, and degree adverbs. The trilingual group assigned a mean score of 2.85 to all the ungrammatical stimuli and 4.72 to the grammatical ones; the trilinguals assigned an average of 3.33 points to the ungrammatical stimuli and 5.4 to the grammatical ones.

This outcome suggested that both groups of participants successfully distinguished the ungrammatical expression, meaning they had successfully acquired the English grammar rules governing adjunct placement in an SV clause. Interestingly, they made accurate judgments specific to individual contexts. For example, the manner adverb *quickly* canonically precedes the verb, but the pre-verbal position for the synonymous adverb *fast* is less acceptable. Although these two adverbs convey the same semantic information, our participants distinguished the nuances in their lexical features. Both groups assigned high scores to stimulus B1-2 *He quickly fell asleep* ( $M1_{B1-2} = 4.73$ ,  $M2_{B1-2} = 5.63$ ;  $p = 0.023$ ) and B2-2 *The child quickly ran away* ( $M1_{B2-2} = 4.67$ ,  $M2_{B2-2} = 5.3$ ;  $p = 0.103 > 0.1$ ), but lower acceptance scores to B3-2 *\*Children fast grow up* ( $M1_{B3-2} = 2.93$ ,  $M2_{B3-2} = 3.27$ ;  $p > 0.1$ ).

Another piece of evidence is the ratings for stimulus D8-2, *The police right now are searching for the missing child* ( $M1_{D8-2} = 2.97$ ,  $M2_{D8-2} = 4$ ;  $p = 0.028$ ). Both groups noticed that the sentence was arranged in a non-canonical word order, as evidenced by

the drop in acceptance scores. In this case, the participants' rating patterns differed from the scores in rating other grammatical stimuli organized in canonical order.

**Group Differences:** Noticeably, in rating these S-Adv-V stimuli, the mean scores assigned to each sentence by the trilinguals were lower than those by the bilinguals (except for rating A7-2 *\*I with my family spend the summer holiday*, to which the two groups assigned comparable mean scores). Statistically significant group differences were observed in the ratings of 8 stimuli (N = 8 out of 25, 32%), and marginally significant differences in 7 instances (N = 7 out of 25, 28%).<sup>98</sup>

Our supplementary sub-hypothesis finds support in the dataset. Group differences were observed in the ratings for more than half of the stimuli. Compared with the bilingual controls, the trilinguals showed a lowered acceptance of these V3 stimuli.

### ***Analysis:***

First, the experiment outcome suggests that both groups of participants have a solid grasp of the rules governing adverbial placement in English. Specifically, they rejected the placement of heavy PP adverbial adjuncts between the subject and the verb, showing a good understanding of the principle of end-weight. They could differentiate the positioning requirements inherent to the lexical and syntactic features of individual adverbials. In other words, the participants assessed stimuli based on their acquired English grammar rules. Noticeably, their L2 English remains unaffected by the

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<sup>98</sup> It should be noted that group difference has turned more pronounced when rating stimuli featuring the S-Adv-Ptcl-DO order. It could be either the continuous order of the particle verb (S-Adv-V-Ptcl-DO) or the V3 position (S-Adv-V-Ptcl-DO) that has influenced the judgment of trilinguals, resulting in slightly lower acceptance of the stimuli. In rating the stimuli arranged in the S-Adv-V-Ptcl-DO word order, trilinguals' lower acceptability may be attributed to two variables: a) the continuous word order of the transitive VPC and b) the Adv2-V3 position. Our findings in Section 6.2 suggest that German did not significantly influence the trilinguals' acceptability judgments of the continuous word order in English VPC; hence, it is reasonable to ascribe the outcome to the influence of the Adv2-V3 position. To this end, a limitation of our experiment is that we did not examine the participants' judgment toward the S-Adv-V-DO-Ptcl word order, which could have limited the German influence to only one variable. We recommend further investigation in this area.

potential influence of their native language, Chinese, which allows longer PPs to appear in the pre-verbal position. Nonetheless, as we did not explicitly compare the Chinese-English bilinguals' judgments with those of English monolinguals, we could not completely exclude the potential negative transfer effect from L1 Chinese. However, considering the accurate grammatical judgment of the participants, especially the bilinguals, we may conclude that the Chinese grammar did not exert any non-facilitative influence in this scenario.

The data provides evidence for backward influence from L3 German in influencing the already acquired grammar rules of adverbial placement. The V2 constraint in German might render the pre-verbal adverbial placement less natural to the trilinguals. However, since the trilinguals did not rate these stimuli dramatically lower than the bilinguals, and they still successfully discerned the grammaticality, we can only tentatively conclude that syntax rules for German middlefield have moderately influenced the trilinguals' perception of adverbial placement in English. This influence, while present, does not exert a remarkable enough impact to completely reshape the trilingual participants' integral English grammar knowledge.

Finally, we compare how participants perceived two types of V3 positioning: Adv-S-V (*preposing*, Section 6.1) and S-Adv-X (this section). In rating Adv-S-V constructions, the group differences were not as pronounced as when rating S-Adv-V stimuli, and the rating patterns were not as consistent. This observation can be explained by the fact that the Adv-S-V structure represents a non-canonical word order, which is less prevalent than the canonical S-Adv-V order. Consequently, backward transfer turns more pronounced in canonical constructions. It should be noted that although syntactic restrictions in German have influenced speakers' perception of the word orders in English that are not permitted in German, the influence is rather weak and is not always consistent.

### 6.3.5 Interim Summary: Adverbial Placement in SV Clauses

When evaluating stimuli with different adverbial positions within main clauses, we have considered four sub-scenarios: adverbial placement in stimuli with a direct object, an intransitive VPC, a transitive VPC, and a prepositional complement. To wrap up the findings, let's revisit our main sub-hypothesis, which states:

- ✧ *Compared with the bilinguals, the trilingual participants will assign higher acceptance scores to stimuli with the word orders of S-V-Adv-DO, S-V-Adv-Ptcl, S-V-Adv, S-V-(Adv)-DO-Adv-Ptcl, and S-V-Adv-PP.*

When rating 33 English stimuli featuring German word order arrangement, the trilingual participants generally assigned higher acceptance scores, with statistically significant group differences reflected in 26 cases (78.8%) and marginally significant differences in 4 (9.1%). The sub-hypothesis has therefore been substantiated.

On the other hand, the trilingual group also showed a certain degree of lower acceptability for those variants that violated the German syntactic rules, which suggests how German has indirectly influenced its speakers' implicit English knowledge.

The experiment outcome has yielded several key findings regarding the characteristics of backward transfer from German: (1) the transfer effect is non-facilitative and indirect; (2) German grammar conventions to place adverbials have greater transferability; and (3) it interacts with the syntactic features of L1 Chinese. These findings are consistent with those obtained in the previous experiment parts.

- ✧ *Non-facilitative, indirect transfer effect*

First, the influence of L3 German is non-facilitative. The trilinguals were less adept than the bilingual controls at clearly differentiating grammaticality. They demonstrated more tolerance for ungrammatical stimuli: all but one received an acceptance score above 3 points, and 12 sentences even had a mean score above 4 points. How German syntax places the adverbial has significantly increased the trilinguals' acceptance of the S-V-Adv-X word order. As this word order is predominantly used in German, the



trilinguals found it natural in English contexts, even if it does not conform to English grammar. On the other hand, they showed slightly lower acceptability for V3 stimuli that did not conform to adverbial placement in German, even if these sentences were grammatical in English.

Second, although the influence of German is pronounced, it is indirect. When judging the S-Adv-V-(Adv)-X variants, the attitudinal differences between the two groups, though present, were not as consistent as those reflected in judging the S-V-Adv-X stimuli. The trilinguals could still recognize the grammatical word order arrangement; namely, accepting stimuli organized based on German syntax did not result in the rejection of sentences arranged according to English grammar. Therefore, the backward influence from German occurs at the level of language users' passive grammar knowledge. Further investigation is needed to determine if German syntax also affects the word order in language output.

The outcome of this experiment part is similar to that of inversion. The experimental design of these two experiment parts followed the same vein: (1) to provide participants with (mostly) ungrammatical stimuli that aligned with German syntax (X-V-X/Aux, S-V-Adv); (2) to further examine whether the acquired English grammar rules, which conflict with those of German (X-S-V, S-Adv-V), were influenced. The impact of German syntax manifested itself in a more pronounced way in participants' performance in accepting ungrammatical or non-canonical stimuli, whose word order aligned with German syntactic conventions. However, it decreased when participants were to accept the grammatical and canonical English stimuli whose word order violated German grammar. This tendency in acceptability judgment was observed when participants evaluated subject-simple verb inversions and their respective V3 counterparts featuring topicalization.

Earlier in Section 6.1.5, we proposed an explanation for such an outcome, which equally applies to the scenario of adverbial placement. Given that the S-V-Adv-X word order is either ungrammatical or marked in English and is therefore likely less frequently encountered during L2 input, it appears as a rather new linguistic representation for the bilinguals. Conversely, since the initial end position of adverbials

is obligatory in German grammar, the syntactic representation of S-V-Adv-X is familiar to the trilinguals, whose dominant foreign language is German. As the bilinguals lacked a source of transfer, namely, neither English nor Chinese has a grammatical representation of the S-V-Adv-X word order, they strictly rejected the stimuli featuring this order.

On the contrary, the structural representation of S-Adv-V-X has already been ingrained in both groups' linguistic repertoires due to their L1 Chinese and L2 English instruction. Consequently, the word order, along with the grammar knowledge regarding adverbial types permissible between the subject and the verb, has been successfully acquired and is therefore less susceptible to influence from an additional language. This explains why German grammar "lost" its transferability when participants judged stimuli with grammatical word orders. This further supports our earlier speculation that previously acquired grammar knowledge is less susceptible to backward transfer. Taken together, the backward transfer effect of L3 German on L2 English is indirect. To delve deeper into the degree of backward transfer, further research is needed to examine the English output of the trilinguals, i.e., whether they utter English in German word order.

#### ✧ *Greater transferability of adverbial placement*

Trilingual participants generally exhibited heightened acceptance of S-V-Adv-X word order across all three sub-scenarios. In many instances, the group differences were extremely significant. Two accidental findings align with our previous speculation that different syntactic properties vary in their transferability. The V2 constraint and the word order of the middlefield have proven to be a more competitive transfer source than other features, such as the obligatory VF position for non-finite verbs and verb compounds. Moreover, the transfer effect does not have to be all-sweeping; it can also occur at a sentence's segment level. This is evidenced by trilinguals' great acceptance of filler sentences that involved the occurrence of the V-Adv-X structure but whose word order arrangement did not entirely conform to German grammar.

#### ✧ *Potential interplay between L1 and L3*

The interplay between L1 Chinese and L3 German has two facets. First, Chinese supports only the pre-verbal position of adverbials, which conforms to English word order in many cases but contrasts sharply with German. Group differences were observed in rating several stimuli featuring the S-Adv-V-X position, where the trilinguals showed slightly lower acceptance, though they were able to distinguish the grammaticality. This provides evidence that German syntax has, to some extent, neutralized the potential impact of Chinese. Second, Chinese and English have a similarity in that a non-finite verb may immediately follow the modal auxiliary, whereas in German, it moves to the clause-final. We argue that this overlap prevented the trilinguals from being influenced by German grammar.

Notice that regarding the interplay between L1 and L3, we cannot provide direct evidence of how Chinese has influenced participants' perception of English word order, because we did not arrange a bilingual control group of other languages, e.g., a group of L1 German-L2 English bilinguals, for comparison. This aspect warrants further investigation.

#### **6.4 Patterns in Forming Ditransitive Constructions**

In examining the acceptability judgment of various grammatical word orders in forming a ditransitive construction, we posited the following two sub-hypotheses:

- ✧ *When the direct object is nominal, the trilingual participants will assign lower acceptance scores to stimuli following the DO-to-IO pattern compared with the bilinguals.*
- ✧ *When both objects are pronominal, the trilinguals will demonstrate a higher degree of acceptability for the DO-IO pattern compared with the bilinguals.*

### 6.4.1 Comparing Participants' Acceptability of DO<sub>NOM</sub>-to-IO Pattern

Table 55 exhibits the mean scores assigned to the DO<sub>NOM</sub>-to-IO pattern and the statistical significance of ratings between the two groups.

**Table 55:** Comparison of Two Groups' Acceptability Judgment of DO-prep-IO Pattern (Nominal DO)

| Stimuli                                                                | M1   | M2   | <i>p</i> -value ( <i>U</i> test) |
|------------------------------------------------------------------------|------|------|----------------------------------|
| <i>She always tells stories to her son.</i>                            | 5.03 | 5.8  | <b><i>p</i> = 0.019</b>          |
| <i>She always tells stories to him.</i>                                | 5.03 | 5.67 | <b><i>p</i> = 0.054</b>          |
| <i>Uncle Sam gave a present to Margaret.</i>                           | 5.4  | 5.77 | <b><i>p</i> = 0.009</b>          |
| <i>Uncle Sam gave a present to her.</i>                                | 5.17 | 5.63 | <b><i>p</i> = 0.029</b>          |
| <i>I bring a necklace to my cousin.</i>                                | 5.63 | 5.83 | <i>p</i> = 0.292                 |
| <i>I bring a necklace to him.</i>                                      | 5.57 | 5.87 | <i>p</i> = 0.161                 |
| <i>The secretary sends weekly reports to the manager every Friday.</i> | 5.17 | 5.4  | <i>p</i> = 0.356                 |
| <i>The secretary sends weekly reports to him every Friday.</i>         | 5.1  | 5.5  | <i>p</i> = 0.158                 |
| <i>Pass the water to the farmers!</i>                                  | 5.27 | 5.63 | <i>p</i> = 0.199                 |
| <i>Pass the water to them!</i>                                         | 5.27 | 5.47 | <i>p</i> = 0.669                 |
| <i>Give the money to me!</i>                                           | 5.3  | 5.43 | <i>p</i> = 0.731                 |

Our first sub-hypothesis finds partial support in the experiment data. As shown in Table 55, the overall mean scores assigned by the trilingual participants were slightly lower than those given by the bilinguals. Among the 11 stimuli, statistically significant intergroup differences were observed for four and marginally significant differences for one. Notably, these stimuli involved the use of the verbs *tell* and *give*, for which their German counterparts do not allow for the prepositional paraphrasing of the dative indirect object. Conversely, no group differences emerged in the ratings for the other stimuli, which mainly featured verbs of communication and dislocation such as *bring*, *send*, and *pass*, all of which permit prepositional alternatives in their German equivalences; compare the grammaticality of the English stimuli and their German translation, as exemplified in (191) and (192).

(191) *give...to/\*geben...an/zu*

Eng. Uncle Sam gave a present to Margaret. (DO-prep-IO)

Ger. \*Onkel Sam gab ein Geschenk an/zu Margaret. (\*DO-prep-IO)

(192) *bring...to/bringen...zu*

Eng. I bring a necklace to my cousin. (DO-prep-IO)

Ger. Ich bringe eine Halskette zu meiner Cousine. (DO-prep-IO)

This contrast provides evidence that CLI arises from language similarities and mismatches, even at the lexical level. Expressions such as (191) lack grammatical representations in German. The trilinguals, whose dominant foreign language is German, might therefore find them unnatural, even though the DO-prep-IO pattern is also found in German grammar.

The mismatches between L2 English and L3 German in lexical features might be a source of transfer. However, we have only arranged two verbs showcasing such mismatches. Due to data limitations in the present study, we cannot draw a definitive conclusion on whether the lexical features of the verb and participants' judgment consistently correlate. Further research is warranted, and our first hypothesis should be adjusted as follows:

- ✧ *When the direct object is nominal, the trilingual participants will assign lower acceptance scores to stimuli following the V-DO-prep-IO pattern compared with bilinguals when the German counterpart of the verb does not support the prepositional pattern.*

Regarding the mean scores, participants from both groups acknowledged the grammatical validity of these stimuli, assigning mean scores exceeding 5 points. While the trilinguals showed slightly lower acceptance toward the prepositional alternative in the stimulus set than the bilinguals did, they nevertheless acknowledged their

grammatical correctness. This suggests that the trilingual group's overall proficiency in recognizing the grammaticality of ditransitive constructions has not been altered.

The high scores assigned to these stimuli by our participants indicated their successful acquisition of word order alternation for English ditransitive constructions. This outcome can be attributed to the potential facilitative influence of L1 Chinese. Chinese and English resemble each other in always permitting the prepositional alternative. In Chinese, the indirect object is marked by the coverb 给 *gěi* (see Section 4.5.1.), which is very similar to the preposition *to* in English. Learners may have taken advantage of this similarity between English and Chinese to facilitate their learning. Moreover, we further speculate that the transfer from L1 to L2 can be partial. Chinese frequently uses the *bǎ*-DO-V-*gěi*-IO structure, whose word order does not fully overlap with English, as the direct object precedes the verb. However, it is still plausible that the partial overlap between the *to*-IO pattern in English and the *gěi*-IO in Chinese has led to the high acceptance of the prepositional alternative.

We do not exclude other factors, such as pedagogical instruction and language practices. The coverb in Chinese can be omitted under certain circumstances, for example, when the verb itself is already 给 *gěi* ('to give'). Also, the *bǎ*-construction is a very frequently used one. For instance, when translating the imperative stimuli: *Pass the water to the farmers*, *Pass the water to them*, *Give the money to me*, into Chinese, the *bǎ*-construction would be the preferred one. Despite these disparities between English and Chinese, the participants still accurately judged the grammaticality.

#### 6.4.2 Comparing Participants' Acceptability of DO<sub>PRON</sub>-IO<sub>PRON</sub> Pattern

Tables 56, 57, and 58 present two groups' judgments of the DO<sub>PRON</sub>-IO<sub>PRON</sub>, IO<sub>PRON</sub>-DO<sub>PRON</sub>, and IO<sub>PRON</sub>-to-DO<sub>PRON</sub> variants of the stimuli. We expected the trilinguals to assign higher ratings for the DO-IO pattern in comparison with the bilinguals.

**Table 56:** Comparison of Two Groups' Acceptability Judgment of Stimuli Variants in DO-IO Pattern (Pronominal DO, Pronominal IO)

| Stimuli                                         | M1   | M2   | p-value (U test) |
|-------------------------------------------------|------|------|------------------|
| <i>She always tells them him.</i>               | 1.8  | 1.93 | $p = 0.621$      |
| <i>Uncle Sam gave it her.</i>                   | 2.13 | 2.13 | $p = 0.818$      |
| <i>I bring it him.</i>                          | 2.17 | 2.23 | $p = 0.818$      |
| <i>The secretary sends it him every Friday.</i> | 2.23 | 2    | $p = 0.755$      |
| <i>Pass it them!</i>                            | 1.7  | 1.87 | $p = 0.571$      |
| <i>Give it me!</i>                              | 1.6  | 2.13 | $p = 0.324$      |

As shown in Table 56, both groups rejected the grammaticality of the stimuli in the DO-IO pattern. The extremely low mean scores assigned by both groups ( $1.6 \leq M1 \leq 2.23$ ,  $1.87 \leq M2 \leq 2.23$ ) indicated that this word order was considered unnatural. Neither marginal nor significant differences between the two groups' ratings were observed. Generally, the trilingual participants even gave slightly lower ratings to these sentences compared with bilinguals, which is not within our expectations. Our second sub-hypothesis is thus rejected, with no observed influence from L3 German indicated in this context.

**Table 57:** Comparison of Two Groups' Acceptability Judgment of Stimuli Variants in IO-DO Pattern (Pronominal DO, Pronominal IO)

| Stimuli                                         | M1   | M2   | p-value (U test) |
|-------------------------------------------------|------|------|------------------|
| <i>She always tells him <b>them</b>.</i>        | 2.6  | 2.67 | $p = 0.982$      |
| <i>Uncle Sam gave her it.</i>                   | 2.8  | 2.97 | $p = 0.982$      |
| <i>I bring him it.</i>                          | 3.3  | 3.03 | $p = 0.546$      |
| <i>The secretary sends him it every Friday.</i> | 3.43 | 3.23 | $p = 0.602$      |
| <i>Pass <b>them</b> it!</i>                     | 2.67 | 3.17 | $p = 0.336$      |
| <i>Give me it!</i>                              | 3.8  | 3.5  | $p = 0.553$      |

**Table 58:** Comparison of Two Groups' Acceptability Judgment of Stimuli Variants DO-to-IO Pattern (Pronominal DO, Pronominal IO)

| Stimuli                                            | M1   | M2   | p-value (U test) |
|----------------------------------------------------|------|------|------------------|
| <i>She always tells them to him.</i>               | 3.97 | 3.9  | $p = 0.927$      |
| <i>Uncle Sam gave it to her.</i>                   | 5.5  | 5.7  | $p = 0.285$      |
| <i>I bring it to him.</i>                          | 5.5  | 5.83 | $p = 0.237$      |
| <i>The secretary sends it to him every Friday.</i> | 5.37 | 5.6  | $p = 0.168$      |
| <i>Pass it to them!</i>                            | 5.33 | 5.1  | $p = 0.419$      |
| <i>Give it to me!</i>                              | 5.57 | 5.77 | $p = 0.491$      |

The ratings in our study align with those exhibited by native speakers in Lorenz et al.'s study (2019). The DO-to-IO pattern received the highest acceptance scores ( $3.97 \leq M1 \leq 5.57$ ,  $3.9 \leq M2 \leq 5.83$ ; see Table 58), followed by the IO-DO pattern ( $2.6 \leq M1 \leq 3.43$ ,  $2.67 \leq M2 \leq 3.23$ ; see Table 57), and the DO-IO pattern was rendered the lowest scores ( $1.6 \leq M1 \leq 2.23$ ,  $1.87 \leq M2 \leq 2.23$ ; see Table 56).

It is worth mentioning that all DO-to-IO stimuli were considered fully acceptable except for one instance: *He always tells them to him* ( $M1 = 3.97$ ,  $M2 = 3.9$ ), likely due to the awkward pronominalization of the direct object *stories* (from the nominal variant *he always tells stories to him*), as *them* can also refer to an indirect object. Nonetheless, the prepositional variant still garnered higher scores than the other two variants. The native-like acceptability judgment underscored our participants' successful acquisition of L2 English of ditransitive constructions. Taken together, our second sub-hypothesis is rejected.

#### 6.4.3 Interim Summary: Ditransitive Construction

The experiment part of the study aims to investigate whether the word order conventions of L3 German influence language users' perception of grammatical word orders in constructing ditransitive constructions in English. We provided participants with word order alternatives and expected the trilinguals to show decreased acceptance



of patterns with lower productivity in German and preference for typical patterns used for ditransitive constructions in German, which are also found in English grammar.

The overall results indicate that both groups could accurately distinguish the grammaticality of word order variation. This indicated that our participants had successfully acquired the grammar rules for constructing ditransitive constructions in English. In our analysis, we included the facilitative influence of L1 Chinese and the importance of other factors such as instructions during the acquisition process.

In this scenario, the transfer effect from L3 German has manifested weakly. Influence from German has only been observed in a few concrete situations, such as when the German counterpart of a specific verb in English does not use a certain word order pattern. In these cases, the trilinguals exhibited marginally lowered acceptance of the corresponding stimuli.

The characteristics and mechanisms of transfer are summarized as follows: (1) mismatches in linguistic properties may lead to backward transfer, and other factors influence its occurrence; (2) backward transfer has an indirect and partial nature and is less likely to occur after the successful acquisition of L2 grammar rules. These align with our previous findings.

#### ✧ *Structural dissimilarities as sources of backward transfer*

The analysis of the experiment results reveals that the structural overlap between two foreign languages does not necessarily reinforce the syntactic representation of the same structure in a multilingual mind. Instead, the absence of a grammatical representation in a dominant foreign language might reversely affect how its speakers perceive this structure in another foreign language. This is evidenced by trilinguals' slightly lowered acceptance of the prepositional pattern featuring the verbs *give* and *tell*. Although German supports the prepositional alternative, the two verbs' counterparts in German do not support this representation. Therefore, we conclude that the absence of grammatical representation of specific items has led to CLI.

In this scenario, structural similarities between languages did not catalyze CLI. The structural overlap between L2 English and L3 German did not reinforce the shared

structural representation in a multilingual mind. Also, this time, the structural similarity between the stimuli and German word order did not influence the trilinguals' judgments. We analyze the ratings for filler stimuli arranged in non-prepositional patterns featuring nominal objects, as shown in Table 59.

**Table 59:** *Two Groups' Ratings for Fillers featuring IO<sub>NOM</sub>-DO<sub>NOM</sub> and DO<sub>NOM</sub>-IO<sub>NOM</sub> Patterns*

| No.                                       | Stimuli                                                       | M1   | M2   | p-value     |
|-------------------------------------------|---------------------------------------------------------------|------|------|-------------|
| <b>IO<sub>NOM</sub>-DO<sub>NOM</sub></b>  |                                                               |      |      |             |
| (89)                                      | She always tells her son stories.                             | 5.37 | 5.5  | $p = 1$     |
| (90)                                      | Uncle Sam gave Margaret a present.                            | 5.73 | 5.63 | $p = 0.826$ |
| (91)                                      | I bring my cousin a necklace.                                 | 5.5  | 5.6  | $p = 0.381$ |
| (92)                                      | The secretary sends the manager weekly reports every Friday.  | 5.3  | 5.3  | $p = 0.68$  |
| (93)                                      | Pass the farmers the water!                                   | 4.9  | 4.73 | $p = 0.743$ |
| <b>*DO<sub>NOM</sub>-IO<sub>NOM</sub></b> |                                                               |      |      |             |
| (94)                                      | *She always tells stories her son.                            | 2.53 | 2.57 | $p = 0.878$ |
| (95)                                      | *Uncle Sam gave a present Margaret.                           | 1.83 | 2.03 | $p = 0.341$ |
| (96)                                      | *I bring a necklace my cousin.                                | 2.37 | 2.4  | $p = 0.731$ |
| (97)                                      | *The secretary sends weekly reports the manager every Friday. | 2.93 | 3.03 | $p = 0.784$ |
| (98)                                      | *Pass the water the farmers!                                  | 2.23 | 2    | $p = 0.868$ |

Both groups accepted the grammatical IO<sub>NOM</sub>-DO<sub>NOM</sub> stimuli while rejecting the ungrammatical DO<sub>NOM</sub>-IO<sub>NOM</sub> ones, indicating a solid understanding of relevant grammar. The former structure is shared in English and German, while the latter is ungrammatical in English and grammatical in German but not typically used (see Sections 4.5.1.1 and 4.5.1.2). Chinese employs both orders; however, the indirect object is normally marked by a coverb (see Section 4.5.1.3).

First, the two groups did not differ in rating the IO<sub>NOM</sub>-DO<sub>NOM</sub> stimuli. German supports both orders, while English permits only the IO<sub>NOM</sub>-DO<sub>NOM</sub> pattern. The two languages thus have a surface structural overlap. However, this overlap did not increase

trilinguals' acceptance of the IO<sub>NOM</sub>-DO<sub>NOM</sub> stimuli. The result further indicates that the surface structural overlap hypothesis does not apply in the multilingual context.

Second, different from the findings obtained in ratings of ungrammatical subject-simple verb inversion and ungrammatical S-V-Adv-X stimuli, the trilinguals did not exhibit higher acceptance of the ungrammatical DO<sub>NOM</sub>-IO<sub>NOM</sub> order, although this pattern could be the source of transfer, as it is used only in German. This outcome can be explained from two aspects. First, unlike the commonly used Adv-V-S-Y and S-V-Adv-X word orders, the DO<sub>NOM</sub>-IO<sub>NOM</sub> construction, though grammatical, occurs infrequently in German (Audehm, 2006; see Section 4.5.1.1). The trilinguals did not highly accept this word order, possibly because they did not receive sufficient input of this construction to reinforce the syntactic representation in their minds. Second, L1 Chinese might have played a role. As the indirect object is mostly marked by a preposition in Chinese, the DO<sub>NOM</sub>-IO<sub>NOM</sub> arrangement might sound less natural to Chinese natives.

Taken together, mismatches between languages, rather than overlaps in two grammars, serve as sources for backward transfer. Besides, other factors, including the frequency of distribution, token frequency, and the structure used in L1, can also influence the manifestation of backward transfer.

#### ✧ *Indirect and partial nature of backward transfer*

Backward transfer has once again manifested its indirect nature. Although the trilinguals exhibited lowered acceptance of certain DO-to-IO stimuli, their overall acceptability remained unaffected. The trilinguals still had a strong performance in judging ditransitive constructions. They could discern which pattern is commonly used and which is not, assigning acceptance scores accordingly. This indicates that transfer effects from German, while present, are not stark enough to thoroughly change speakers' implicit English grammar knowledge.

The mismatch between German and English might be a necessary condition for backward transfer to occur, but it is not a sufficient condition. The transfer effect is not necessarily wholesale, as some features more easily exert an influence, while others do

not. In our case, transfer from German did not exhibit in trilinguals' evaluation of the DO<sub>PRON</sub>-IO<sub>PRON</sub> pattern, although it is frequently used in German and less commonly/ungrammatical in English/Chinese.

We maintain that once a grammar representation that is different from that of L1 is acquired, it becomes less susceptible to the influence of a linguistic feature of a later-acquired foreign language. This argument has, thus far, been supported by trilinguals' extraordinary performance in judging the discontinuous order for VPCs and their native speaker-like judgment for word order alternatives in ditransitive constructions featuring pronominal objects.

## 6.5 Revisiting General Hypotheses

Finally, let's revisit the general hypotheses that guided our experimental design, from which we derived many specific sub-hypotheses for each researched scenario. The first hypothesis is as follows:

- ✧ *If L3 German exerts an influence on its users' implicit knowledge of L2 English syntax, compared with the bilingual group, the trilingual group will exhibit significantly greater acceptability to English stimuli arranged in German word order, even when this word order does not adhere to the syntactic configuration of English and Chinese.*

Is this hypothesis substantiated by the experiment results? The answer is not simply a "yes" or a "no," as we have obtained different experiment outcomes for each scenario. Compared with the bilingual participants, the trilinguals indeed showed heightened acceptance toward many structures that adhere to the German word order, including those ungrammatical subject-simple verb inversions and stimuli featuring the initial end position of adverbials in an SV clause. These configurations follow the basic word order in German but are either ungrammatical or non-canonical in English and Chinese. However, the hypothesis loses its validity in the following cases: (1) subject-auxiliary

inversion. For this, we speculate that structural complexity plays a role, and the hypothesis applies in simple tense sentences but not compound tense sentences. (2) Word orders that are grammatical in English, even if they have low productivity, such as the discontinuous word order for transitive VPCs and the DO<sub>PRON</sub>-IO<sub>PRON</sub> pattern in ditransitive constructions. Furthermore, regarding word order alignments that violate German word order, such as the pre-verbal position of adverbials in an SV clause and the continuous order for transitive VPCs, the trilinguals exhibited slightly less acceptance than the bilinguals. This, on the other hand, indicates an indirect, subtle backward influence from German grammar.

The second hypothesis examines whether the reverse influence of German has a more direct impact on participants' implicit knowledge. It states:

✧ *If L3 German exerts an influence on its users' implicit knowledge of L2 English syntax, in situations where several word orders are available in English, the trilingual group will favor the stimulus variant that aligns with German syntactic configuration over the one that violates German grammar rules.*

Our data do not validate this hypothesis. Had the hypothesis been true, the trilinguals would have preferred the discontinuous VPCs over the continuous ones and preferred the DO<sub>PRON</sub>-IO<sub>PRON</sub> pattern over the prepositional pattern for ditransitive constructions. Our results, though, indicated the opposite. Therefore, a conclusion can be made that once a grammar rule of L2, distinct from that of L1, has been successfully established, it is less likely to undergo the influence of a different syntactic representation in L3 for the same grammar entity.

## 7 Discussion: Backward Transfer in Multilingual Contexts

This chapter discusses the three research questions raised in Section 3.1 regarding the manifestations, characteristics, and mechanisms of backward transfer from L3 German to L2 English among L1 Chinese speakers. Let's revisit the research questions:

- (1) **Manifestations:** For L1 Chinese speakers who have successfully acquired L2 English and L3 German, do the syntactic features of German influence the perception of word order in English? Which syntactic feature is transferred, and which is not? Does German syntax interact with that of L1 Chinese?
- (2) **Characteristics:** Is the transfer effect facilitative, neutral, or detrimental? Is backward transfer all-encompassing or partial? Does one syntactic property have a greater transferability than another?
- (3) **Mechanisms:** Why does backward transfer from L3 German to L2 English occur? What are the contributing factors? How can this phenomenon be explained?

### 7.1 Manifestations of Backward Transfer from L3 German

*For L1 Chinese speakers who have successfully acquired L2 English and L3 German, do the syntactic features of German influence the perception of word order in English?*

The answer to the first question regarding the manifestations of backward transfer is a resounding “yes.” The dataset presented in Chapter 6 has provided robust evidence of the impact of German syntax rules on trilingual participants in their perception of English input. In Section 7.1.1, we synthesize the results attained from the ATJ and summarize how participants' perception of English word order was influenced by German. In Section 7.1.2, we summarize the potential interplay between L3 German and L1 Chinese.

### 7.1.1 L3 German Influence on L2 English Word Order Perception

*Which syntactic feature is transferred, and which is not?* The second question finds an answer in our study. The results of the ATJ show that backward transfer primarily results from mismatches in syntactic structure between languages. When the linguistic properties in German conflict with those in English and Chinese, they will likely be transferred to the speakers' implicit grammar of English.<sup>99</sup> In the current study, the two major German grammar rules that have exerted an influence in parsing English sentences are (1) the V2 constraint, which limits the number of elements at the clause-initial position and contradicts the “subject before object” constraint in English and Chinese; (2) the word order alignment within the German verbal bracket in an SV declarative main clause in simple tenses, which differs from English and Chinese in linearizing complements and adjuncts.

First, we will revisit and synthesize the results and analyses detailed in Chapter 6. Table 60 outlines two major contexts where German word orders for a grammar entity differ from English and Chinese. The first context pertains to constructions exclusively used in German but ungrammatical or unproductive in English and Chinese (Context 1). Our primary hypothesis was based on this context, i.e., when German syntactic rules deviate from those for English and Chinese, the trilingual participants will show higher acceptance for stimuli organized according to German syntax than the bilingual controls. The second context involves word orders that are ungrammatical in German but grammatical and productive in English and Chinese (Context 2). Accordingly, we posited a supplementary hypothesis that the trilinguals will rate the corresponding stimuli lower, as they do not adhere to German syntax.

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<sup>99</sup> For the roles of linguistic similarities/mismatches in CLI, refer to Weinreich (1953), Gass (1984), Kupisch (2014), Westergaard et al. (2017), and Slabakova (2017), as discussed in Section 2.1.1.

**Table 60: Contexts Showcasing Structural Mismatches Between L3 German and L2 English/L1 Chinese**

| Mis-matches                                                                                                                                                                                                         | Involved Constructions |                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Context 1</b> (grammatical/productive** in German, ungrammatical/unproductive in English and Chinese)                                                                                                            | ✧                      | <b>Inversion:</b> (1) Fronting a non-directional, non-negative, and non-restrictive element (X-V-S or/and X-Aux-S-V).                                                                                                     |
|                                                                                                                                                                                                                     | Examples               | <p>Ger. &lt;Zweimal in der Woche&gt; besuche &lt;ich&gt; meine Großeltern.</p> <p>Eng. *&lt;Twice a week&gt; visit &lt;I&gt; my grandparents.</p> <p>Chn. *&lt;Měi zhōu liǎng cì&gt; tànwàng &lt;wǒ&gt; wǒ de zǔfùmǔ.</p> |
|                                                                                                                                                                                                                     | ✧                      | <b>Adverbial placement:</b> Placing an adverbial between the verb and an object complement / a particle / PP complement (S-V-Adv-DO, S-V-Adv-Ptcl, S-V-(Adv)-DO-Adv-Ptcl, S-V-Adv-PP).                                    |
|                                                                                                                                                                                                                     | Examples               | <p>Ger. Ich besuche &lt;zweimal in der Woche&gt; meine Großeltern.</p> <p>Eng. *I visit &lt;twice a week&gt; my parents.</p> <p>Chn. *Wǒ tànwàng &lt;měi zhōu liǎng cì&gt; wǒ de zǔfùmǔ.</p>                              |
|                                                                                                                                                                                                                     | ✧                      | <b>Ditransitive construction:</b> Placing a pronominal DO before the pronominal IO (DO <sub>PRON</sub> -IO <sub>PRON</sub> ).                                                                                             |
|                                                                                                                                                                                                                     | Examples               | <p>Ger. Gib &lt;es&gt; &lt;mir&gt;!</p> <p>Eng. **Give &lt;it&gt; &lt;me&gt;!</p> <p>Chn. *Gěi &lt;tā&gt; &lt;wǒ&gt;.</p>                                                                                                 |
| <b>Context 2</b> (ungrammatical/unproductive in German, grammatical in English and Chinese)                                                                                                                         | ✧                      | <b>Continuous word in transitive VPCs:</b> Placing the DO before the particle of a VPC (S-V-DO-Ptcl).                                                                                                                     |
|                                                                                                                                                                                                                     | Examples               | <p>Ger. *Ich &lt;nehme weg&gt; zwei Bücher.</p> <p>Eng. I &lt;take away&gt; two books.</p> <p>Chn. Wǒ &lt;ná zǒu&gt; liǎng běn shū.</p>                                                                                   |
|                                                                                                                                                                                                                     | ✧                      | <b>V3 position:</b> Placing certain adverbs before the verb in an SV clause (S-Adv-V) or fronting a non-subject element for marked reading (X-S-V).                                                                       |
|                                                                                                                                                                                                                     | Examples               | <p>Ger. *Wahrscheinlich er (wahrscheinlich) &lt;mag&gt; dieses Gefühl.</p> <p>Eng. Probably he (probably) &lt;likes&gt; this feeling.</p> <p>Chn. Kěnéng tā (kěnéng) &lt;xǐhuan&gt; zhè zhǒng gǎnjué.</p>                 |
|                                                                                                                                                                                                                     | ✧                      | <b>Ditransitive construction:</b> In German, certain verbs do not support the prepositional pattern.                                                                                                                      |
|                                                                                                                                                                                                                     | Examples               | <p>Ger. *Er gab zwei Bücher &lt;an Lucy&gt;.</p> <p>Eng. He gave two the books &lt;to Lucy&gt;.</p> <p>Chn. Tā sòng le liǎng běn shū &lt;gěi Lùxī&gt;.</p>                                                                |
| **Although some constructions are grammatical in one language, they can be less productive, e.g., the DO <sub>PRON</sub> -IO <sub>PRON</sub> word order in English and the discontinuous word order in Chinese VPC. |                        |                                                                                                                                                                                                                           |



✧ ***Context 1: Grammatical/productive in German, ungrammatical/unproductive in English and Chinese***

The first context involves the judgment of English sentences featuring the following word orders: (1) inversion with the fronting of a non-directional, non-restrictive, or non-negative adverbial, including PPs and AdvPs of time, frequency, accompaniment, attitude, probability, degree, and manner; (2) SV declarative simple-tense clauses where the adverbial immediately follows the main verb and precedes the directive object, the particle of a VPC, or the PP complement; and (3) the DO-IO word order when both objects are pronominal. Except for rare exceptions, these structures lead to ungrammatical expressions in English. Our main hypothesis was validated in the first two scenarios, where the trilinguals consistently showed greater acceptance for these word orders than the bilingual controls.

The first evidence emerged in the ratings for the scenario: subject-simple verb inversion. As detailed in Section 6.1.4.1, the trilinguals exhibited greater tolerance for the ungrammatical X-S-V-(Y) word order, especially when a direct object was present, such as \**<Certainly> was <it> very good*, \**<Often> thinks <he> about his mother*, and \**<Probably> likes <she> this feeling*. This is a clear result of transferring German syntactic configuration to English sentence processing. When evaluating a total of 51 subject-simple verb inversions, trilingual participants assigned higher scores to the majority (N = 37 out of 51, 72.5%), with statistically significant group differences observed in the ratings of 24 out of the 37 stimuli (64.9%).

However, the transfer effect from German grammar was not manifested in the acceptability of subject-auxiliary inversion (Section 6.1.4.2). Contrary to our expectations, the trilinguals displayed a reversed pattern when evaluating subject-simple verb inversion and subject-auxiliary inversion. Namely, they assigned higher ratings for the former and lower ratings for the latter compared with the bilingual controls. This unexpected outcome leads to a conclusion regarding the characteristics of backward transfer, i.e., different structures have different degrees of transferability.

We argue that backward syntactic transfer manifests more prominently in speakers' perception of simpler constructions, such as those involving simple tenses.

More solid evidence for backward transfer is seen in participants' attitudinal differences toward stimuli featuring adverbial adjunct placement according to German basic word order. In this scenario, German syntax exhibited a more pronounced influence. The trilinguals showed a notable and consistent tolerance for (mostly ungrammatical) stimuli in the S-V-Adv-DO, S-V-Adv-Ptcl, S-V-Adv-DO-(Adv)-Ptcl, and S-V-Adv-PP word orders, such as *\*Wendy smokes quite often cigarettes*, *\*Her grandpa passed recently away*, *\*My mom throws every morning the garbage away*, or *\*Nick goes at nine o'clock to bed*. As summarized in Section 6.3.5, out of the 33 instances, significant group differences were observed in the ratings for 26 stimuli (78.8%), and marginally significant differences in 3 (9.1%). This finding indicated an extremely high transferability of how German places the adverbial.

Backward transfer from German was not evident in the last scenario. When rating ditransitive constructions featuring pronominalized objects, contrary to our anticipation, the trilinguals did not show greater preference toward the DO<sub>PRON</sub>-IO<sub>PRON</sub> pattern, despite its productivity in German. Instead, both groups exhibited native-speaker-like judgment patterns, accepting the prepositional alternative.

Integrating the results, we come to the conclusion that backward transfer from German syntax does occur, but not every syntactic property in German grammar manifests transferability. Transfer was extremely pronounced when the stimuli involved structures that lacked a corresponding syntactic representation in English and Chinese. The bilingual participants generally outperformed the trilinguals in recognizing the ungrammatical/unproductive stimuli, whose structural representations are absent in both English and Chinese. This outcome is predictable because the chances that bilinguals encounter ungrammatical or non-canonical structures are slim. Neither during English acquisition nor in language practice are they exposed to ungrammatical structures; rather, they are instructed with grammatical ones and exposed to word order alignments that are productive in the language. In contrast,

trilinguals are frequently exposed to the German language; it is natural for them to intuitively rely on these structures to judge those ungrammatical English stimuli.

Finally, it is important to note that the backward transfer from German is exhibited on the level of passive perception of English grammar, and it does not necessarily mean that the trilinguals will utter sentences with German word order in their English output.

✧ ***Context 2: Ungrammatical/unproductive in German, grammatical/productive in English and Chinese***

The second context encompasses the following word orders: (1) the X-S-V order due to the fronting of various non-subject elements; (2) the continuous word order (S-V-P<sub>tel</sub>-DO) in transitive VPCs; (3) the S-Adv-V-X sequence when the adverbial is a short adverb of manner, degree, probability, or frequency; and (4) the DO<sub>NOM</sub>-prep-IO pattern. The results indicated a weak manifestation of German transfer, summarized in the following.

Regarding participants' acceptability for the V3 position, our initial expectation was not met that trilinguals would show lower acceptance of the X-S-V stimuli. As discussed in Section 6.1.6, the trilinguals did not consistently rate the V3 variant higher than the bilinguals, and minimal statistically significant group differences in ratings were observed. This suggested that the V2 constraint of German did not alter speakers' implicit knowledge regarding the use of the X-S-V word order in English and Chinese.

Weak and indirect backward transfer from L3 German was observed in participants' ratings for the continuous order in transitive VPCs. As elucidated in Section 6.2.2, the trilingual participants exhibited slightly lower acceptance scores for stimuli featuring the continuous order than the bilingual controls. Statistically significant group differences were seen in the rating for 5 stimuli (N = 5 out of 21, 23.8%). Nevertheless, both groups of participants performed well in their acceptability judgment, recognizing the grammaticality of the continuous stimuli while distinguishing the differences between word order variations in specific semantic contexts. We observed that the prohibition of the continuous order for German VPCs did not directly impact the

trilinguals' implicit grammatical knowledge of English VPCs. In this scenario, the backward transfer from L3 German, albeit present, is subtle and indirect.

In the third scenario, again, due to the V2 constraint, the adverbial must not precede the verb in a German SV simple-tense clause, contrasting with English and Chinese, where certain adverbs may occupy the pre-verbal position. We anticipated that this syntactic feature of German would reduce trilinguals' acceptance of the S-Adv-V-X word order. Unlike in the previous scenarios, our expectation was met, i.e., the trilingual participants consistently assigned lower scores to the stimuli compared with the bilinguals, with statistically significant group differences observed in the ratings of 8 cases ( $N = 8$  out of 25, 32%) and marginally significant differences in 7 ( $N = 7$  out of 25, 28%), as shown in Section 6.3.4. The results provide robust evidence for German influence in this scenario. Nonetheless, their overall ability to discern grammaticality has not been drastically affected. Furthermore, our findings suggested that the trilinguals were particularly sensitive to the position of adverbial adjuncts in a non-inverted clause. They not only showed a greater tolerance for the ungrammatical or non-canonical initial end position of adverbials, which conforms to German syntax, but also demonstrated reduced acceptance of the pre-verbal position, which violates German syntax.

The final scenario involves the prepositional pattern in ditransitive constructions. German differs from English and Chinese in that the productivity of the  $DO_{NOM}$ -prep-IO pattern is restricted by the lexical features of the verb. All participants showed full acceptance of the stimuli arranged in the prepositional alternative, assigning mean scores approaching the maximal point of 6. When the German counterpart of the verb in the given stimuli did not support the prepositional pattern, the trilingual participants gave marginally lower ratings than the bilinguals (see Section 6.4.1). This outcome partially supports the presence of German influence; again, the transfer effect is trivial and not all-encompassing.

Backward transfer from German is more pronounced in Context 1 than in Context 2. This divergence relates to the essential difference between the two contexts. In the former context, we investigated a more direct influence from German syntax; in the

latter, we examined the potential impact of German on altering the acquired grammar rules of English. In Context 1, participants rated sentences structured according to German word order, most of which are not found in real English grammar, leading to sharper contrasts in rating patterns between the two groups. The trilinguals intuitively relied on German grammar when accepting the stimuli because the word orders are grammatical in German. The bilinguals, lacking an established representation of such word order alignments in their linguistic repertoire, naturally rejected the grammaticality. Conversely, the word orders in Context 2 reflect the syntactic features of English and Chinese, i.e., the V3 position, the continuous word order of VPCs, and the prepositional alternative for ditransitive constructions. These word orders are instructed in foreign language classes and have been successfully acquired by the participants, making them less susceptible to German influence. This explains the reduced transferability of German syntax in this context. Nevertheless, the manifestation of the backward transfer effects from German, especially in adverbial placement, remains present.

### 7.1.2 Potential Interaction with L1 Chinese

*Does German syntax interact with that of L1 Chinese?* Our data suggest a weak, indirect interplay between the two languages. The interaction between L1 and L3 appears contingent upon the specific linguistic setting.

Generally, the strong performance of both groups in distinguishing grammatical structures may be attributed to structural overlaps between English and Chinese. These include the V3 position in certain cases, the use of the continuous word order in VPCs, and the prepositional pattern for ditransitive constructions, as listed in Context 2 in Table 60. These similarities potentially reinforce the corresponding syntactic representations in a multilingual mind, thereby facilitating English acquisition.<sup>100</sup> A

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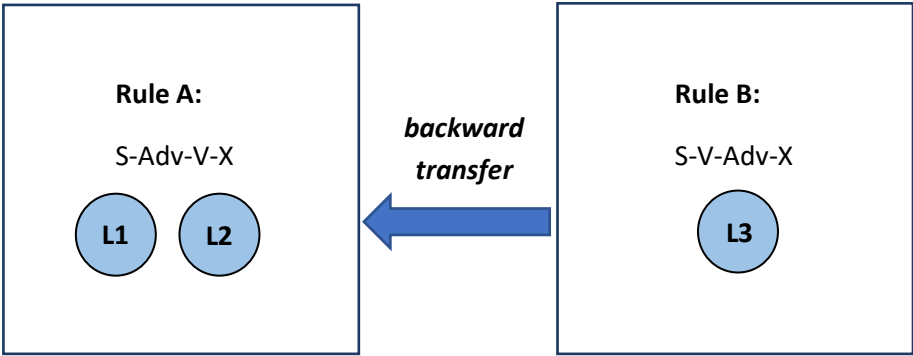
<sup>100</sup> It should be noted that our data does not provide direct evidence for a positive influence from Chinese. However, when combined with findings from previous empirical studies

counteracting effect of German against the potential influence from L1 might emerge when Chinese uses the same word order rule as English, whereas German differs. The results analyzed in the preceding section provide evidence for such a counteracting effect. The trilinguals generally exhibited reduced acceptance of these word orders, with statistically significant group differences observed in several instances.

Thus far, we can synthesize our findings as follows: *for the same grammar entity, if L3 differs from L1 and L2 in the syntactic representation, the grammar rule in L3 might influence speakers’ perception of the rule shared by L1 and L2.* Figure 50 illustrates the conclusion using the example of adverbial placement, where trilinguals’ pre-verbal position of adverbs, supported by L1 Chinese and L2 English, is influenced by the adverb-third position, a default in L3 German.

**Figure 50:** Examples of Transfer Effects from Subsequently Acquired Grammar Rules

**Grammar representation: adverb placement in an SVX clause**



suggesting facilitative transfer due to structural similarities (Westergaard et al., 2017; Slabakova, 2017; Jensen et al., 2023), we are convinced that the structural similarities between Chinese and English have, at least partially, facilitated the learning of English. However, it is important to note that our participants did not generalize structural similarities, as they still showed a solid understanding of English grammar, which differs from Chinese. Other factors, such as pedagogical instruction and language proficiency, might have also contributed to their successful distinction of grammaticality.

It is important to note that the counter-effect from German does not occur in every scenario. According to our data, the counter-effect of L3 German grammar rules is more pronounced when the setting involves word order variation in VPCs and pre-verbal placement of adverbials, but it is minimal in scenarios regarding ditransitive constructions and V3 position by topicalization. Moreover, for the language constellation of L1 Chinese-L2 English-L3 German, the transfer effect from L3 is non-facilitative, as it subtly steers the accuracy of grammaticality judgment in another direction.

Another example of L3 German neutralizing the influence of L1 Chinese is seen in participants' attitudes toward word order variations in VPCs. We first related this scenario to the surface structural overlap hypothesis, which states that if two syntactic structures are represented in one language, while only one of them is used in another language, the overlapped structure is more likely to exert an influence on the learner (Hulk & Müller, 2000; Argyri & Sorace, 2007; Kupisch, 2014). As English supports both discontinuous and continuous orders, Chinese mainly uses the continuous order, and German exclusively employs the discontinuous word order, we expected the bilinguals to show preferences for the continuous variant over the discontinuous one and that German would have a counter-influence in enhancing trilinguals' acceptance of the discontinuous word order. The expected outcome did not emerge. The continuous word order turned out to be the preferred one, which was a possible result of the successful acquisition of relevant grammar rules and the influence of Chinese only permitting the continuous order. While we did not observe any direct transfer from German to English, we did see how its restriction to the discontinuous order neutralized the potential influence of Chinese: the trilinguals displayed a slightly reduced acceptance of the continuous variant.

To sum up, the interplay between L3 German and L1 Chinese is characterized by the neutralizing effect of German when its surface syntax differs from Chinese and English in representing a grammar entity, while Chinese and English share the same structure. This effect, albeit observed, is subtle and indirect. Furthermore, it remains to be explored whether L3 German syntax exerts direct transfer effects on L1 Chinese,

specifically in terms of affecting the perception or production of word order in Chinese. Therefore, further investigations are required.

## **7.2 Characteristics of Backward Influence**

Integrating the results and findings from each part of the experiment, the nature of L3 German backward transfer on L2 English can be summarized into three key aspects: *non-facilitative, indirect, and partial*.

### **7.2.1 Non-Facilitative**

The impact of German syntax on how its users perceive English word order, if present, exhibits a non-facilitative nature. Two important facets evidence this. On the one hand, the word order rules in German grammar have contributed to trilingual participants' heightened tolerance for grammatically less acceptable stimuli within our experiment setup. Even when the trilinguals could discern that a stimulus was not as grammatically acceptable as its grammatical variant, they displayed heightened acceptance toward it compared with the bilingual controls. Examples are their higher mean scores assigned to those ungrammatical subject-simple verb inversions featuring the fronting of non-directional and non-restrictive/non-negative adverbials (e.g., *\*Slowly read the children the text*, see Sections 6.1.3.2 to 6.1.3.5, 6.1.5), as well as their notably higher acceptance of stimuli featuring ungrammatical or non-canonical adverbial-third position (e.g., *\*My mom throws every morning the garbage away*). Especially when rating ungrammatical word orders featuring the adverbial-third placement (S-V-Adv-X), the trilinguals even went as far as awarding scores higher than 4 or even 5 (see Sections 6.3.1 to 6.3.3), considering them as rather completely grammatical. These results provide solid evidence of German syntax obfuscating its speakers' judgment of ungrammatical expressions.

On the other hand, the syntactic features in German have subtly interfered with the successfully acquired English grammar rules. When presented with stimuli in basic



word orders in English that either contradict German grammar rules or have less productive structural counterparts in German, the trilinguals' ratings have not exceeded those of bilinguals, indicating their diminished acceptance of these word orders. This tendency is mainly evidenced by trilinguals' slightly yet rather consistently lowered scores for the default S-Adv-V-X pattern in English (e.g., *Wendy often smokes cigarettes*; see Section 6.3.4) and for certain stimuli featuring the continuous order in VPCs (e.g., *They bring in the food*; see Section 6.2.3). Besides, we observed single evidence that the trilinguals showed marginally decreased acceptance of the prepositional pattern of the ditransitive construction when the verb's counterpart in German does not support such the prepositional alternative (e.g., *Uncle Sam gave a present to her*; see Section 6.4.1). They found the above word orders less natural-sounding, likely because German disallows the non-V2 positions and has lower productivity of certain word order variants. In other words, trilinguals' perception of English sentence structures has been confounded by the syntactic restrictions of German.

Moreover, it is important to note that the initial analysis of rating patterns in some cases suggested a seemingly facilitative effect from German syntax. Specifically, when evaluating the ungrammatical subject-auxiliary inversions, the trilingual group even assigned lower scores to some stimuli than the bilinguals (see Section 6.1.4.2). Also, they showed greater acceptance of several grammatical sentences in the S-V-Adv-X word order (see Sections 6.3.1, 6.3.2.2, and 6.3.3). Regarding these outcomes, we asked whether the trilinguals successfully distinguished the grammaticality of these cases because they had successfully internalized the grammar rules accordingly. The answer is negative because the trilinguals concurrently failed to identify the grammatical subject-auxiliary inversions (see Section 6.1.3.6) and ungrammatical S-V-Adv-X stimuli (see Sections 6.3.1 and 6.3.2.1). In essence, their attitudes toward a particular construction were comparable, and the ostensibly accurate discernment of the grammaticality in isolated cases was merely coincidental. The distinct way of linearizing sentence components in German has led to trilinguals' overgeneralization of grammaticality for a specific word order arrangement. This overgeneralization is

non-facilitative, as speakers rely more on word order when processing sentences and do not use grammar rules that apply to each specific context as orientation.

In summary, German syntax interferes with its users' perception of English word orders and leads the accuracy of grammaticality judgment astray. This finding aligns with those of Slabakova (2017), Westergaard et al. (2017), and Westergaard (2021a), among others, who posit that transfer effects are not always facilitative.

### **7.2.2 Indirect**

Despite the conspicuous transferring effect from L3 German, its direct influence remains limited. The indirect nature of German backward transfer is reflected in two aspects.

First, it is important not to equate “trilinguals showing higher acceptability than bilinguals” with “trilinguals accepting the grammaticality of the stimuli.” Although the trilinguals did demonstrate greater tolerance for (ungrammatical) stimuli structured according to German grammar rules compared with the bilinguals—indicating transfer from L3 German—they did not always endorse the grammaticality of these stimuli, as evidenced by mean scores below 4 points in most scenarios. Only when assessing ungrammatical sentences featuring the S-V-Adv-X word order did they assign mean scores higher than the threshold of 4 points, with 16 sentences scoring between 4 and 5.17 (see Sections 6.3.1 to 6.3.3). However, some ungrammatical/non-canonical S-V-Adv-X stimuli were given scores lower than 4 points, with 10 stimuli scored between 2.73 and 3.93. If the transfer effect had been more direct, the trilinguals would have more consistently rated these stimuli high. Mean scores for ungrammatical subject-simple verb inversions ranged from 2.37 to 3.6 (see Sections 6.1.3.2 to 6.1.3.5), indicating a neutral attitude toward grammaticality. For the DO<sub>PRON</sub>-IO<sub>PRON</sub> order in ditransitive constructions, a less uncommonly used pattern, trilinguals' mean scores ranged between 2.6 and 3.8 (see Section 6.4.2), indicating native-like judgment of grammaticality. When processing word order variations for VPCs, they also had excellent performance, and their ratings did not significantly deviate from those of the

bilinguals (see Sections 6.2.1 to 6.2.3). These taken together, the trilinguals' overall ability to distinguish the grammaticality of English is not reshaped by German syntax.

The second indication of the indirect nature of German backward transfer is that the trilinguals did not consistently show reduced acceptance of grammatical English sentences whose word order diverges from German syntax. If the German transfer effect had manifested in a more direct way, the trilinguals would have demonstrated significantly lower acceptance toward the stimuli in these scenarios: sentences featuring the V3 position (S-Adv-V-X, X-S-V/Aux), the continuous word order of VPCs, and the prepositional pattern for ditransitive constructions with a nominal direct object. The trilinguals only partially showed a reduction in the acceptance of the continuous VPCs and the stimuli featuring grammatical pre-verbal position of adverbials. When rating the X-S-V/Aux word order, they exhibited similar rating patterns as the bilinguals. These findings demonstrate that the disparities between German and English do not entirely alter the previously acquired rules for English grammar. In this regard, the influence of L3 German syntax resides in its potential to neutralize the positive effect of L1 Chinese, given that the latter conforms to L2 English order in many respects.

Furthermore, the influence of German was more pronounced when participants rated artificial stimuli deliberately designed to align with German grammar rules. Nonetheless, once the stimuli involved "natural English," namely word orders consistent with English grammar and encountered in English input in a natural setting, the influence of German, though present, became less significant. In conclusion, the backward transfer from L3 German syntax to speakers' perception of L2 English is indirect and does not sufficiently reshape their already established English grammar system.

Finally, it is crucial to note that increased acceptance of grammatically less acceptable sentences does not necessarily imply a tendency to produce ungrammatical structures aligned with German word order. Our data only serve to illustrate the role of L3 German influence in passive perception of English input in an artificial setting, but

our findings should not be considered as direct indicators of one's English language output in real English use.

### 7.2.3 Partial

The final characteristic of L3 German transfer is partial rather than all-encompassing. The transfer effect is not consistently observed across all four scenarios investigated, and different syntactic properties exhibit varying degrees of transferability.

The V2 constraint of German demonstrates a higher degree of transferability. Due to this constraint, subject-verb inversion and adverbial-third position in declarative SV clauses are obligatory. The trilinguals showed great sensitivity when evaluating stimuli featuring these structures: X-V-S-(Y) and S-V-Adv-X. The trilinguals were particularly sensitive toward structures featuring a direct object, showing exceptionally great acceptance of Adv-V-S-DO-(Ptcl) and S-V-Adv-DO-(Ptcl) alignments. However, it should be noted that the transferability decreases in the presence of an auxiliary. The inversion of the subject and the auxiliary, which is common in German, did not influence the trilinguals' judgments. Regarding this outcome, we propose that syntactic transfer is more likely to occur in simpler constructions.

Aside from auxiliary constructions, the word order alignments for ditransitive constructions and VPCs in German grammar exhibit minimal transferability. The participants did not show a peculiar preference for the word order variants of S-V-DO-Ptcl and DO<sub>RPN</sub>-IO<sub>PRN</sub>. The null transferability of the discontinuous VPC can be ascribed to its grammaticality in English. As for the ditransitive construction, the use of the prepositional variant (DO<sub>RPN</sub>-to-IO<sub>PRN</sub>) in both English and Chinese may have reinforced this structural representation, making the seldom-used DO<sub>RPN</sub>-IO<sub>PRN</sub> option sound less natural to our participants.

Finally, an incidental finding suggests that the distinctive syntactic feature of German, the VF position of the non-finite verb within the verbal bracket, does not transfer. The trilinguals could accurately identify the ungrammaticality of the filler sentences, such as *\*Probably has he us forgotten* and assigned higher scores to the

variant without the VF position, *\*Probably has he forgotten us*. Also, our participants appeared to base their acceptability judgments on specific sentence segments rather than the entire clause. For example, the trilinguals displayed greater tolerance for stimuli like *\*You can rebuild in this way your life* or *\*He is telling for sure the truth*, indicating a stronger transferability of the V-Adv-DO alignment of German, despite the rest of the sentence not conforming to the German syntactic rules governing its middlefield.

In summary, the backward transfer from German is not all-encompassing. Our finding supports the argument for property-by-property transfer: anything may transfer, but not everything can transfer (Westergaard et al., 2017; Westergaard, 2021a). This characteristic of CLI does not only apply to the initial stage of FLA but also to the final phase.

### **7.3 Explaining Mechanism of Backward Transfer: Revisiting CLI Factors**

When interpreting the findings and exploring the mechanisms of the transfer phenomenon, it is crucial to avoid simplistic attributions to a single factor. Language-related factors, especially structural disparities and similarities, play a non-negligible role in catalyzing backward transfer. Studying structural overlaps and disparities not only helps us grasp the source of transfer but also deepens our understanding of language interactions. External factors, such as pedagogical practices, individual differences, and exposure to language input, also contribute to the CLI phenomenon. Therefore, it is essential to adopt a comprehensive perspective, considering the interplay of these different factors not only in shaping one's implicit linguistic knowledge, but also in tuning the direction, magnitude, and quality of transfer.

### **7.3.1 Language-Related Factors**

#### **7.3.1.1 Structural Similarities and Overlaps**

Similarities between languages have been argued to be a crucial premise in facilitating foreign language learning, as evidenced by many empirical studies demonstrating that learners transfer syntactic features from a known language to comprehend similar grammatical structures in the target language (e.g., Gass, 1984; Westergaard et al., 2017; Lorenz & Siemund, 2019; Jessen & Westergaard, 2023). Within the framework of the current study, structural similarities primarily served as the foundation for our general hypotheses and our experimental design. We hypothesized that individuals with German syntactic knowledge would show acceptance of English expressions that share similarities with German syntax. The results show that similarities, particularly structural overlaps between English stimuli and German word order in simpler clauses, clearly oriented the trilingual participants in making judgments.

This finding prompts the question of whether German backward transfer also manifests in trilinguals' English output. Will English sentences inadvertently organized according to German word order emerge in their speech or writing? This compelling question warrants further investigation in future studies.

Our study also included scenarios where German and English use the same structure in representing a certain grammar entity, such as inversion due to the fronting of directional, locative, restrictive, and negative elements; discontinuous word order in constructing VPCs; and the prepositional pattern in ditransitive construction. In evaluating stimuli within these scenarios, we observed German influence in isolated cases, yet the overall data lacked consistency in demonstrating a direct backward transfer effect attributed to structural similarities.

Furthermore, it is reasonable that the similarity between L1 Chinese and L2 English contributed to both groups' strong performance in judging V3 orders and the continuous VPCs. Additionally, the overarching structural overlap of "DO before IO" in both Chinese and English likely facilitated the participants' successful grammaticality judgment. The structural overlap between L1 and L2 may function as a counterbalance,

resisting potential influence from a later-acquired language. Nonetheless, this remains a speculation, as the data does not provide direct evidence for it.

Therefore, while structural similarities may catalyze CLI, their effect probably appears more pronounced in the context of forward transfer during the initial stage of foreign language acquisition. As for how the picture unfolds in the context of backward transfer, we have reasons to hypothesize its occurrence: since the trilinguals perceive sentences arranged in German order, such as *\*Wendy quite often smokes cigarettes*, as completely natural-sounding, it is plausible to consider that similar structures might slip off the tongue in their English output.

### ➤ *Surface Structural Overlap Hypothesis*

Last but not least, we want to discuss the second condition of the surface structural overlap hypothesis proposed by Müller and Hulk (2000), which was originally introduced to explain forward CLI in bilingual acquisition, positing that:

✧ *Syntactic transfer occurs only if language A has a syntactic construction that may seem to allow more than one syntactic analysis and, at the same time, language B contains evidence for one of these two possible analyses, i.e., there must be a certain overlap of the two systems at the surface level.*

We examined participants' attitudes toward different patterns in VPC. English (language A) has two syntactic analyses: the continuous order and the discontinuous order. German (language B) overlaps with English in one of the syntactic analyses: the discontinuous order. According to the structural overlap hypothesis, the trilinguals should show more positive attitudes toward the discontinuous order; however, this was not suggested by our results.

The hypothesis is hence less applicable in the scenario of multilingualism when more than two languages come into play and the interaction between languages becomes more intertwined. The unanimous rating patterns exhibited by both groups may be an outcome of Chinese influence: as Chinese overlaps with English solely in

the continuous word order, and the continuous word order is applicable in most cases, our participants naturally have taken advantage of this overlap during their English acquisition to facilitate their learning.

### **7.3.1.2 Structural Disparities and Mismatches**

Structural disparities provide chances for backward transfer to occur. Our findings align with Weinreich's (1953) statement that "[t]he greater the number of mutually exclusive forms and patterns in language systems, the greater the learning problem and the potential area of interference" (p. 1). This holds not only during the FLA process but also after the successful acquisition of a foreign language and during the active use of this language.

Our study has provided ample evidence that the word order rules of German, which in some respects differ greatly from those in English and Chinese, are sources of backward transfer. On the one hand, English stimuli that adhere to German grammatical structures are perceived as more natural; on the other hand, those syntactic forms in English that do not align with German grammar, despite being grammatically acceptable, receive slightly lower acceptance from the trilinguals compared with the bilinguals. The disparities between the two languages have led to interferences in grammar perception.

One pertinent question revolves around the degree of transferability, i.e., why are certain syntactic forms in German not transferred to English, although they are crucial features of German grammar? Examples are trilinguals' rejection of the DO<sub>PRON</sub>-IO<sub>PRON</sub> word order for English ditransitive construction and their unaffected attitudes toward discontinuous word order in VPCs. This can be attributed to the interplay between the structural absence of these forms in L1 and the characteristics of SLA. The above-mentioned structures are rarely used in Chinese: the discontinuous order is restricted to extremely few cases of RVCs, and the non-prepositional DO<sub>PRON</sub>-IO<sub>PRON</sub> pattern is not supported for ditransitive constructions in Chinese grammar. Consequently, native Chinese learners of L2 English acquire these new linguistic forms



during the acquisition process. These new forms are inherently salient in the English language, thereby enhancing their likelihood of being acquired (James, 1996). We postulate that for the same grammar entity, once a structure in L2, which is different from that in L1, has been successfully acquired during SLA, it becomes resistant to the potential influence of L3 unless it uses a syntactic representation that differs from both L1 and L2. In other words, if a linguistic feature of a later-learned language diverges from any previously established syntactic representation, it may exert a reverse influence.

Furthermore, while structural disparities are potent factors for language transfer to occur, the degree of transferability of each syntactic form may vary considerably. This variability is likely related to other factors such as structural complexity, frequency of occurrence, salience of a linguistic property, language dominance, and external factors during the acquisition process, discussed soon in Sections 7.3.1.4, 7.3.1.5, and 7.3.2.

### **7.3.1.3 (Psycho)typological Proximity and Distance**

It is posited that when learners perceive the target language to be typologically similar to a previously required language, there exists a potential for transferring linguistic items from the previously learned language to the new one during the acquisition process (Ringbom, 1985; Jarvis & Pavlenko, 2010; Rothman & Cabrelli Amaro, 2010; Rothman, 2010). During the ATJ, the trilinguals might have perceived English and German as being typologically closer, thus intuitively relying on German syntax to evaluate the English stimuli, especially those ungrammatical ones whose word orders do not conform to English grammar rules. The bilinguals, having acquired only English as their foreign language, which is typologically more distant from Chinese, might have exhibited greater caution while making judgments. However, given that both groups of participants showed the capability to distinguish the overall grammaticality of the stimuli, we can exclude (psycho)typological proximity/distance as a major source of affecting their perception of English.

The concept of (psycho)typological proximity/distance is probably more relevant in explaining transfer mechanisms during the initial stage of FLA. In contrast, successful learners like those in our study, who already have a solid grasp of English knowledge, may not need to rely on typological proximity to navigate grammaticality judgments. The only occasion where typological proximity between English and German might play a role is when the stimuli involve a construction that does not exist in English grammar. In this case, sentence processing resembles foreign language learning in the initial stage, where learners might use typological proximity as an orientation when encountering new structures in the target language.

#### **7.3.1.4 Frequency**

Another important factor contributing to CLI is frequency, which is further divided into *token frequency* and *type frequency* (Bybee & Thompson, 1997; Ellis, 2002). The underlying principle is that the more frequently a linguistic item (token) or a linguistic property (type) occurs, the more likely it is to be reinforced in one's mind and transferred into language use.

In the context of inversion, German exhibits a higher type frequency of placing non-subject constituents, such as adverbials, in the forefield without necessarily leading to a marked reading (Doherty, 2005; Kyellberg, 2017). Due to the V2 constraint, inversion is obligatory in German when the subject moves to the middlefield. Conversely, English is subject to the SVO word order; subject-verb inversion has low type frequency, as it represents non-canonical word order arrangements. Nor do they have a high token frequency, as only limited categories of elements can be fronted. Also, the proportion of topicalization in English has decreased over time, remaining a small usage until today (Speyer, 2005, p. 243). In Chinese, inversion is permitted only when the fronted element is a directional or locative phrase. The significant difference in the frequency of fronting between German and English/Chinese, coupled with the obligatory V2 position in German, provides a plausible explanation for why trilingual

participants found X-V-S word orders more natural. In contrast, bilingual participants, who are less frequently exposed to such structures, strictly rejected their grammaticality.

In a similar vein, the rules governing the linear order of elements within the German verbal bracket determine that an adverbial adjunct should appear after the finite lexical verb and before the (usually indefinite) direct object, the particle of a VPC, and the PP complement. Structures including S-V-Adv-DO, S-V-Adv-Ptcl, S-V-(Adv)-DO-Adv-Ptcl, and S-V-Adv-PP are the default according to the *Satzbaupläne* ('Sentence Construction Plans') (see Engel, 1970a, pp. 70–71, 1970b, pp. 109–121; Heidolph et al., 1984, pp. 703–715). Contrary to German, these word orders have significantly lower type and token frequency in English. They are atypical and are grammatical only when specific adverbials are involved. In some cases, they imply a marked reading, such as *He thinks often about his mother*, as compared with the canonical order, *He often thinks about his mother*. Again, the trilinguals, frequently exposed to these word order alignments, naturally found them grammatical, even if they were used in another language, English.

Conversely, the S-Adv-V-X word order conforms to the canonical arrangement in English and Chinese, such as *He often thinks about his mother*, *She probably likes this feeling*, or *The child quickly ran away*. The linguistic features of adverbials in these sentences not only have a high type frequency (i.e., the higher frequency of single-adverb adverbials in the pre-verbal position as a syntactic feature)<sup>101</sup> but also a high token frequency (i.e., specific semantic classes of adverbials, such as the stance adverb *probably* and the frequency adverb *often* in our case, have a higher preference for the pre-verbal position than other adverbials).<sup>102</sup> This plausibly explains why the influence

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<sup>101</sup> See Biber et al. (2021, p. 799) for the association between position and grammatical structure for circumstance adverbials realized as single words or phrases, and p. 864 for positions of stance adverbials across registers.

<sup>102</sup> For the distribution of semantic categories, see Biber et al. (2021, pp. 775–776). For associations between position and semantic category, see the same work (p. 794). Biber et al. (2021) point out that one- or two-word additive/restrictive and extent/degree adverbials (e.g., *probably*, *only*) often apply to the medial position of the clause, and single time adverbs marking a time point (e.g., *now*, *yesterday*, *today*) or time frequency (e.g., *always*, *never*, *often*) often occur before the main verb (p. 798).

from L3 German diminishes: because of the high frequency of occurrence, the participants have already established a representation of such word orders, effectively counterbalancing the effect against potential German influence.

Similarly, frequency could also account for the low acceptance as well as the null group differences in judging the DO<sub>PRON</sub>-IO<sub>PRON</sub> pattern. In the corpora for spoken German, a majority of ditransitive constructions in German feature a pronominal indirect object preceding a nominal direct object, with only a small proportion featuring the DO<sub>PRON</sub>-IO<sub>PRON</sub> pattern (Audehm, 2006). Although the DO<sub>PRON</sub>-IO<sub>PRON</sub> pattern is typically used, occurrences of both objects being pronominalized are, however, relatively infrequent. Interestingly, we found that the stimulus *Give it me!* received higher scores from both groups (M1 = 3.8, M2 = 3.5;  $p = 0.336$ ). This could be attributed to its more frequent use in colloquial speech as compared with other rather awkward expressions, such as *\*She always tells him them*.

To conclude, frequency plays a significant role not only in facilitating forward transfer but also in backward transfer.

### 7.3.1.5 Perceptual Salience

Perceptual salience has not manifested as a contributing factor to backward transfer in our study; rather, it appears to mitigate the occurrence of backward transfer.

This argument is supported by our additional finding that the VF position of non-finite verbs in German did not lead to the trilinguals' heightened acceptance of this arrangement in English. The participants rejected the grammaticality of fillers that featured the VF position, such as *\*Titanic has into the North Atlantic Ocean sunk* (M1 = 2.53, M2 = 2.27;  $p = 0.957$ ) or *\*All parents should with the class teacher talk* (M1 = 2.03, M2 = 2.33;  $p = 0.308$ ). This word order could be particularly noticeable for trilinguals, as it is a syntactic feature unique to German. The salience of the VF position has likely prompted immediate recognition of differences between German and English, leading to trilinguals' rejection of its naturalness when applied to English.

A related finding is trilinguals' judgments of subject-auxiliary inversion. Out of our expectation, the trilinguals did not differ from the bilingual controls in their assessment. This may stem from their awareness that the presence of auxiliaries leads to the obligatory VF position of the non-finite verb, a structure not permitted by English and Chinese grammar (X-Aux-S-V word order in German vs. X-Aux-S-V in English/Chinese). This awareness may result in an overgeneralization of the ungrammaticality associated with subject-auxiliary inversion, meaning that any structure featuring the X-Aux-S word order will be immediately deemed grammatically less acceptable.

To sum up, in the context of backward transfer, perceptual salience serves as a strategy to avoid errors in processing the target language.

### **7.3.2 Language-External Factors**

Apart from factors inherently related to languages, several language-external factors related to the acquisition process and language use might contribute to backward transfer, discussed in the following sections.

#### **7.3.2.1 Pedagogical Practices and Emphasis**

A significant factor contributing to linguistic transfer is explicit pedagogical instruction. Foundational grammar, including parts of speech, canonical word order, and placement of adverbials, constitutes the initial subjects of instruction. Advanced rules, such as inversion and distinctions between word order variations, are introduced after learners reach a threshold of language proficiency. Furthermore, it is possible that during the FLA process, highly specific rules are not given additional emphasis. If learners encounter these structures during language input, they might assimilate the corresponding knowledge; otherwise, it remains absent. Moreover, differential instructional approaches could account for the variations in performance observed among our participants.

Regarding CLI in language acquisition, pedagogical instructions may mitigate the transfer effects of the linguistic properties of previously acquired languages. When a grammar rule is explicitly addressed in the foreign language classroom, learners will more easily notice the similarities and differences across languages instead of erroneously borrowing structures and features from another language.

While our study may not provide direct evidence regarding the impact of pedagogical instructions, there are indirect indicators to consider. For instance, when accepting the optional inversions triggered by the fronting of direct quotes, both groups of participants made accurate judgments. Although an inversion is not permitted in Chinese in this case, the bilinguals still highly accepted the V2 stimuli, recognizing their grammaticality. Although German requires inversion, the trilinguals assigned high scores to both the V2 and V3 variants. Such results indicated that the participants underwent neither potential forward transfer from L1 Chinese nor backward influence from L3 German. The outcome can be explained by the functions of explicit instruction and intensive practice of English during language teaching and acquisition.

In light of the *Scalpel Model* proposed by Slabakova (2017), it becomes evident that pedagogical instructions and practices are important factors in regulating the extent of influence from source languages.

### **7.3.2.2 Recency**

Recency primarily refers to the phenomenon where speakers tend to transfer linguistic patterns from their most recent language input into subsequent output. Our study is particularly relevant to the concept of *syntactic priming*, which posits that processing a specific grammatical form influences the subsequent processing of similar forms (Hartsuiker et al., 2004).

The results of our study can be indirectly explained by syntactic priming. As detailed in Section 5.1.6, all trilingual participants resided in Germany at the time of the experiment, with a majority (N = 24 out of 30, 80%) reporting frequent use of German at work or study, and one-third (N = 11 out of 30, 36.7%) reporting using

German frequently in personal lives. In contrast, their L2 English usage was infrequent. As the trilinguals had been receiving extensive exposure to German, they likely received substantial input of German syntax and encountered similar sentence structures shortly before participating in the experiment. This might have led to their acceptance of ungrammatical English sentences that align with German word order.

However, since our study focused on the passive perception of English rather than active production, we cannot provide evidence on whether a priming effect also influences the English speech production of the trilinguals.

### **7.3.2.3 Language Proficiency and Dominance**

Finally, language proficiency and dominance of the source language emerge as two key factors in explaining the occurrence of backward transfer in our study. However, our data do not treat these factors as primary variables and can only indirectly suggest their influence.

Although the trilingual participants have attained an English proficiency level of B2 or higher, their German proficiency is still higher than their English proficiency (see Section 5.1.5). Among the 30 trilinguals, 23 have achieved a test-German proficiency level of C1/C2, whereas only 11 have reached a similar proficiency level in English. The trilinguals' overall lower L2 English proficiency level may raise the possibility of their susceptibility to influence from L3 German.

In terms of language exposure, our trilingual participants were recruited in Germany. Most of them (23 out of 30) reported daily exposure to the German language exceeding 30%, with 13 who reported more than 50% of their daily multilingual interaction in English. In comparison with the bilingual participants, the trilinguals had slightly less exposure to English, with almost half of them having limited contact (5% to 10%) with the language (13 out of 30). In contrast, only two trilingual individuals reported limited use of the German language in their work or study environments, and five did not use German in their personal lives. This indicates that German is the dominant foreign language for input and output among the trilinguals, but English is

not. Through repeated exposure to and use of German sentence structures, the trilinguals have become more accustomed to them. Consequently, their perception of English word order is more susceptible to influence.

Additionally, we found that the implicit knowledge of L2 English is not directly related to language exposure and language use. Only six bilingual participants have reported frequent exposure ( $> 50\%$ ) to English in their working or studying environment, and almost none of them use English as a communication language in their private life. Despite the infrequent language contact with English, they still displayed a good understanding of the syntactic rules of the language. So far, we have not observed explicit L2 attrition. A longitudinal study is thus warranted to explore whether and how German may accelerate this process.

## **7.4 Revisiting Current Models on Cross-Linguistic Transfer**

Now that we have amassed a substantial body of evidence supporting the hypothesis of backward transfer, we proceed to revisit the CLI models outlined in Section 2.2 to examine their applicability after the successful SLA. Our primary goal is to address whether these models remain relevant in explaining backward transfer in the later stage of language development and to what extent. Furthermore, we intend to develop a novel CLI model tailored to elucidate the intricacies of backward transfer.

### **7.4.1 Revisiting Linguistic Proximity Models**

The results of our study can be explained by the linguistic proximity models, mainly the *Scalpel Model* (Slabakova, 2017) and the *Linguistic Proximity Model* (LPM) (Westergaard et al., 2017). Now let's revisit the key concepts of the LPM, explicitly formulated in Westergaard (2021a), as follows:

*Ln* acquisition involves incremental property-by-property learning and allows for both facilitative and non-facilitative influence from one or both previously acquired languages. Cross-linguistic influence occurs when a particular linguistic



property in the  $L_n$  input reveals abstract structural similarity with linguistic properties of the previously learned languages. (p. 394)

The *Scalpel Model* bears similarities to LPM, and it emphasizes the role of other factors in adjusting the quality of CLI, as stated in Slabakova (2017):

The activated grammatical possibilities of the L1-plus-L2 combined grammar act with a scalpel-like precision, rather than as a blunt object, to extract the enhancing, or facilitative, options of L1 or L2 parameter values. However, additional factors such as processing complexity, misleading input, and construction frequency in the target L3 are also operative property by property. They are the factors that can lead the scalpel away from precision. (p. 662)

The results of our study confirm the applicability of these two models in five key aspects. First, the source of transfer is inherently linked to the structural (dis)similarities between the source languages and the target language. This transfer mechanism is notably highlighted in our study, as the trilinguals predominantly used specific features of German syntax as criteria to process English sentences. Particularly, the trilingual individuals showed a heightened tolerance for stimuli showcasing identical word orders to those found in German, even though they have a solid understanding of syntactic rules in English.

Second, the transfer process operates on a property-by-property basis rather than being wholesale. This characteristic finds its applicability also in the context of backward transfer. Not every syntactic property exhibited transferability, and the trilinguals did not solely rely on German syntax for making grammatical judgments. Certain linguistic properties exerted an influence solely at the level of sentence segments instead of the entire sentence. Notably, neither Chinese nor German has an all-encompassing influence on our participants' processing of English sentences, as evidenced by our participants' accurate judgments of certain grammatical English structures whose word order conforms to neither Chinese nor German.

Third, any previously acquired language has the potential to be the source language. The syntactic alignments in both German and Chinese grammar were observed to

influence the perception of English in our trilingual group. This characteristic can be extended to the advanced stage of language acquisition, where a later-acquired language may reversely impact the implicit knowledge of a previously acquired foreign language. In our case, L3 German has exerted different degrees of impact on participants' perceptions of L2 English.

Fourth, the transfer effects can take on facilitative and non-facilitative forms. We observed that the influence of L1 Chinese had a positive, or at the very least, neutral effect, whereas that of German is non-facilitative, or even detrimental.

Fifth, in line with the *Scalpel Model*, additional factors other than linguistic proximity, such as language exposure and pedagogical input, also play an important role in changing the quality of CLI. For instance, the transfer direction is linked to language status. If a later-acquired foreign language becomes the speaker's dominant language, it might impact the implicit knowledge of the earlier-learned foreign language. In turn, backward transfer occurs. Teaching practices possibly directly influence the occurrence and extent of transfer. If a certain grammar rule is not emphasized in the foreign language classroom, it may provide revenue for cross-linguistic transfer. Specifically, without being instructed properly, language users might apply a presumed compatible rule of one language to process the target language, even though this rule is not inherently applicable in a given situation.

In conclusion, the linguistic proximity models can be extended to examine the characteristics of language processing in the advanced stage of FLA. The attributes presented in these models are valuable tools for exploring the nature and mechanisms of backward transfer in multilingual contexts.

#### **7.4.2 Revisiting the Cumulative-Enhancement Model**

The *Cumulative-Enhancement Model* (CEM) introduced by Flynn et al. (2004) posits a cumulative effect of all linguistic features in one's repertoire during the ongoing FLA process. It emphasizes the potential for positive transfer effects from both L1 and L2 to one's L3 acquisition. In line with CEM, our study lends support to the argument that

linguistic knowledge from all previously acquired languages can serve as sources of transfer. Importantly, a later-acquired language, upon reaching a certain proficiency level and becoming the dominant contact language, can reversely affect speakers' perception of the linguistic features of a previously learned language.

Although the transfer effect from L3 German is identified as non-facilitative in our study, we do not intend to hastily discredit CEM's argument for solely positive transfer effects. While the backward transfer from L3 German is observed to be negative, the forward transfer from L1 Chinese is facilitative. Hence, it is reasonable to hypothesize that the nature of the CLI effect is related to the transfer direction. A language user may, consciously or unconsciously, employ the linguistic properties of any previous languages as references to facilitate the understanding of the language being learned, thus rendering forward transfer a positive nature. Nevertheless, in terms of reverse transfer, a prominent feature of the dominant foreign language may interfere with the perception of an early-learned foreign language that is less frequently and dominantly used. Given that English is not the frequently used foreign language of the trilinguals in our study, it is more likely to be susceptible to the influence of the dominantly used L3 German. Nonetheless, one should notice that the negative impact primarily occurs at the level of implicit language perception; whether L3 German also exerts a negative influence on one's L2 English output requires further investigation.

To sum up, the CEM is only partially applicable to illustrate the characteristics of backward transfer in a multilingual context. While we have observed cumulative effects of linguistic features in one's repertoire, i.e., effects from both L1 and L3 on L2, it is important to acknowledge that the effects can also be non-facilitative. Additional research is required to clarify the relationship between the quality of transfer effects, the direction of transfer, and the distinction between transfer from foreign languages and transfer from the native language.

### 7.4.3 Revisiting the Typological Primacy Model

The *Typological Primacy Model* (TPM), as introduced by Rothman (2011), emphasizes the role of (psycho)typological similarity between languages in the initial stage of FLA. It states that the sources of transfer for additional language acquisition can be either L1 or L2, and the impact of this transfer can manifest as either facilitative or non-facilitative. According to TPM, learners may choose a typologically more similar system to facilitate the acquisition of  $L_n$ , especially during the initial stages of acquisition.

Our study could not directly substantiate the applicability of TPM in describing the mechanisms for backward transfer following the successful L3 acquisition. Within our experiment setting, English and Chinese are typologically more distant, whereas English and German are closer. If TPM had been applicable, the trilingual participants would have made sweeping generalizations that any stimulus structured according to German word order would be grammatically acceptable in English. However, participants demonstrated the ability to discern the overall grammaticality of most stimuli. This outcome is predictable, as the trilinguals in our study were proficient English users and would not need to rely on typological proximity for processing sentences as beginners would.

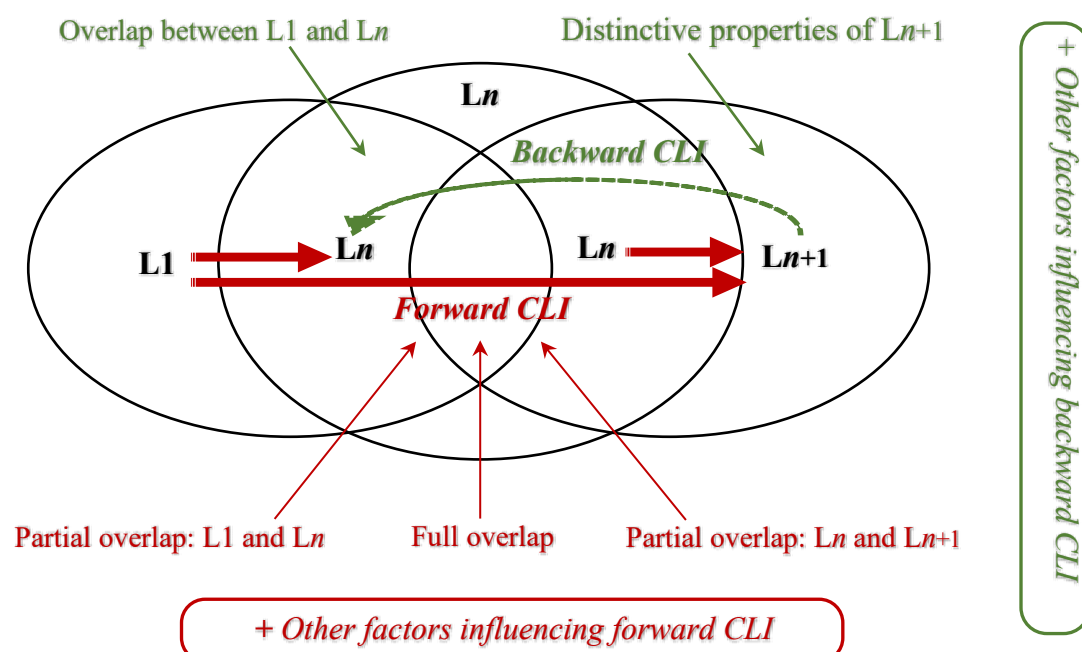
Nevertheless, TPM has an indirect relevance to our study in explaining trilinguals' rating patterns for the ungrammatical stimuli, the syntactic arrangements of which do not find a representation in English grammar. We do not rule out the possibility that the trilingual participants intuitively leveraged the typological proximity between L3 German and L2 English when evaluating ungrammatical English sentences in the ATJ. This process bears some resemblance to the initial stage of learning, where the learners encounter unfamiliar syntactic representations. They judged the English sentences using the word order conventions in L3 German instead of referencing the syntactic structures of L1 Chinese, even though Chinese and English share more similarities in word order.

Overall, while our study did not confirm TPM's direct applicability to backward transfer in our specific context, the model remains theoretically sound in explaining initial language learning processes and warrants further investigation in multilingual acquisition studies.

## 7.5 The Bi-Directional Transfer Model

While the primary objectives of the study revolve around the three questions regarding the manifestation, the characteristics, and the mechanism of backward transfer, the supplementary objective is to examine whether the current CLI models have their applicability in systematically illustrating the backward transfer phenomenon, provided it occurs. Among the CLI models examined thus far, the *Linguistic Proximity Model* by Westergaard et al. (2017) and the *Scalpel Model* by Slabakova (2017) are best suited to describe reverse CLI in multilingual contexts. Based on these two models, a novel model, the *Bi-Directional Transfer Model*, is developed to illustrate the mechanism of cross-linguistic transfer in the later stage of multilingual acquisition, as shown in Figure 51.

**Figure 51:** *The Bi-Directional Transfer Model*



### 7.5.1 Languages Within the Framework

The *Bi-Directional Transfer Model* is designed to elucidate the nature of CLI within a multilingual constellation, where foreign languages are acquired chronologically and successfully. In this model:

- L1 denotes one's native language, acquired before learning other languages.
- $L_n$  represents any foreign language successfully acquired after L1 (e.g., L2 English in our case).
- $L_{n+1}$  refers to the most recently acquired foreign language that is actively used (e.g., L3 German in our study).

Within the framework of the current study, this model pertains to the context of successful trilingualism.

### 7.5.2 Source of Transfer

Drawing from the multi-competence framework (Cook, 2003, 2016a), the *Bi-Directional Transfer Model* recognizes that a multilingual mind houses an integrated and interactive language system consisting of a collection of linguistic features of the acquired languages. Instead of existing as isolated systems, the knowledge and skills of one language can influence and be influenced by other languages. During multilingual acquisition and multilingual development, these languages continuously interact with each other, catalyzing transfer phenomena.

From a pure perspective of syntax, the overlaps and mismatches of linguistic properties among languages when denoting a grammar entity are potent sources of transfer. Namely, multilingual individuals are likely to apply known structures while processing another language, as suggested by numerous studies, as selectively introduced in Chapter 2. Backward transfer due to (dis)similarities in linguistic property has been observed in studies examining the CLI on implicit grammar understanding and passive sentence parsing, such as Rah (2010), Fung and Murphy (2016), and Llinàs-Grau and Mayenco (2016). To date, only one study has examined the retroactive effect

of L3 on language output, including speech production, writing, and the acquisition of rules of a subsequent language (see Cheung et al., 2011 in Section 2.3.2.2). Our study adds to additional empirical support in this field: the trilinguals utilized L3 German word order when assessing sentences in L2 English.

Linguistic properties can be shared across all languages or just between two. Full overlap occurs when all three languages use the same property (e.g., surface syntax, lexical features, or morphological features) for a grammar entity. Partial overlap happens when two of the languages share a property, whereas the third does not. There can also be situations with null overlap, where each language uses a distinct grammatical representation. In our study, syntactic properties exclusive to L3 German have exerted an influence.

### **7.5.3 Transfer Direction**

Transfer is not inherently unidirectional. The direction of CLI can evolve over time. This is because multilingual development has a dynamic, nonlinear, and variable nature that is dependent on social, psychological, and individual factors (Jessner, 2013, p. 803).

First, language acquisition is a dynamic process where the grammar being acquired interacts with previously acquired grammar at various levels. The mechanisms of language transfer in a later stage may differ from those at the initial stage (see Rothman, 2011; Westergaard et al., 2023). Second, the activation level of each language in a multilingual mind depends on not only psychological factors such as cognitive mode (see Grosjean, 1985, 1998, 2020) but also the linguistic environment and social context (see Ohsthain, 1989; Bardovi-Harlig & Stringer, 2010; Cenoz, 2013).

The *Bi-Directional Transfer Model* addresses the characteristics of CLI post successful acquisition of  $L_{n+1}$ , complementing current CLI models introduced in Section 2.2.2 and discussed in Section 7.4. The focus is laid on the possibility of a reverse transfer from a later-acquired language to the previously acquired one.

### 7.5.3.1 Forward CLI

Aligned with the *Typological Primacy Model* (Rothman, 2011), the *Linguistic Proximity Model* (Westergaard et al., 2017), and the *Scalpel Model* (Slabakova, 2017), the *Bi-Directional Transfer Model* concurs that forward transfer can originate from any previously acquired languages, especially during the initial stages of FLA, when the learner has little knowledge about the target language. However, we posit that once the grammar of the target language is systematically acquired and reinforced, forward transfer tends to diminish.

During the initial stages of  $L_n$  or  $L_{n+1}$  acquisition, learners may leverage the already established linguistic representations to comprehend the target language and facilitate the learning process. The perceived similarities or disparities between the target language ( $L_{n+1}$ ) and any previously acquired languages ( $L_1, L_2, \dots, L_n$ ) may be transferred, allowing any language to serve as a source of influence. As shown in Figure 51, forward transfer can occur from the native language to  $L_2/L_n$  or between two foreign languages ( $L_n$  to  $L_{n+1}$ ). When  $L_{n+1}$  shares the same linguistic property with the source language, learners can benefit from these similarities, potentially accelerating their learning process (e.g., Hulk & Müller, 2000; Jarvis, 2002; Westergaard et al., 2017). This type of transfer can be facilitative. However, learners may also make sweeping overgeneralizations and oversimplifications of these similarities, leading to non-facilitative transfer (e.g., Kellerman, 1995; Argyri & Sorace, 2007). When the target language employs a distinctive structure, learners might find it challenging. Yet, these salient structural disparities can also serve as valuable indicators, helping learners avoid errors (James, 1996).

Regarding the patterns of transfer, scholars present varying arguments. Some argue for a full transfer for the initial stage of SLA (Schwartz & Sprouse, 1996; White, 2003). They argued that at the initial stage of SLA, learners fully copy the  $L_1$  grammatical representations and restructure them during the acquisition process.<sup>103</sup> Westergaard

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<sup>103</sup> Refer to Judy and Rothman (2010), Rothman and Halloran (2013), Westergaard (2021a), and White (2021) for further discussion of the *Full Transfer Hypothesis*.



(2020a, 2021b) and Slabakova (2017) argue for a property-by-property transfer. This view is supported and validated by subsequent studies, including those by Westergaard et al. (2017), Archibald (2022), and Gallarde and Montrul (2023). While the current study focuses on the phenomenon of backward transfer, it also supports the argument for a property-by-property transfer. The bilinguals in our study did not holistically apply the word order of their L1 Chinese when evaluating English sentences. For instance, they could distinguish the improper pre-verbal placement of long PP adverbials in a declarative SV clause, which would be grammatical in Chinese. To this end, we posit that the forward transfer may lessen toward the end of the acquisition process or after the successful establishment of the target language's grammatical system. This aspect, however, warrants future study.

Lastly, it is important to note that, regarding the forward transfer, the *Bi-Directional Transfer Model* mainly builds upon earlier CLI models and empirical research. The current study did not specifically focus on this transfer direction.

### 7.5.3.2 Backward CLI

The core of the *Bi-Directional Transfer Model* is backward transfer. Multilingual development is a dynamic process characterized by extensive interaction between languages in the multilingual mind, not only during the acquisition process but also during active language practice. The extensive interaction provides “abundant opportunities for grammars to influence each other, and over time, this interaction may lead to representational changes, mainly in the language to be learned, but also in the previously acquired grammars” (Westergaard et al., 2023, p. 225). Following this rationale, our study delved into the directionality of the transfer phenomenon and provided substantial evidence for a retroactive transfer effect after successful  $L_{n+1}$  acquisition.

The syntactic features of a later-acquired language ( $L_{n+1}$ ) may influence a previously acquired foreign language ( $L_n$ ), as seen in our case where L3 German affects L2 English. The influence of  $L_{n+1}$  manifests on three levels:

- First, a salient and predominantly applied syntactic property of  $L_{n+1}$  can habituate the language user to this structure, resulting in its broader application in processing other languages. Our study found that the trilinguals tended to accept non-target-like L2 English sentences organized in the L3 German word order. We speculate that in their English speech production, they are likely to produce the same structures.
- Second, structural disparities and mismatches between  $L_{n+1}$  and  $L_n$  may indirectly interfere with language users' perception of the grammar system of  $L_n$ , challenging their retention of the implicit knowledge of  $L_n$ . This is evidenced by the trilinguals' slightly changed attitudes toward English V3 structures.
- Third,  $L_{n+1}$  might interact with L1 in neutralizing its impact on  $L_n$ . Nonetheless, the dataset only indirectly supports this argument.

Three key points regarding backward CLI merit attention. First, backward influence manifests on a property-by-property basis rather than sweeping across all aspects. Some grammatical features exhibit a higher degree of transferability than others. Second, evidence for backward transfer, thus far, remains indirect (that's why the green arrow labeling backward CLI in Figure 51 is indicated by a dashed line). The influence of German did not significantly alter speakers' perceptions of the systematically, successfully acquired English grammar knowledge. In the ATJ, our trilinguals indeed displayed different degrees of tolerance for English stimuli arranged in typical German word order, but this does not necessarily imply that they would produce similar sentence structures in their English output themselves. To address this, follow-up research focusing on the reverse influence on active language production is needed. Third, the occurrence of backward transfer is not solely dependent on the structural (dis)similarities between languages. While certain features are more readily transferred, others are not. There is no one-size-fits-all answer; this complexity arises due to the intricacies of multilingualism per se, necessitating a tailored analysis for each specific constellation of linguistic environments.

Finally, *the Bi-Directional Transfer Model* does not include the direct transfer effect from a foreign language to the mother tongue. It still remains uncertain whether the linguistic properties of a non-L1 language influence the perception or output of one's native language, warranting future research.

#### **7.5.4 Other Factors Influencing Transfer**

While structural (dis)similarities are primary sources of transfer, the precision of CLI can be led astray by other factors, as posited by Slabakova (2017) in her *Scalpel Model*. In our study, these factors include user-related ones such as language proficiency and language dominance. External factors such as pedagogical instruction and daily practice may also play a crucial role in internalizing language-specific rules and addressing exceptional cases.

Some trilingual participants in our study reported higher proficiency in German than in English. Also, the trilinguals have been immersed in a German-speaking environment daily. As German has become their dominant foreign language, other foreign languages of the trilinguals have become more susceptible to the impact of German syntax. If the trilingual participants had been immersed in a different linguistic environment where another language was the dominant foreign language, and their German proficiency was lower or absent from daily use, the experimental outcomes would likely have varied significantly.

As previously mentioned, backward transfer from German to English did not universally manifest across all aspects of grammar. This suggests that the successful acquisition of English is pivotal. Participants with lower English proficiency or lacking systematic training in the language would be more likely to experience a more pronounced influence from German, potentially leading to L2 restructuring and L2 attrition.

Furthermore, not all syntactic properties of German have been consistently transferred to evaluating stimuli in the scenarios we set up in the ATJ. This likely relates to the instructions they received during the SLA process. Both participant groups

struggled to accurately distinguish the grammaticality of subject-verb inversion after restrictive adverbials, neither fully accepting the grammatical V2 variant nor strictly rejecting the ungrammatical V3 variant. Conversely, when accepting the ditransitive constructions, they performed at a native-speaker level, despite structural mismatches across German, English, and Chinese. Similarly, their strong performance in accepting the transitive discontinuous VPCs showed minimal German influence and no discernible non-facilitative impact from L1 Chinese. Finally, our participants consistently accepted those target-like English fillers featuring the end position of adverbial adjuncts. These results cannot simply be interpreted by syntactic transfer. A more plausible explanation is that some grammar rules, such as VPCs, ditransitive construction, and adverbial placement, received greater emphasis during in-class instruction, while others, such as inversion, did not receive as much pedagogical focus.

In conclusion, external factors beyond pure language-internal content are influential in shaping the occurrence and extent of transfer. Future CLI studies should be conducted to systematically investigate the roles of these factors.

## 8 Conclusion

This chapter serves as a conclusion for the entire project. It summarizes the most important findings in our study, points out the limitations for future improvement, and provides an outlook for future research in the field.

### 8.1 Research Summary

The present study explored syntactic backward transfer in the context of multilingualism. We started from one of the earliest works on CLI, in which Weinreich (1953) notes that the deviation from the norms of either language of bilinguals may interfere with their speech as a result of language contact and bilinguals' familiarity with both languages (p. 1). This statement indicates a bidirectional nature of transfer. Grounded in Cook's (1992, 2003, 2016a) multi-competence framework, which views the multilingual mind as a dynamic amalgamation of linguistic properties rather than a mere collection of isolated language systems, we examined the role of a later-acquired foreign language in language users' perception of an earlier-learned foreign language.

Cook's (2003) publication documents a range of studies showcasing effects of L2 on L1. CLI scholars have collected ample evidence showing that a bilingual mind processes languages differently from a monolingual mind, particularly in how one's native language can be influenced by the L2. Our research endeavor extended from the bilingual context into the multilingual one. Why? The rationale is straightforward: alongside globalization, multilingualism is widespread, and its impact is growing. It is essential for the functioning of key societal components like technology, finance, politics, and culture (Aronin & Singleton, 2008, pp. 1–2). Not only does the interaction across languages have an important function in our society, but it also inevitably exerts an impact on individuals. If language acquisition is a dynamic, ongoing process where features of the acquired languages and the languages being acquired potentially interact with each other, and if one's native language can be influenced by L2 in different respects, it stands to reason any later-acquired languages may similarly impact

previously acquired ones. This area, however, is under-researched. Most studies on multilingual education and multilingual acquisition focus on the role of L1 and L2 in learning an additional language, i.e., forward transfer, while studies on backward transfer are rare, prompting our investigation.

We began with a fundamental question: *Does a third language influence one's second language?* Our study specified this question down to the investigation of backward transfer from the syntactic features of L3 German on speakers' perception of L2 English word order. Through a thorough analysis of trilingual language users' rating patterns for L2 English sentences composed in German, English, and Chinese word orders, we addressed the key questions regarding the manifestations, characteristics, and mechanisms of backward transfer.

Specifically, we delved into four scenarios where word order similarities and contrasts are observed in German, English, and Chinese: (1) subject-verb inversion, (2) word order variation in transitive VPCs, (3) placement of adverbial adjunct in SV simple tense clauses, and (4) patterns for ditransitive constructions. Through an ATJ, we investigated the attitudinal differences between trilinguals and bilinguals in assessing sentences with different word orders. The detailed experiment results for each specific scenario are illustrated in Chapter 6, followed by an integrated synthesis and discussion in Chapter 7. The most significant findings are as follows:

- **Does backward transfer from L3 German occur? Yes.** Backward transfer from L3 German syntax to L2 English is evident after the successful acquisition of L3, influencing the implicit knowledge of L2.
- **What is transferred? The V2 constraint and rules governing the position of constituents within the German verbal bracket for simple tense clauses are transferred.** The influence of German is pronounced in subject-simple verb inversion and adverbial position; it is nuanced regarding subject-auxiliary inversion, word order variation in VPCs, and patterns for ditransitive constructions. The VF position does not exhibit transferability.

- **What characteristics does backward transfer have? Non-facilitative, indirect, and partial.** The transfer effect from L3 German is non-facilitative in two main aspects: it negatively impacts the language user's perception of English word order, particularly of the pre-verbal adverbial position; it increases tolerance for grammatically less acceptable constructions aligning with German order. The transfer effect is indirect, as it does not completely reshape the already established English grammar system. The transfer effect is partial because not every syntactic property is transferred.
- **What drives backward transfer? Structural disparities between languages, stemming from distinctive features of German syntax from English and Chinese, are major sources of transfer. Other factors may play a role, including structural frequency, perceptual salience, language dominance, and language proficiency.** Trilingual speakers make judgments based on the acquired syntactic rules of L3 German that differ from word order alignments in L1 Chinese and L2 English; however, newly acquired linguistic properties in L2 that lack representation in L1 are less susceptible to L3 influence. Additional factors may affect the manifestation or degree of backward transfer effects.

The results of this study strongly support the views of Westergaard et al. (2017) and Slabakova (2017) regarding the nature of CLI: transfer can also be non-facilitative, and it occurs property-by-property rather than wholesale.

Finally, we introduced a novel CLI model, the *Bi-Directional Transfer Model*, to systematically explain the nature of (backward) CLI. This model posits that features of each acquired language hold the potential for CLI, whether forward or backward, whether facilitative or non-facilitative. Moreover, other factors, internal or external to languages, also contribute to the magnitude and extent of CLI. The *Bi-Directional Transfer Model* serves as an extension of the *Linguistic Proximity Model* by Westergaard et al. (2017) and the *Scalpel Model* by Slabakova (2017) by incorporating the bidirectional nature of transfer and focusing on how CLI dynamics unfold in the

advanced stage of multilingual acquisition. It emphasizes the potential for backward transfer from a later-acquired foreign language that has become the dominant foreign language, providing a more comprehensive understanding of CLI in multilingual contexts.

## **8.2 Research Limitations**

In considering the limitations of the current study, the primary constraint pertains to the absence of an investigation into participants' English output in a natural setting. Participants rated artificially designed sentences in an unnatural setting—an acceptability judgment task. However, such a task could not account for other potentially influential variables, such as semantic and pragmatic aspects. To mitigate this limitation, we conducted quantitative research by arranging multiple stimuli in the task for each sub-scenario, followed by qualitative analyses.

Importantly, the judgment task could only reveal the influence of German on participants' language perception rather than their actual language production. Many ungrammatical and non-canonical stimuli adhering to German word order were included in this task. However, as previously noted, we were unable to ascertain whether the trilinguals would naturally utter the corresponding structures in their English output. As a result, we cannot confirm whether the influence from German syntax manifests in a more direct, observable manner. Therefore, addressing this gap with follow-up studies is imperative.

The second limitation concerns the scope of the experimental design. In an initial, prototypical research, which was conducted during the author's master's thesis research, preliminary instances of German syntactic influence were observed in two isolated cases involving V2 constraints. While these findings showed promise, their isolated nature meant they could only offer preliminary evidence and lacked the robustness needed for comprehensive conclusions. Therefore, in this current project, we aimed to encompass a broader range of syntactic features to obtain more extensive results. To achieve this, multiple stimuli were devised for each specific scenario, including English



sentences aligning with German word order, their counterparts conforming to English/Chinese grammar, and fillers, especially for the two scenarios involving subject-verb inversion and adverbial placement in SV clauses. Our primary object was to investigate whether trilingual participants would consistently demonstrate higher tolerance toward sentences featuring German V2 constraints (different types of inversion and the S-V-Adv-X order). Therefore, we included a substantial number of stimuli reflecting German word order, many of which were in turn ungrammatical in English. Additionally, as a secondary aim, we sought to explore whether German syntax could sufficiently influence the participants' already established English grammar system, which led us to include several V3 variants. However, since this exploration was not our primary focus, and to mitigate the risk of overwhelming participants and developing habitual thinking patterns during the judgment task, we reduced the number of the V3 variants (88 V3 stimuli vs. 52 V3 stimuli for inversion/preposing; 25 V3 stimuli vs. 33 V2 stimuli for adverbial placement).

The results suggest that German grammar rules not only prompted trilingual participants to accept English sentences whose word order aligns with German syntax but also subtly impacted their established English grammar system, specifically reducing the acceptance of V3 stimuli in canonical SV clauses. This finding illustrates a clear manifestation of a more direct, non-facilitative transfer effect. If we had focused more on the aspect of how trilinguals perceived English word orders that violate German grammar, we would have gathered more direct evidence of the impact of V2 constraint in German and gained a more comprehensive understanding of the transfer effect. While this limitation did not affect the overall integrity of the study, it did limit the comprehensiveness of our analysis concerning the V2-V3 contrast. Balancing between breadth and depth of the experimental design was a real challenge.

Furthermore, when analyzing the interaction between L1 Chinese and L3 German. We could only speculate that the structural overlap between English and Chinese contributed to the bilinguals' good performance and that the distinctive structure of German has neutralized the potential influence from Chinese. Including a control bilingual group's performance would have substantiated our conjecture. For instance,

if proficient L1 German-L2 English bilinguals show lower acceptance of the S-Adv-V-X word order than the L1 Chinese-L2 English speakers, we can more confidently conclude that the similarity between English and Chinese in the pre-verbal placement of adverbials exerts a positive influence on the acquisition of adverbial placement of English. In turn, we would have attained more evidence of the neutralizing effect of German.

Another limitation is the reliance on a descriptive grammar theoretical approach. Due to the scope of the experiment and limitations in financial support, we were unable to recruit a monolingual control group consisting of native English speakers. A control group would have allowed for a more rigorous comparison of our participants' performance, particularly in assessing whether their performance exhibits native-like patterns. In turn, it would have enabled us to make more detailed observations of the extent to which German exerts an influence. Nevertheless, it is important to note that we designed the stimuli in our experiment based on grammar rules concluded by multiple grammarians. These rules are derived from corpus studies and empirical observations. For cases whose grammatical productivity is less clear, such as stimuli *The team solves easily the problem* and *She likes probably this feeling*,<sup>104</sup> we consulted the token count in the *Corpus of Contemporary American English* (COCA). This ensured a more accurate analysis of participants' performance.

Finally, due to the scarcity of trilingual speakers, recruiting participants with identical language levels posed a challenge. Ideally, all participants in the trilingual group were targeted to have a C1 proficiency in both German and English. However, we recruited a few trilinguals with English or German proficiency between B2 and C1, who nevertheless reported frequent exposure to German. Apart from this, a potential

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<sup>104</sup> These cases involved a non-canonical word order, and we were unsure about their productivity by only consulting reference works, especially when compared with the canonical arrangement. Although grammarians such as Cinque (1999, pp. 30–31) and Huddleston and Pullum (2002, p. 587) mentioned the exceptions regarding adverbial placement, we still performed a double check in the corpus. We thank Dr. Martin Schweinberger and Dr. Eliane Lorenz for pointing out this issue in the workshop on July 7, 2023, organized by Prof. Dr. Peter Siemund.

avenue for further research could involve an exclusive investigation into the relationship between backward transfer and language proficiency (or language exposure). To reach this goal, two experimental groups, one with higher German proficiency but identical Chinese and English proficiency and the other with lower German proficiency but identical Chinese and English proficiency, would need to be recruited.

### **8.3 Implications for Future Research**

This doctoral project represents a pioneering and comprehensive study within the field of CLI, specifically with a focus on the phenomenon of backward syntactic transfer in successful multilingual acquisition. Drawing from our research limitations, four topics are suggested for future studies:

- **Transfer from L3 German to trilinguals' active L2 English production.** Observations of L2 output in a natural speech setting are recommended. If structures aligning with German syntax are observed in trilinguals' English production, solid influence from German will be directly obtained, complementing the findings of the current study.
- **Interaction between L3 German and the native language.** This can be understood in two ways. First, as the current study has not explored the potential transfer effects of Chinese syntax on bilinguals' English performance, it is only speculative to suggest a positive Chinese influence due to structural overlaps between English and Chinese. The strong performance of bilinguals in the judgment task suggests that structural similarities between the two languages might have facilitated speakers' understanding and internalization of English grammar. In turn, the trilinguals' relatively weaker performance could be correlated with a potential non-facilitative influence from L3 German. To substantiate the impact of Chinese, a comparison of performance between the L1 Chinese-L2 English group and an additional L1-L2 English group is needed, where the L1 differs in a certain

syntactic structure, whereas English and Chinese share similarities. Second, our study primarily focused on the transfer phenomenon between two foreign languages. Whether L3 German syntax exerts a direct influence on the perception or output of L1 Chinese remains unclear. This gap awaits further investigation.

- **Extent of influence of German syntax on successfully acquired English grammar.** A more systematic dataset is needed to underscore the extent to which the syntactic disparities between German and English/Chinese directly influence the successfully established English grammar system. Evidence provided in this study shows that adverbial placement in German, because of the V2 constraint, has subtly affected trilinguals' perception of English rules for placing adverbials. Further investigation is required to determine the manifestation of such a direct influence in other scenarios and the degrees of influence.
- **Foreign language dominance and degree of backward transfer.** We posit that the occurrence and extent of transfer are related to the language status of speakers. A direction for future research is investigating how L3 dominance, including frequency of exposure and language proficiency, steers the direction of transfer and influences the extent of backward transfer.

Building upon the empirical insights, a novel, prototypical model, the *Bi-Directional Transfer Model*, has been introduced, underscoring the direction of transfer after the successful acquisition of foreign languages. This model remains open to further refinement and enhancement. For instance, the arrow denoting the influence from the  $L_n/L_{n+1}$  to the mother tongue needs completion and further elaboration. Additionally, future studies could extend the research scope on backward influence to other linguistic domains, not just syntax. The approaches used in the present study can be applied to investigate backward transfer in other language constellations, i.e., whether a linguistic property exclusive to  $L_{n+1}$  influences the perception or processing of a language acquired at an earlier time point.

In the practices of foreign language didactics, this study offers a two-fold contribution. First, in Chapter 4, we have meticulously elucidated the syntactic similarities and contrasts between German, English, and Chinese. This detailed analysis serves as a reference for foreign language educators, particularly those adopting a plurilingual pedagogical approach. Second, the findings derived from our experiment highlight the potential pitfalls in the language acquisition process, serving as a reminder for language learners and users engaged in the complex multilingual context of German-English-Chinese. To mitigate the negative backward influence of an additional dominant foreign language, explicit comparisons of linguistic similarities and differences of the acquired languages are strongly recommended. Periodical reexamination of grammatical knowledge of less frequently used foreign languages is recommended. Such ongoing engagement ensures a well-grounded awareness of language contrasts and potential challenges in language use.

Finally, for CLI researchers, it is of paramount significance not to rest on existing findings but to actively pursue further research. As we move forward in this field, we embark on a collective journey of exploration and understanding, shaping the extending landscape of multilingual acquisition and its intricate dynamics.

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## Appendix

### Appendix 1: Two Groups' Acceptability Judgment of Ungrammatical Inversions

| No.  | Ungrammatical stimuli                                     | M1   | M2   | p-value        |
|------|-----------------------------------------------------------|------|------|----------------|
| *S1  | A1 *In has he come.                                       | 1.4  | 1.93 | $p = 0.004$    |
| *S2  | A2 *Into the North Atlantic Ocean has Titanic sunk.       | 2.7  | 3.17 | $p > 0.1$      |
| *S3  | A3 *Back to the village has the farmer come.              | 2.67 | 3.67 | $p = 0.043$    |
| *S4  | A4 *Into the house must the boys run.                     | 1.73 | 2.8  | $p = 0.056$    |
| *S5  | A5 *Into the house have they run.                         | 2.13 | 2.8  | $p = 0.079$    |
| *S6  | A6 *Down the hill has the football rolled.                | 2.67 | 2.97 | $p > 0.1$      |
| *S7  | A8 In came he.                                            | 1.4  | 1.73 | $p = 0.094$    |
| *S8  | A11 *Into the house run they.                             | 1.6  | 1.7  | $p > 0.1$      |
| *S9  | A13 *On each wall hangs Bill a large picture.             | 2.97 | 2.23 | $p = 0.075$    |
| *S10 | A14 *On each wall hangs Bill it.                          | 2.4  | 1.5  | $p = 0.024$    |
| *S11 | AA7 *In a corner are laughing the children.               | 1.93 | 2.03 | $p > 0.1$      |
| *S12 | AA8 *At an old desk is writing Tom Lopez.                 | 1.77 | 1.87 | $p > 0.1$      |
| *S13 | AA9 *At an old desk writes Tom Lopez.                     | 2.9  | 2.5  | $p > 0.1$      |
| *S14 | AA10 *In Munich resides the man.                          | 3.3  | 3.43 | $p > 0.1$      |
| *S15 | B1 *With him should you talk.                             | 2.6  | 2.87 | $p > 0.1$      |
| *S16 | B2 *With the class teacher should all parents talk.       | 2.33 | 2.67 | $p > 0.1$      |
| *S17 | B3 *Until midnight should they stay awake.                | 3.37 | 3.17 | $p > 0.1$      |
| *S18 | B4 *In this way can you rebuild your life.                | 3.37 | 3.4  | $p > 0.1$      |
| *S19 | B5 *At 7:00 must I get up.                                | 2.33 | 2.6  | $p > 0.1$      |
| *S20 | B6 *In my opinion is the answer correct.                  | 3.6  | 2.07 | $p = 0.001$    |
| *S21 | B7 *Since 1999 left no employee the company.              | 2.53 | 2.27 | $p = 0.005$    |
| *S22 | B8 *In his notebook writes the student everything down.   | 3.53 | 1.87 | $p = 0.0006$   |
| *S23 | B9 *At nine o'clock goes Nick to bed.                     | 3.57 | 2.17 | $p = 0.002$    |
| *S24 | B10 *Every day at 7:00 go Nick and his brother to school. | 3.13 | 1.93 | $p = 0.006$    |
| *S25 | B11 *To me means this present a lot.                      | 3.5  | 1.47 | $p = 0.000005$ |
| *S26 | B12 *For three hours lasted the movie.                    | 2.37 | 2.47 | $p > 0.1$      |
| *S27 | C1 *Probably has he forgotten us.                         | 3.17 | 2.87 | $p > 0.1$      |
| *S28 | C2 *Probably will he leave early.                         | 3.1  | 2.83 | $p > 0.1$      |
| *S29 | C3 *Surprisingly have they already finished.              | 3.9  | 3.5  | $p > 0.1$      |
| *S30 | C4 *Absolutely should you take a rest.                    | 3.5  | 3.73 | $p > 0.1$      |
| *S31 | C5 *Unfortunately was he killed.                          | 2.47 | 2.2  | $p > 0.1$      |
| *S32 | C6 *Probably comes Alex as well.                          | 3.4  | 2.33 | $p = 0.029$    |
| *S33 | C7 *Probably likes she this feeling.                      | 2.93 | 2.1  | $p = 0.042$    |
| *S34 | C8 *Certainly was it very good.                           | 3.47 | 2.57 | $p = 0.034$    |

| No.                                                                                                                                                                                                                                                                                                                 | Ungrammatical stimuli                                            | M1     | M2   | p-value       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|--------|------|---------------|
| *S35                                                                                                                                                                                                                                                                                                                | C9 *Largely depends it on his decision.                          | 3.33   | 2.27 | $p = 0.017$   |
| *S36                                                                                                                                                                                                                                                                                                                | D1 *Over and over again has he made the same mistake.            | 3.17   | 3.9  | $p > 0.1$     |
| *S37                                                                                                                                                                                                                                                                                                                | D2 *Quickly has he fallen asleep.                                | 2.9    | 3.3  | $p > 0.1$     |
| *S38                                                                                                                                                                                                                                                                                                                | D3 *Quickly was the problem solved.                              | 3      | 3.23 | $p > 0.1$     |
| *S39                                                                                                                                                                                                                                                                                                                | D4 *Quickly ran the children into the classroom.                 | 3.1    | 2.57 | $p > 0.1$     |
| *S40                                                                                                                                                                                                                                                                                                                | D5 *Quickly put the firefighter the fire out.                    | 3.5    | 2.07 | $p = 0.001$   |
| *S41                                                                                                                                                                                                                                                                                                                | D6 *Slowly read the children the text.                           | 3.53   | 2.07 | $p = 0.001$   |
| *S42                                                                                                                                                                                                                                                                                                                | D7 *Slowly figures out John the solution.                        | 3.23   | 1.9  | $p = 0.001$   |
| *S43                                                                                                                                                                                                                                                                                                                | D8 *Easily solved the team the problem.                          | 3.4    | 2.13 | $p = 0.004$   |
| *S44                                                                                                                                                                                                                                                                                                                | D9 *Beautifully sings the opera singer.                          | 2.97   | 2.47 | $p > 0.1$     |
| *S45                                                                                                                                                                                                                                                                                                                | D10 *Angrily speaks the woman.                                   | 3.6    | 3    | $p > 0.1$     |
| *S46                                                                                                                                                                                                                                                                                                                | D11 *Elegantly talks the movie star.                             | 2.73   | 2.67 | $p > 0.1$     |
| *S47                                                                                                                                                                                                                                                                                                                | D12 *Loudly barks the dog.                                       | 2.77   | 3.03 | $p > 0.1$     |
| *S48                                                                                                                                                                                                                                                                                                                | E1 *Every morning throws my mom the garbage away.                | 3.5    | 2.07 | $p = 0.001$   |
| *S49                                                                                                                                                                                                                                                                                                                | E2 *Often thinks he about his mother.                            | 3.4    | 2.1  | $p = 0.003$   |
| *S50                                                                                                                                                                                                                                                                                                                | E3 *Twice a week visits Lucie her grandma.                       | 3.57   | 1.8  | $p = 0.00003$ |
| *S51                                                                                                                                                                                                                                                                                                                | E4 *Twice a week visits she her grandma.                         | 3.6    | 1.57 | $p = 0.00001$ |
| *S52                                                                                                                                                                                                                                                                                                                | E5 *Rarely felt my grandpa so excited.                           | 3.57   | 2.33 | $p = 0.005$   |
| *S53                                                                                                                                                                                                                                                                                                                | E6 *Quite often smokes Wendy cigarettes.                         | 3      | 1.9  | $p = 0.004$   |
| *S54                                                                                                                                                                                                                                                                                                                | E7 *Every morning drinks he a glass of milk.                     | 3.27   | 2.37 | $p = 0.026$   |
| *S55                                                                                                                                                                                                                                                                                                                | E8 *Twice a week comes she.                                      | 3      | 2.17 | $p = 0.069$   |
| *S56                                                                                                                                                                                                                                                                                                                | E9 *Twice a week comes Nancy.                                    | 3.43   | 3    | $p > 0.1$     |
| *S57                                                                                                                                                                                                                                                                                                                | G1 *When she was young, was she very poor.                       | 2.7    | 2.03 | $p = 0.081$   |
| *S58                                                                                                                                                                                                                                                                                                                | G2 *When she was young must she work very hard to make a living. | 2.63   | 2.87 | $p > 0.1$     |
| *S59                                                                                                                                                                                                                                                                                                                | G3 *Before we act must we think twice.                           | 2.87   | 3.07 | $p > 0.1$     |
| *S60                                                                                                                                                                                                                                                                                                                | G4 *Before we play games should we do our homework.              | 3.13   | 3.13 | $p > 0.1$     |
| *S61                                                                                                                                                                                                                                                                                                                | G5 *Even if the chance is very low should you give a try.        | 3.47   | 3.43 | $p > 0.1$     |
| N = 61                                                                                                                                                                                                                                                                                                              |                                                                  | Mean = | 2.95 | 2.52          |
| <p><b>Interpretation of p-value:</b><br/> <math>p \leq 0.001</math>: highly significant evidence:<br/> <math>0.001 &lt; p \leq 0.05</math>: significant evidence<br/> <math>0.05 &lt; p \leq 0.1</math>: marginally significant evidence<br/> <math>p &gt; 0.1</math>: no significant evidence for a difference</p> |                                                                  |        |      |               |

## Appendix 2: Two Groups' Acceptability Judgment of Grammatical Inversions

| No.                                                                                                                                                                                                                                                 | Grammatical Stimuli                                                   | M1   | M2   | p-value      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|------|------|--------------|
| S1                                                                                                                                                                                                                                                  | A8 Into the North Atlantic Ocean sank Titanic.                        | 3.47 | 2.6  | $p = 0.045$  |
| S2                                                                                                                                                                                                                                                  | A9 Back to the village comes the farmer.                              | 4    | 4.1  | $p > 0.1$    |
| S3                                                                                                                                                                                                                                                  | A10 Into the house run the boys.                                      | 2.87 | 2.93 | $p > 0.1$    |
| S4                                                                                                                                                                                                                                                  | A12 Down the hill rolled the football.                                | 3.2  | 3.53 | $p > 0.1$    |
| S5                                                                                                                                                                                                                                                  | AA1 Among the guests was Mary.                                        | 3.47 | 3.37 | $p > 0.1$    |
| S6                                                                                                                                                                                                                                                  | AA2 Among the guests sits Mary.                                       | 4.33 | 3.87 | $p > 0.1$    |
| S7                                                                                                                                                                                                                                                  | AA3 In the shadow stands a tall man.                                  | 4.53 | 4.63 | $p > 0.1$    |
| S8                                                                                                                                                                                                                                                  | AA4 In the shadow is standing a tall man.                             | 3    | 3.57 | $p > 0.1$    |
| S9                                                                                                                                                                                                                                                  | AA6 At an old desk sits Jimmy Brown.                                  | 4.23 | 4    | $p > 0.1$    |
| S10                                                                                                                                                                                                                                                 | AA10 Along the riverside runs a little dog.                           | 3.3  | 3.9  | $p > 0.1$    |
| S11                                                                                                                                                                                                                                                 | F1 Rarely has my grandpa felt so excited.                             | 3.5  | 4.33 | $p = 0.031$  |
| S12                                                                                                                                                                                                                                                 | F2 On no account should you give up.                                  | 2.93 | 2.1  | $p = 0.042$  |
| S13                                                                                                                                                                                                                                                 | F3 Only in this way can you earn enough money for your next holiday.  | 3.83 | 5.03 | $p = 0.003$  |
| S14                                                                                                                                                                                                                                                 | F4 Never had I seen such a wonderful thing!                           | 4.17 | 4.8  | $p > 0.1$    |
| S15                                                                                                                                                                                                                                                 | F5 Not until the rain stops can we go outside.                        | 2.57 | 4.1  | $p = 0.002$  |
| S16                                                                                                                                                                                                                                                 | F6 Only when you finish the homework can you play video games.        | 4    | 5.2  | $p = 0.0002$ |
| S17                                                                                                                                                                                                                                                 | F7 Only after you've read the book will you see what I mean.          | 3.63 | 4.93 | $p = 0.002$  |
| S18                                                                                                                                                                                                                                                 | F8 Not until the rain stops are we allowed to go.                     | 2.63 | 3.5  | $p = 0.063$  |
| S19                                                                                                                                                                                                                                                 | H1 So hard has he tried.                                              | 2.83 | 4    | $p = 0.015$  |
| S20                                                                                                                                                                                                                                                 | H2 So polluted was the river that all the fish died.                  | 3.17 | 4.07 | $p = 0.082$  |
| S21                                                                                                                                                                                                                                                 | H3 So hard must I work that I wonder whether it is really worth it.   | 2.97 | 3.7  | $p > 0.1$    |
| S22                                                                                                                                                                                                                                                 | H4 So bad must his health be that the doctors can no longer help him. | 3.4  | 4.1  | $p > 0.1$    |
| S23                                                                                                                                                                                                                                                 | I1 "No problem", said Mary.                                           | 4.47 | 4.6  | $p > 0.1$    |
| S24                                                                                                                                                                                                                                                 | I2 "No problem", murmured Mary.                                       | 4.37 | 4.03 | $p > 0.1$    |
| S25                                                                                                                                                                                                                                                 | I3 "Let's go home", said he loudly.                                   | 4.03 | 3.43 | $p > 0.1$    |
| S26                                                                                                                                                                                                                                                 | I4 "Let's go home", said he.                                          | 3.83 | 3.27 | $p > 0.1$    |
| S27                                                                                                                                                                                                                                                 | I5 "Let's go home", said the man.                                     | 4.53 | 4.4  | $p > 0.1$    |
| N = 27      Mean =                                                                                                                                                                                                                                  |                                                                       | 3.58 | 3.87 |              |
| <b>Interpretation of p-value:</b><br>$p \leq 0.001$ : highly significant evidence:<br>$0.001 < p \leq 0.05$ : significant evidence<br>$0.05 < p \leq 0.1$ : marginally significant evidence<br>$p > 0.1$ : no significant evidence for a difference |                                                                       |      |      |              |

**Appendix 3:** Two Groups' Acceptability Judgment of Subject-Verb Inversion in Relation to Categories of Fronted Elements

| <i>Fronted Element</i>     | <i>No.</i> | <i>V2 Stimuli</i>                                | <i>M1</i> | <i>M2</i> | <i>p-value</i> |
|----------------------------|------------|--------------------------------------------------|-----------|-----------|----------------|
| <b>Directional Phrases</b> | A1         | *In has he come.                                 | 1.4       | 1.93      | $p = 0.004$    |
|                            | A2         | *Into the North Atlantic Ocean has Titanic sunk. | 2.7       | 3.17      | $p > 0.1$      |
|                            | A3         | *Back to the village has the farmer come.        | 2.67      | 3.67      | $p = 0.043$    |
|                            | A4         | *Into the house must the boys run.               | 1.73      | 2.8       | $p = 0.056$    |
|                            | A5         | *Into the house have they run.                   | 2.13      | 2.8       | $p = 0.079$    |
|                            | A6         | *Down the hill has the football rolled.          | 2.67      | 2.97      | $p > 0.1$      |
|                            | A7         | *In came he.                                     | 1.4       | 1.73      | $p = 0.094$    |
|                            | A8         | Into the North Atlantic Ocean sank Titanic.      | 3.47      | 2.6       | $p = 0.045$    |
|                            | A9         | Back to the village comes the farmer.            | 4         | 4.1       | $p > 0.1$      |
|                            | A10        | Into the house run the boys.                     | 2.87      | 2.93      | $p > 0.1$      |
|                            | A11        | *Into the house run they.                        | 1.6       | 1.7       | $p > 0.1$      |
|                            | A12        | Down the hill rolled the football.               | 3.2       | 3.53      | $p > 0.1$      |
|                            | A13        | *On each wall hangs Bill a large picture.        | 2.97      | 2.23      | $p = 0.075$    |
|                            | A14        | *On each wall hangs Bill it.                     | 2.4       | 1.5       | $p = 0.024$    |
| <b>Locative Phrases</b>    | AA1        | In the shadow is standing a tall man.            | 3         | 3.57      | $p > 0.1$      |
|                            | AA2        | Among the guests was Mary.                       | 3.47      | 3.37      | $p > 0.1$      |
|                            | AA3        | Among the guests sits Mary.                      | 4.33      | 3.87      | $p > 0.1$      |
|                            | AA4        | In the shadow stands a tall man.                 | 4.53      | 4.63      | $p > 0.1$      |
|                            | AA5        | At an old desk sits Jimmy Brown.                 | 4.23      | 4         | $p > 0.1$      |
|                            | AA6        | Along the riverside runs a little dog.           | 3.3       | 3.9       | $p > 0.1$      |
|                            | AA7        | *In a corner are laughing the children.          | 1.93      | 2.03      | $p > 0.1$      |
|                            | AA8        | *At an old desk is writing Tom Lopez.            | 1.77      | 1.87      | $p > 0.1$      |
|                            | AA9        | *At an old desk writes Tom Lopez.                | 2.9       | 2.5       | $p > 0.1$      |
|                            | AA10       | *In Munich resides the man.                      | 3.3       | 3.43      | $p > 0.1$      |
| <b>Non-Directional PPs</b> | B1         | *With him should you talk.                       | 2.6       | 2.87      | $p > 0.1$      |
|                            | B2         | *With the class teacher should all parents talk. | 2.33      | 2.67      | $p > 0.1$      |
|                            | B3         | *Until midnight should they stay awake.          | 3.37      | 3.17      | $p > 0.1$      |
|                            | B4         | *In this way can you rebuild your life.          | 3.37      | 3.4       | $p > 0.1$      |
|                            | B5         | *At 7:00 must I get up.                          | 2.33      | 2.6       | $p > 0.1$      |
|                            | B6         | *In my opinion is the answer correct.            | 3.6       | 2.07      | $p = 0.001$    |

| <i>Fronted Element</i>                              | <i>No.</i> | <i>V2 Stimuli</i>                                     | <i>M1</i> | <i>M2</i> | <i>p-value</i> |
|-----------------------------------------------------|------------|-------------------------------------------------------|-----------|-----------|----------------|
|                                                     | B7         | *Since 1999 left no employee the company.             | 2.53      | 2.27      | $p = 0.005$    |
|                                                     | B8         | *In his notebook writes the student everything down.  | 3.53      | 1.87      | $p = 0.0006$   |
|                                                     | B9         | *At nine o'clock goes Nick to bed.                    | 3.57      | 2.17      | $p = 0.002$    |
|                                                     | B10        | *Every day at 7:00 go Nick and his brother to school. | 3.13      | 1.93      | $p = 0.006$    |
|                                                     | B11        | *To me means this present a lot.                      | 3.5       | 1.47      | $p = 0.000005$ |
|                                                     | B12        | *For three hours lasted the movie.                    | 2.37      | 2.47      | $p > 0.1$      |
| Stance Adverbs<br>(attitude/probability/evaluation) | C1         | *Probably has he forgotten us.                        | 3.17      | 2.87      | $p > 0.1$      |
|                                                     | C2         | *Probably will he leave early.                        | 3.1       | 2.83      | $p > 0.1$      |
|                                                     | C3         | *Surprisingly have they already finished.             | 3.1       | 2.83      | $p > 0.1$      |
|                                                     | C4         | *Absolutely should you take a rest.                   | 3.5       | 3.73      | $p > 0.1$      |
|                                                     | C5         | *Unfortunately was he killed.                         | 2.47      | 2.2       | $p > 0.1$      |
|                                                     | C6         | *Probably comes Alex as well.                         | 3.4       | 2.33      | $p = 0.029$    |
|                                                     | C7         | *Probably likes she this feeling.                     | 2.93      | 2.1       | $p = 0.042$    |
|                                                     | C8         | *Certainly was it very good.                          | 3.47      | 2.57      | $p = 0.034$    |
|                                                     | C9         | *Largely depends it on his decision.                  | 3.33      | 2.27      | $p = 0.017$    |
| Adverbials of Manner                                | D1         | *Over and over again has he made the same mistake.    | 3.17      | 3.9       | $p > 0.1$      |
|                                                     | D2         | *Quickly has he fallen asleep.                        | 2.9       | 3.3       | $p > 0.1$      |
|                                                     | D3         | *Quickly was the problem solved.                      | 3         | 3.23      | $p > 0.1$      |
|                                                     | D4         | *Quickly ran the children into the classroom.         | 3.1       | 2.57      | $p > 0.1$      |
|                                                     | D5         | *Quickly put the firefighter the fire out.            | 3.5       | 2.07      | $p = 0.001$    |
|                                                     | D6         | *Slowly read the children the text.                   | 3.53      | 2.07      | $p = 0.001$    |
|                                                     | D6         | *Slowly figures out John the solution.                | 3.23      | 1.9       | $p = 0.001$    |
|                                                     | D8         | *Easily solved the team the problem.                  | 3.4       | 2.13      | $p = 0.004$    |
|                                                     | D9         | *Beautifully sings the opera singer.                  | 2.97      | 2.47      | $p > 0.1$      |
|                                                     | D10        | *Angrily speaks the woman.                            | 3.6       | 3         | $p > 0.1$      |
|                                                     | D11        | *Elegantly talks the movie star.                      | 2.73      | 2.67      | $p > 0.1$      |
|                                                     | D12        | *Loudly barks the dog.                                | 2.77      | 3.03      | $p > 0.1$      |
| Adverbials of Frequency                             | E1         | *Every morning throws my mom the garbage away.        | 3.5       | 2.07      | $p = 0.001$    |
|                                                     | E2         | *Often thinks he about his mother.                    | 3.4       | 2.1       | $p = 0.003$    |
|                                                     | E3         | *Twice a week visits Lucie her grandma.               | 3.57      | 1.8       | $p = 0.00003$  |

| Fronted Element                 | No. | V2 Stimuli                                                        | M1   | M2   | p-value       |
|---------------------------------|-----|-------------------------------------------------------------------|------|------|---------------|
|                                 | E4  | *Twice a week visits she her grandma.                             | 3.6  | 1.57 | $p = 0.00001$ |
|                                 | E5  | *Rarely felt my grandpa so excited.                               | 3.57 | 2.33 | $p = 0.005$   |
|                                 | E6  | *Quite often smokes Wendy cigarettes.                             | 3    | 1.9  | $p = 0.004$   |
|                                 | E7  | *Every morning drinks he a glass of milk.                         | 3.27 | 2.37 | $p = 0.026$   |
|                                 | E8  | *Twice a week comes she.                                          | 3    | 2.17 | $p = 0.069$   |
|                                 | E9  | *Twice a week comes Nancy.                                        | 3.43 | 3    | $p > 0.1$     |
| Negative/Restrictive Adverbials | E5  | *Rarely felt my grandpa so excited.                               | 3.57 | 2.33 | $p = 0.005$   |
|                                 | F1  | Rarely has my grandpa felt so excited.                            | 3.5  | 4.33 | $p = 0.031$   |
|                                 | F2  | On no account should you give up.                                 | 2.93 | 2.1  | $p = 0.042$   |
|                                 | F3  | Only in this way can you earn enough money for your next holiday. | 3.83 | 5.03 | $p = 0.003$   |
|                                 | F4  | Never had I seen such a wonderful thing!                          | 4.17 | 4.8  | $p > 0.1$     |
|                                 | F5  | Not until the rain stops can we go outside.                       | 2.57 | 4.1  | $p = 0.002$   |
|                                 | F6  | Only when you finish the homework can you play video games.       | 4    | 5.2  | $p = 0.0002$  |
|                                 | F7  | Only after you've read the book will you see what I mean.         | 3.63 | 4.93 | $p = 0.002$   |
| Adverbial Clauses               | F8  | Not until the rain stops are we allowed to go.                    | 2.63 | 3.5  | $p = 0.063$   |
|                                 | F5  | Not until the rain stops can we go outside.                       | 2.57 | 4.1  | $p = 0.002$   |
|                                 | F6  | Only when you finish the homework can you play video games.       | 4    | 5.2  | $p = 0.0002$  |
|                                 | F7  | Only after you've read the book will you see what I mean.         | 3.63 | 4.93 | $p = 0.002$   |
|                                 | F8  | Not until the rain stops are we allowed to go.                    | 2.63 | 3.5  | $p = 0.063$   |
|                                 | G1  | *When she was young, was she very poor.                           | 2.7  | 2.03 | $p = 0.081$   |
|                                 | G2  | *When she was young must she work very hard to make a living.     | 2.63 | 2.87 | $p > 0.1$     |
|                                 | G3  | *Before we act must we think twice.                               | 2.87 | 3.07 | $p > 0.1$     |
|                                 | G4  | *Before we play games should we do our homework.                  | 3.13 | 3.13 | $p > 0.1$     |
|                                 | G5  | *Even if the chance is very low should you give a try.            | 3.47 | 3.43 | $p > 0.1$     |

| <i>Fronted Element</i>                                                                                                                                                                                                                                                           | <i>No.</i> | <i>V2 Stimuli</i>                                                  | <i>M1</i> | <i>M2</i> | <i>p-value</i> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------|-----------|-----------|----------------|
| <b>So + Adj/Adv</b>                                                                                                                                                                                                                                                              | H1         | So hard has he tried.                                              | 2.83      | 4         | $p = 0.015$    |
|                                                                                                                                                                                                                                                                                  | H2         | So polluted was the river that all the fish died.                  | 3.17      | 4.07      | $p = 0.082$    |
|                                                                                                                                                                                                                                                                                  | H3         | So hard must I work that I wonder whether it is really worth it.   | 2.97      | 3.7       | $p > 0.1$      |
|                                                                                                                                                                                                                                                                                  | H4         | So bad must his health be that the doctors can no longer help him. | 3.4       | 4.1       | $p > 0.1$      |
| <b>Direct Quote</b>                                                                                                                                                                                                                                                              | I1         | "No problem", said Mary.                                           | 4.47      | 4.6       | $p > 0.1$      |
|                                                                                                                                                                                                                                                                                  | I2         | "No problem", murmured Mary.                                       | 4.37      | 4.03      | $p > 0.1$      |
|                                                                                                                                                                                                                                                                                  | I3         | "Let's go home", said the man.                                     | 4.53      | 4.4       | $p > 0.1$      |
|                                                                                                                                                                                                                                                                                  | I4         | **"Let's go home", said he.                                        | 3.83      | 3.27      | $p > 0.1$      |
|                                                                                                                                                                                                                                                                                  | I5         | **"Let's go home", said he loudly.                                 | 4.03      | 3.43      | $p > 0.1$      |
| <b>Interpretation of p-value:</b><br>$p \leq 0.001$ : <i>highly significant evidence</i> :<br>$0.001 < p \leq 0.05$ : <i>significant evidence</i><br>$0.05 < p \leq 0.1$ : <i>marginally significant evidence</i><br>$p > 0.1$ : <i>no significant evidence for a difference</i> |            |                                                                    |           |           |                |



#### Appendix 4: Two Groups' Acceptability Judgment of Subject-Simple Verb Inversions

| No.  | Stimuli in Subject-Simple Verb Inversion                  | M1   | M2   | p-value        |
|------|-----------------------------------------------------------|------|------|----------------|
| (1)  | A7 *In came he.                                           | 1.4  | 1.73 | $p = 0.094$    |
| (2)  | A8 Into the North Atlantic Ocean sank Titanic.            | 3.47 | 2.6  | $p = 0.045$    |
| (3)  | A9 Back to the village comes the farmer.                  | 4    | 4.1  | $p > 0.1$      |
| (4)  | A10 Into the house run the boys.                          | 2.87 | 2.93 | $p > 0.1$      |
| (5)  | A11 *Into the house run they.                             | 1.6  | 1.7  | $p > 0.1$      |
| (6)  | A12 Down the hill rolled the football.                    | 3.2  | 3.53 | $p > 0.1$      |
| (7)  | A13 *On each wall hangs Bill a large picture.             | 2.97 | 2.23 | $p = 0.075$    |
| (8)  | A14 *On each wall hangs Bill it.                          | 2.4  | 1.5  | $p = 0.024$    |
| (9)  | AA2 Among the guests was Mary.                            | 3.47 | 3.37 | $p > 0.1$      |
| (10) | AA3 Among the guests sits Mary.                           | 4.33 | 3.87 | $p > 0.1$      |
| (11) | AA4 In the shadow stands a tall man.                      | 4.53 | 4.63 | $p > 0.1$      |
| (12) | AA5 At an old desk sits Jimmy Brown.                      | 4.23 | 4    | $p > 0.1$      |
| (13) | AA6 Along the riverside runs a little dog.                | 3.3  | 3.9  | $p > 0.1$      |
| (14) | AA9 *At an old desk writes Tom Lopez.                     | 2.9  | 2.5  | $p > 0.1$      |
| (15) | AA10 *In Munich resides the man.                          | 3.3  | 3.43 | $p > 0.1$      |
| (16) | B6 *In my opinion is the answer correct.                  | 3.6  | 2.07 | $p = 0.001$    |
| (17) | B7 *Since 1999 left no employee the company.              | 2.53 | 2.27 | $p = 0.005$    |
| (18) | B8 *In his notebook writes the student everything down.   | 3.53 | 1.87 | $p = 0.0006$   |
| (19) | B9 *At nine o'clock goes Nick to bed.                     | 3.57 | 2.17 | $p = 0.002$    |
| (20) | B10 *Every day at 7:00 go Nick and his brother to school. | 3.13 | 1.93 | $p = 0.006$    |
| (21) | B11 *To me means this present a lot.                      | 3.5  | 1.47 | $p = 0.000005$ |
| (22) | B12 *For three hours lasted the movie.                    | 2.37 | 2.47 | $p > 0.1$      |
| (23) | C6 *Probably comes Alex as well.                          | 3.4  | 2.33 | $p = 0.029$    |
| (24) | C7 *Probably likes she this feeling.                      | 2.93 | 2.1  | $p = 0.042$    |
| (25) | C8 *Certainly was it very good.                           | 3.47 | 2.57 | $p = 0.034$    |
| (26) | C9 *Largely depends it on his decision.                   | 3.33 | 2.27 | $p = 0.017$    |
| (27) | D4 *Quickly ran the children into the classroom.          | 3.1  | 2.57 | $p > 0.1$      |
| (28) | D5 *Quickly put the firefighter the fire out.             | 3.5  | 2.07 | $p = 0.001$    |
| (29) | D6 *Slowly read the children the text.                    | 3.53 | 2.07 | $p = 0.001$    |
| (30) | D7 *Slowly figures out John the solution.                 | 3.23 | 1.9  | $p = 0.001$    |
| (31) | D8 *Easily solved the team the problem.                   | 3.4  | 2.13 | $p = 0.004$    |
| (32) | D9 *Beautifully sings the opera singer.                   | 2.97 | 2.47 | $p > 0.1$      |
| (33) | D10 *Angrily speaks the woman.                            | 3.6  | 3    | $p > 0.1$      |
| (34) | D11 *Elegantly talks the movie star.                      | 2.73 | 2.67 | $p > 0.1$      |
| (35) | D12 *Loudly barks the dog.                                | 2.77 | 3.03 | $p > 0.1$      |
| (36) | E1 *Every morning throws my mom the garbage away.         | 3.5  | 2.07 | $p = 0.001$    |
| (37) | E2 *Often thinks he about his mother.                     | 3.4  | 2.1  | $p = 0.003$    |

| No.                                                                                                                                                                                                                                                 | Stimuli in Subject-Simple Verb Inversion             | M1   | M2   | p-value       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|------|------|---------------|
| (38)                                                                                                                                                                                                                                                | E3 *Twice a week visits Lucie her grandma.           | 3.57 | 1.8  | $p = 0.00003$ |
| (39)                                                                                                                                                                                                                                                | E4 *Twice a week visits she her grandma.             | 3.6  | 1.57 | $p = 0.00001$ |
| (40)                                                                                                                                                                                                                                                | E5 *Rarely felt my grandpa so excited.               | 3.57 | 2.33 | $p = 0.005$   |
| (41)                                                                                                                                                                                                                                                | E6 *Quite often smokes Wendy cigarettes.             | 3    | 1.9  | $p = 0.004$   |
| (42)                                                                                                                                                                                                                                                | E7 *Every morning drinks he a glass of milk.         | 3.27 | 2.37 | $p = 0.026$   |
| (43)                                                                                                                                                                                                                                                | E8 *Twice a week comes she.                          | 3    | 2.17 | $p = 0.069$   |
| (44)                                                                                                                                                                                                                                                | E9 *Twice a week comes Nancy.                        | 3.43 | 3    | $p > 0.1$     |
| (45)                                                                                                                                                                                                                                                | G1 *When she was young, was she very poor.           | 2.7  | 2.03 | $p = 0.081$   |
| (46)                                                                                                                                                                                                                                                | H2 So polluted was the river that all the fish died. | 3.17 | 4.07 | $p = 0.082$   |
| (47)                                                                                                                                                                                                                                                | I1 "No problem", said Mary.                          | 4.47 | 4.6  | $p > 0.1$     |
| (48)                                                                                                                                                                                                                                                | I2 "No problem", murmured Mary.                      | 4.37 | 4.03 | $p > 0.1$     |
| (49)                                                                                                                                                                                                                                                | I3 "Let's go home", said the man.                    | 4.53 | 4.4  | $p > 0.1$     |
| (50)                                                                                                                                                                                                                                                | I4 "Let's go home", said he.                         | 3.83 | 3.27 | $p > 0.1$     |
| (51)                                                                                                                                                                                                                                                | I5 "Let's go home", said he loudly.                  | 4.03 | 3.43 | $p > 0.1$     |
| <b>Interpretation of p-value:</b><br>$p \leq 0.001$ : highly significant evidence:<br>$0.001 < p \leq 0.05$ : significant evidence<br>$0.05 < p \leq 0.1$ : marginally significant evidence<br>$p > 0.1$ : no significant evidence for a difference |                                                      |      |      |               |

## Appendix 5: Two Groups' Acceptability Judgment of Subject-Auxiliary Inversions

| No.  | Stimuli in Subject-Auxiliary Inversion                               | M1   | M2   | p-value      |
|------|----------------------------------------------------------------------|------|------|--------------|
|      | <b>Stimuli in Full Subject-Auxiliary Inversion</b>                   |      |      |              |
| (1)  | A1 *In has he come.                                                  | 1.4  | 1.93 | $p = 0.004$  |
| (2)  | A2 *Into the North Atlantic Ocean has Titanic sunk.                  | 2.7  | 3.17 | $p > 0.1$    |
| (3)  | A3 *Back to the village has the farmer come.                         | 2.67 | 3.67 | $p = 0.043$  |
| (4)  | A4 *Into the house must the boys run.                                | 1.73 | 2.8  | $p = 0.056$  |
| (5)  | A5 *Into the house have they run.                                    | 2.13 | 2.8  | $p = 0.079$  |
| (6)  | A6 *Down the hill has the football rolled.                           | 2.67 | 2.97 | $p > 0.1$    |
| (7)  | AA1 In the shadow is standing a tall man.                            | 3    | 3.57 | $p > 0.1$    |
| (8)  | AA7 *In a corner are laughing the children.                          | 1.93 | 2.03 | $p > 0.1$    |
| (9)  | AA8 *At an old desk is writing Tom Lopez.                            | 1.77 | 1.87 | $p > 0.1$    |
| (10) | B1 *With him should you talk.                                        | 2.6  | 2.87 | $p > 0.1$    |
| (11) | B2 *With the class teacher should all parents talk.                  | 2.33 | 2.67 | $p > 0.1$    |
| (12) | B3 *Until midnight should they stay awake.                           | 3.37 | 3.17 | $p > 0.1$    |
| (13) | B4 *In this way can you rebuild your life.                           | 3.37 | 3.4  | $p > 0.1$    |
| (14) | B5 *At 7:00 must I get up.                                           | 2.33 | 2.6  | $p > 0.1$    |
| (15) | C1 *Probably has he forgotten us.                                    | 3.17 | 2.87 | $p > 0.1$    |
| (16) | C2 *Probably will he leave early.                                    | 3.1  | 2.83 | $p > 0.1$    |
| (17) | C3 *Surprisingly have they already finished.                         | 3.9  | 3.5  | $p > 0.1$    |
| (18) | C4 *Absolutely should you take a rest.                               | 3.5  | 3.73 | $p > 0.1$    |
| (19) | C5 *Unfortunately was he killed.                                     | 2.47 | 2.2  | $p > 0.1$    |
| (20) | D1 *Over and over again has he made the same mistake.                | 3.17 | 3.9  | $p > 0.1$    |
| (21) | D2 *Quickly has he fallen asleep.                                    | 2.9  | 3.3  | $p > 0.1$    |
| (22) | D3 *Quickly was the problem solved.                                  | 3    | 3.23 | $p > 0.1$    |
| (23) | F1 Rarely has my grandpa felt so excited.                            | 3.5  | 4.33 | $p = 0.031$  |
| (24) | F2 On no account should you give up.                                 | 2.93 | 2.1  | $p = 0.042$  |
| (25) | F3 Only in this way can you earn enough money for your next holiday. | 3.83 | 5.03 | $p = 0.003$  |
| (26) | F4 Never had I seen such a wonderful thing!                          | 4.17 | 4.8  | $p > 0.1$    |
| (27) | F5 Not until the rain stops can we go outside.                       | 2.57 | 4.1  | $p = 0.002$  |
| (28) | F6 Only when you finish the homework can you play video games.       | 4    | 5.2  | $p = 0.0002$ |
| (29) | F7 Only after you've read the book will you see what I mean.         | 3.63 | 4.93 | $p = 0.002$  |
| (30) | F8 Not until the rain stops are we allowed to go.                    | 2.63 | 3.5  | $p = 0.063$  |
| (31) | G2 *When she was young must she work very hard to make a living.     | 2.63 | 2.87 | $p > 0.1$    |
| (32) | G3 *Before we act must we think twice.                               | 2.87 | 3.07 | $p > 0.1$    |
| (33) | G4 *Before we play games should we do our homework.                  | 3.13 | 3.13 | $p > 0.1$    |

| <b>No.</b>                                                                                                                                                                                                                                          | <b>Stimuli in Subject-Auxiliary Inversion</b>                         | <b>M1</b>   | <b>M2</b> | <b>p-value</b>                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-------------|-----------|-------------------------------|
| (34)                                                                                                                                                                                                                                                | G5 *Even if the chance is very low should you give a try.             | 3.47        | 3.43      | $p > 0.1$                     |
| (35)                                                                                                                                                                                                                                                | H1 So hard has he tried.                                              | <b>2.83</b> | <b>4</b>  | <b><math>p = 0.015</math></b> |
| (36)                                                                                                                                                                                                                                                | H3 So hard must I work that I wonder whether it is really worth it.   | 2.97        | 3.7       | $p > 0.1$                     |
| (37)                                                                                                                                                                                                                                                | H4 So bad must his health be that the doctors can no longer help him. | 3.4         | 4.1       | $p > 0.1$                     |
| <b>Interpretation of p-value:</b><br>$p \leq 0.001$ : highly significant evidence:<br>$0.001 < p \leq 0.05$ : significant evidence<br>$0.05 < p \leq 0.1$ : marginally significant evidence<br>$p > 0.1$ : no significant evidence for a difference |                                                                       |             |           |                               |

**Appendix 6: Rating Patterns in Relation to Structural Overlap (Subject-Auxiliary Inversion)**

| <b>Stimuli in Full Subject-Auxiliary Inversion<br/>(Full Overlap with German Word Order)</b> |                                                     | <b>M1</b>   | <b>M2</b>   | <b>p-value</b> |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------|-------------|----------------|
| Ungrammatical stimuli                                                                        | A1 *In has he come.                                 | 1.4         | 1.93        | $p = 0.004$    |
|                                                                                              | A2 *Into the North Atlantic Ocean has Titanic sunk. | 2.7         | 3.17        | $p > 0.1$      |
|                                                                                              | A3 *Back to the village has the farmer come.        | 2.67        | 3.67        | $p = 0.043$    |
|                                                                                              | A4 *Into the house must the boys run.               | 1.73        | 2.8         | $p = 0.056$    |
|                                                                                              | A5 *Into the house have they run.                   | 2.13        | 2.8         | $p = 0.079$    |
|                                                                                              | A6 *Down the hill has the football rolled.          | 2.67        | 2.97        | $p > 0.1$      |
|                                                                                              | B1 *With him should you talk.                       | 2.6         | 2.87        | $p > 0.1$      |
|                                                                                              | B2 *With the class teacher should all parents talk. | 2.33        | 2.67        | $p > 0.1$      |
|                                                                                              | C3 *Surprisingly have they already finished.        | 3.9         | 3.5         | $p > 0.1$      |
|                                                                                              | C5 *Unfortunately was he killed.                    | 2.47        | 2.2         | $p > 0.1$      |
|                                                                                              | D3 *Quickly was the problem solved.                 | 3           | 3.23        | $p > 0.1$      |
|                                                                                              | <b>Mean</b>                                         | <b>2.51</b> | <b>2.89</b> |                |
|                                                                                              | H1 So hard has he tried.                            | 2.83        | 4           | $p = 0.015$    |

| <b>Stimuli in Partial Subject-Auxiliary Inversion<br/>(Full Overlap with German Word Order)</b> |                                                                  | <b>M1</b>   | <b>M2</b>   | <b>p-value</b> |
|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-------------|-------------|----------------|
| ungrammatical                                                                                   | B3 *Until midnight should they stay awake.                       | 3.37        | 3.17        | $p > 0.1$      |
|                                                                                                 | B4 *In this way can you rebuild your life.                       | 3.37        | 3.4         | $p > 0.1$      |
|                                                                                                 | B5 *At 7:00 must I get up.                                       | 2.33        | 2.6         | $p > 0.1$      |
|                                                                                                 | C1 *Probably has he forgotten us.                                | 3.17        | 2.87        | $p > 0.1$      |
|                                                                                                 | C2 *Probably will he leave early.                                | 3.1         | 2.83        | $p > 0.1$      |
|                                                                                                 | C4 *Absolutely should you take a rest.                           | 3.5         | 3.73        | $p > 0.1$      |
|                                                                                                 | D1 *Over and over again has he made the same mistake.            | 3.17        | 3.9         | $p > 0.1$      |
|                                                                                                 | D2 *Quickly has he fallen asleep.                                | 2.9         | 3.3         | $p > 0.1$      |
|                                                                                                 | G2 *When she was young must she work very hard to make a living. | 2.63        | 2.87        | $p > 0.1$      |
|                                                                                                 | G3 *Before we act must we think twice.                           | 2.87        | 3.07        | $p > 0.1$      |
|                                                                                                 | G4 *Before we play games should we do our homework.              | 3.13        | 3.13        | $p > 0.1$      |
|                                                                                                 | G5 *Even if the chance is very low should you give a try.        | 3.47        | 3.43        | $p > 0.1$      |
|                                                                                                 | AA7 *In a corner are laughing the children.                      | 1.93        | 2.03        | $p > 0.1$      |
|                                                                                                 | AA8 *At an old desk is writing Tom Lopez.                        | 1.77        | 1.87        | $p > 0.1$      |
|                                                                                                 | <b>Mean</b>                                                      | <b>2.91</b> | <b>3.01</b> |                |
| gramm                                                                                           | F1 Rarely has my grandpa felt so excited.                        | 3.5         | 4.33        | $p = 0.031$    |
|                                                                                                 | F2 On no account should you give up.                             | 2.93        | 2.1         | $p = 0.042$    |

|                                                                                                                                                                                                                                                                                                                             |                                                                       |      |      |              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|------|------|--------------|
|                                                                                                                                                                                                                                                                                                                             | F3 Only in this way can you earn enough money for your next holiday.  | 3.83 | 5.03 | $p = 0.003$  |
|                                                                                                                                                                                                                                                                                                                             | F4 Never had I seen such a wonderful thing!                           | 4.17 | 4.8  | $p > 0.1$    |
|                                                                                                                                                                                                                                                                                                                             | F5 Not until the rain stops can we go outside.                        | 2.57 | 4.1  | $p = 0.002$  |
|                                                                                                                                                                                                                                                                                                                             | F6 Only when you finish the homework can you play video games.        | 4    | 5.2  | $p = 0.0002$ |
|                                                                                                                                                                                                                                                                                                                             | F7 Only after you've read the book will you see what I mean.          | 3.63 | 4.93 | $p = 0.002$  |
|                                                                                                                                                                                                                                                                                                                             | F8 Not until the rain stops are we allowed to go.                     | 2.63 | 3.5  | $p = 0.063$  |
|                                                                                                                                                                                                                                                                                                                             | H3 So hard must I work that I wonder whether it is really worth it.   | 2.97 | 3.7  | $p > 0.1$    |
|                                                                                                                                                                                                                                                                                                                             | H4 So bad must his health be that the doctors can no longer help him. | 3.4  | 4.1  | $p > 0.1$    |
|                                                                                                                                                                                                                                                                                                                             | AA1 In the shadow is standing a tall man.                             | 3    | 3.57 | $p > 0.1$    |
|                                                                                                                                                                                                                                                                                                                             | Mean                                                                  | 3.3  | 4.12 |              |
| <p><b>Interpretation of p-value:</b></p> <p><math>p \leq 0.001</math>: highly significant evidence:</p> <p><math>0.001 &lt; p \leq 0.05</math>: significant evidence</p> <p><math>0.05 &lt; p \leq 0.1</math>: marginally significant evidence</p> <p><math>p &gt; 0.1</math>: no significant evidence for a difference</p> |                                                                       |      |      |              |

**Appendix 7:** Two Groups' Acceptability Judgment of V2-V3 Counterparts (X-V/Aux-S vs. X-V/Aux-S)

| <i>Pair.</i> | <i>No.</i> | <i>Stimuli Pairs in V2 and V3</i>                   | <i>M1</i>                     | <i>M2</i>    | <i>p-value<br/>(U test)</i>   |
|--------------|------------|-----------------------------------------------------|-------------------------------|--------------|-------------------------------|
| (1)          | A2         | V2 *Into the North Atlantic Ocean has Titanic sunk. | 2.7                           | 3.17         | $p > 0.1$                     |
|              | A2'        | V3 Into the North Atlantic Ocean Titanic has sunk.  | 2.7                           | 3.1          | $p > 0.1$                     |
|              |            | <b>WSR test</b>                                     | $p = 0.874$                   | $p = 0.676$  |                               |
| (2)          | A6         | V2 *Into the house have they run.                   | 2.13                          | 2.8          | $p = 0.079$                   |
|              | A6'        | V3 Into the house they have run.                    | 2.4                           | 2.6          | $p > 0.1$                     |
|              |            | <b>WSR test</b>                                     | $p = 0.34$                    | $p = 0.486$  |                               |
| (3)          | A8         | V2 In came he.                                      | 1.4                           | 1.73         | $p = 0.094$                   |
|              | A8'        | V3 In he came.                                      | <b>1.47</b>                   | <b>2.03</b>  | <b><math>p = 0.055</math></b> |
|              |            | <b>WSR test</b>                                     | $p = 0.75$                    | $p = 0.137$  |                               |
| (4)          | A11        | V2 Into the house run the boys.                     | 2.87                          | 2.93         | $p > 0.1$                     |
|              | A11'       | V3 Into the house the boys run.                     | 2.57                          | 2.53         | $p > 0.1$                     |
|              |            | <b>WSR test</b>                                     | $p = 0.398$                   | $p = 0.201$  |                               |
| (5)          | A12        | V2 *Into the house run they.                        | 1.6                           | 1.7          | $p > 0.1$                     |
|              | A12'       | V3 Into the house they ran.                         | 2.6                           | 2.9          | $p > 0.1$                     |
|              |            | <b>WSR test</b>                                     | $p = 0.003$                   | $p = 0.001$  |                               |
| (6)          | A14        | V2 *On each wall hangs Bill a large picture.        | 2.97                          | 2.23         | $p = 0.075$                   |
|              | A14'       | V3 On each wall Bill hangs a large picture.         | 4.73                          | 4.53         | $p > 0.1$                     |
|              |            | <b>WSR test</b>                                     | $p = 0.002$                   | $p < 0.0001$ |                               |
| (7)          | A16        | V2 Down the hill rolled the football.               | 3.2                           | 3.53         | $p > 0.1$                     |
|              | A16'       | V3 Down the hill the football rolled.               | 3.63                          | 3.8          | $p > 0.1$                     |
|              |            | <b>WSR test</b>                                     | $p = 0.3$                     | $p = 0.449$  |                               |
| (8)          | AA2        | V2 Among the guests was Mary.                       | 3.47                          | 3.37         | $p > 0.1$                     |
|              | AA2'       | V3 *Among the guests Mary was.                      | 2                             | 2.3          | $p > 0.1$                     |
|              |            | <b>WSR test</b>                                     | <b><math>p = 0.002</math></b> | $p = 0.006$  |                               |
| (9)          | AA3        | V2 Among the guests sits Mary.                      | 4.33                          | 3.87         | $p > 0.1$                     |
|              | AA3'       | V3 ?Among the guests Mary sits.                     | 3.57                          | 3.87         | $p > 0.1$                     |
|              |            | <b>WSR test</b>                                     | <b><math>p = 0.101</math></b> | $p = 0.948$  |                               |
| (10)         | AA5        | V2 At an old desk sits Jimmy Brown.                 | 4.23                          | 4            | $p > 0.1$                     |
|              | AA5'       | V3 ?At an old desk Jimmy Brown sits.                | 3.97                          | 4.07         | $p > 0.1$                     |

| <b>Pair.</b> | <b>No.</b> | <b>Stimuli Pairs in V2 and V3</b>                   | <b>M1</b>    | <b>M2</b>    | <b>p-value<br/>(U test)</b> |
|--------------|------------|-----------------------------------------------------|--------------|--------------|-----------------------------|
|              |            | <b>WSR test</b>                                     | $p = 0.523$  | $p = 0.826$  |                             |
| (11)         | AA6        | V2 Along the riverside runs a little dog.           | 3.3          | 3.9          | $p > 0.1$                   |
|              | AA6'       | V3 Along the riverside a little dog runs.           | 4.37         | 4.23         | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                     | $p = 0.022$  | $p = 0.53$   |                             |
| (12)         | AA7        | V2 *In a corner are laughing the children.          | 1.93         | 2.03         | $p > 0.1$                   |
|              | AA7'       | V3 In a corner the children are laughing.           | 5.13         | 5.23         | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                     | $p < 0.0001$ | $p < 0.0001$ |                             |
| (13)         | AA8        | V2 *At an old desk is writing Tom Lopez.            | 1.77         | 1.87         | $p > 0.1$                   |
|              | AA8'       | V3 *At an old desk Tom Lopez is writing.            | 4.3          | 4.4          | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                     | $p < 0.0001$ | $p < 0.0001$ |                             |
| (14)         | AA10       | V2 *In Munich resides the man.                      | 3.3          | 3.43         | $p > 0.1$                   |
|              | AA10'      | V3 *In Munich the man resides.                      | 4.03         | 4            | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                     | $p = 0.227$  | $p = 0.242$  |                             |
| (15)         | B2         | V2 *With the class teacher should all parents talk. | 2.33         | 2.67         | $p > 0.1$                   |
|              | B2'        | V3 *With the class teacher all parents should talk. | <b>3.07</b>  | <b>2.4</b>   | $p = 0.072$                 |
|              |            | <b>WSR test</b>                                     | $p = 0.011$  | $p = 0.554$  |                             |
| (16)         | B3         | V2 *Until midnight should they stay awake.          | 3.37         | 3.17         | $p > 0.1$                   |
|              | B3'        | V3 Until midnight they should stay awake.           | 4.3          | 4.07         | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                     | $p = 0.054$  | $p = 0.046$  |                             |
| (17)         | B4         | V2 *In this way can you rebuild your life.          | 3.37         | 3.4          | $p > 0.1$                   |
|              | B4'        | V3 In this way you can rebuild your life.           | 5.37         | 5.17         | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                     | $p < 0.0001$ | $p = 0.003$  |                             |
| (18)         | B5         | V2 *At 7:00 must I get up.                          | 2.33         | 2.6          | $p > 0.1$                   |
|              | B5'        | V3 At 7:00 I must get up.                           | 4.6          | 5.13         | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                     | $p < 0.0001$ | $p < 0.0001$ |                             |
| (19)         | B6         | V2 *In my opinion is the answer correct.            | 3.6          | 2.07         | $p = 0.001$                 |
|              | B6'        | V3 In my opinion the answer is correct.             | 5.67         | 5.77         | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                     | $p < 0.0001$ | $p < 0.0001$ |                             |
| (20)         | B7         | V2 *Since 1999 left no employee the company.        | 2.53         | 2.27         | $p = 0.005$                 |
|              | B7'        | V3 Since 1999 no employee left the company.         | 4.9          | 4.33         | $p > 0.1$                   |



| <i>Pair.</i> | <i>No.</i> | <i>Stimuli Pairs in V2 and V3</i>                     | <i>M1</i>    | <i>M2</i>    | <i>p-value<br/>(U test)</i> |
|--------------|------------|-------------------------------------------------------|--------------|--------------|-----------------------------|
|              |            | <b>WSR test</b>                                       | $p = 0.004$  | $p < 0.0001$ |                             |
| (21)         | B11        | V2 *To me means this present a lot.                   | 3.5          | 1.47         | $p = 0.000005$              |
|              | B11'       | V3 To me this present means a lot.                    | 4.57         | 5.1          | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                       | $p = 0.074$  | $p < 0.0001$ |                             |
| (22)         | B12        | V2 *For three hours lasted the movie.                 | 2.37         | 2.47         | $p > 0.1$                   |
|              | B12'       | V3 For three hours the movie lasted.                  | 2.77         | 3.47         | $p = 0.091$                 |
|              |            | <b>WSR test</b>                                       | $p = 0.317$  | $p = 0.007$  |                             |
| (23)         | C1         | V2 *Probably has he us forgotten.                     | 2.07         | 1.37         | $p = 0.086$                 |
|              | C1'        | V3 Probably he has forgotten us.                      | 5.27         | 5.53         | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                       | $p < 0.0001$ | $p < 0.0001$ |                             |
| (24)         | C4         | V2 *Absolutely should you take a rest.                | 3.5          | 3.73         | $p > 0.1$                   |
|              | C4'        | V3 Absolutely you should take a rest.                 | 4.67         | 4.87         | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                       | $p = 0.0017$ | $p = 0.0017$ |                             |
| (25)         | C5         | V2 *Unfortunately was he killed.                      | 2.47         | 2.2          | $p > 0.1$                   |
|              | C5'        | V3 Unfortunately he was killed.                       | 5.7          | 5.7          | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                       | $p < 0.0001$ | $p < 0.0001$ |                             |
| (26)         | C6         | V2 *Probably comes Alex as well.                      | 3.4          | 2.33         | $p = 0.029$                 |
|              | C6'        | V3 Probably Alex comes as well.                       | 4.73         | 4.57         | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                       | $p = 0.005$  | $p < 0.0001$ |                             |
| (27)         | D1         | V2 *Over and over again has he made the same mistake. | 3.17         | 3.9          | $p > 0.1$                   |
|              | D1'        | V3 Over and over again he has made the same mistake.  | 4.03         | 4.4          | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                       | $p = 0.097$  | $p = 0.188$  |                             |
| (28)         | D2         | V2 *Quickly has he fallen asleep.                     | 2.9          | 3.3          | $p > 0.1$                   |
|              | D2'        | V3 Quickly he has fallen asleep.                      | 3.77         | 3.8          | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                       | $p = 0.062$  | $p = 0.242$  |                             |
| (29)         | D3         | V2 *Quickly was the problem solved.                   | 3            | 3.23         | $p > 0.1$                   |
|              | D3'        | V3 Quickly the problem was solved.                    | 4.3          | 4.7          | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                       | $p = 0.002$  | $p = 0.002$  |                             |
| (30)         | D4         | V2 *Quickly ran the children into the classroom.      | 3.1          | 2.57         | $p > 0.1$                   |
|              | D4'        | V3 Quickly the children ran into the classroom.       | 3.4          | 4.53         | $p = 0.035$                 |

| <b>Pair.</b> | <b>No.</b> | <b>Stimuli Pairs in V2 and V3</b>                                     | <b>M1</b>        | <b>M2</b>            | <b>p-value<br/>(U test)</b> |
|--------------|------------|-----------------------------------------------------------------------|------------------|----------------------|-----------------------------|
|              |            | <b>WSR test</b>                                                       | <b>p = 0.54</b>  | <b>p &lt; 0.0001</b> |                             |
| (31)         | D9         | V2 *Beautifully sings the opera singer.                               | 2.97             | 2.47                 | p > 0.1                     |
|              | D9'        | V3 Beautifully the opera singer sings.                                | 3.93             | 3.43                 | p > 0.1                     |
|              |            | <b>WSR test</b>                                                       | <b>p = 0.028</b> | <b>p = 0.033</b>     |                             |
| (32)         | D10        | V2 *Angrily speaks the woman.                                         | 3.6              | 3                    | p > 0.1                     |
|              | D10'       | V3 Angrily the woman speaks.                                          | 3.2              | 3.23                 | p > 0.1                     |
|              |            | <b>WSR test</b>                                                       | <b>p = 0.395</b> | <b>p = 0.522</b>     |                             |
| (33)         | D11        | V2 *Elegantly talks the movie star.                                   | 2.73             | 2.67                 | p > 0.1                     |
|              | D11'       | V3 Elegantly the movie star talks.                                    | 3.6              | 3.83                 | p > 0.1                     |
|              |            | <b>WSR test</b>                                                       | <b>p = 0.036</b> | <b>p = 0.002</b>     |                             |
| (34)         | D12        | V2 *Loudly barks the dog.                                             | 2.77             | 3.03                 | p > 0.1                     |
|              | D12'       | V3 Loudly the dog barks.                                              | 3.53             | 3.83                 | p > 0.1                     |
|              |            | <b>WSR test</b>                                                       | <b>p = 0.082</b> | <b>p = 0.089</b>     |                             |
| (35)         | E8         | V2 *Twice a week comes she.                                           | 3                | 2.17                 | p = 0.069                   |
|              | E8'        | V3 Twice a week she comes.                                            | 4.07             | 4.93                 | p > 0.1                     |
|              |            | <b>WSR test</b>                                                       | <b>p = 0.042</b> | <b>p &lt; 0.0001</b> |                             |
| (36)         | F1         | V2 Rarely has my grandpa felt so excited.                             | 3.5              | 4.33                 | p = 0.031                   |
|              | F1'        | V3 *Rarely my grandpa has felt so excited.                            | 3.6              | 3.83                 | p > 0.1                     |
|              |            | <b>WSR test</b>                                                       | <b>p = 0.719</b> | <b>p = 0.252</b>     |                             |
| (37)         | F3         | V2 On no account should you give up.                                  | 2.93             | 2.1                  | p = 0.042                   |
|              | F3'        | V3 *On no account you should give up.                                 | 4.07             | 3.87                 | p > 0.1                     |
|              |            | <b>WSR test</b>                                                       | <b>p = 0.115</b> | <b>p = 0.18</b>      |                             |
| (38)         | F4         | V2 Only in this way can you earn enough money for your next holiday.  | 3.83             | 5.03                 | p = 0.003                   |
|              | F4'        | V3 *Only in this way you can earn enough money for your next holiday. | 5                | 4.27                 | p = 0.043                   |
|              |            | <b>WSR test</b>                                                       | <b>p = 0.009</b> | <b>p = 0.122</b>     |                             |
| (39)         | F5         | V2 Never had I seen such a wonderful thing!                           | 4.17             | 4.8                  | p > 0.1                     |
|              | F5'        | V3 *Never I had seen such a wonderful thing!                          | 3                | 2.9                  | p > 0.1                     |
|              |            | <b>WSR test</b>                                                       | <b>p = 0.04</b>  | <b>p &lt; 0.0001</b> |                             |
| (40)         | F6         | V2 Only when you finish the homework can you play video games.        | 4                | 5.2                  | p = 0.0002                  |

| <b>Pair.</b> | <b>No.</b> | <b>Stimuli Pairs in V2 and V3</b>                                | <b>M1</b>    | <b>M2</b>    | <b>p-value<br/>(U test)</b> |
|--------------|------------|------------------------------------------------------------------|--------------|--------------|-----------------------------|
|              | F6'        | V3 *Only when you finish the homework you can play video games.  | 5.17         | 3.73         | $p = 0.0004$                |
|              |            | <b>WSR test</b>                                                  | $p = 0.007$  | $p = 0.002$  |                             |
| (41)         | F8         | V2 Only after you've read the book will you see what I mean.     | 3.63         | 4.93         | $p = 0.002$                 |
|              | F8'        | V3 *Only after you've read the book you will see what I mean.    | 4.43         | 3.97         | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                                  | $p = 0.104$  | $p = 0.068$  |                             |
| (42)         | F9         | V2 Not until the rain stops can we go outside.                   | 2.57         | 4.1          | $p = 0.002$                 |
|              | F9'        | V3 *Not until the rain stops we can go outside.                  | 3.1          | 3.27         | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                                  | $p = 0.072$  | $p = 0.113$  |                             |
| (43)         | G2         | V2 *When she was young must she work very hard to make a living. | 2.63         | 2.87         | $p > 0.1$                   |
|              | G2'        | V3 When she was young she must work very hard to make a living.  | 5.6          | 5.77         | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                                  | $p < 0.0001$ | $p < 0.0001$ |                             |
| (44)         | G3         | V2 *Before we act must we think twice.                           | 2.87         | 3.07         | $p > 0.1$                   |
|              | G3'        | V3 *Before we act we must think twice.                           | 5.4          | 5.33         | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                                  | $p < 0.0001$ | $p < 0.0001$ |                             |
| (45)         | G4         | V2 *Before we play games should we do our homework.              | 3.13         | 3.13         | $p > 0.1$                   |
|              | G4'        | V3 Before we play games we should do our homework.               | 5.57         | 5.6          | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                                  | $p < 0.0001$ | $p < 0.0001$ |                             |
| (46)         | G5         | V2 *Even if the chance is very low should you give a try.        | 3.47         | 3.43         | $p > 0.1$                   |
|              | G5'        | V3 Even if the chance is very low you should give a try.         | 5.67         | 5.83         | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                                  | $p < 0.0001$ | $p < 0.0001$ |                             |
| (47)         | H1         | V2 So hard has he tried.                                         | 2.83         | 4            | $p = 0.015$                 |
|              | H1'        | V3 *So hard he has tried.                                        | 3.9          | 3.87         | $p > 0.1$                   |
|              |            | <b>WSR test</b>                                                  | $p = 0.014$  | $p = 0.778$  |                             |
| (48)         | H2         | V2 So polluted was the river that all the fish died.             | 3.17         | 4.07         | $p = 0.082$                 |

| <b>Pair.</b>                                                                                                                                                                                                                                                                                                                                                                                                    | <b>No.</b> | <b>Stimuli Pairs in V2 and V3</b>                                      | <b>M1</b>    | <b>M2</b>    | <b>p-value<br/>(U test)</b> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------------------------------------------------------------|--------------|--------------|-----------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                 | H2'        | V3 *So polluted the river was that all the fish died.                  | 2.9          | 3.67         | $p = 0.067$                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                 |            | <b>WSR test</b>                                                        | $p = 0.429$  | $p = 0.251$  |                             |
| (49)                                                                                                                                                                                                                                                                                                                                                                                                            | H3         | V2 So hard must I work that I wonder whether it is really worth it.    | 2.97         | 3.7          | $p > 0.1$                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                 | H3'        | V3 *So hard I must work that I wonder whether it is really worth it.   | 3.73         | 3.33         | $p > 0.1$                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                 |            | <b>WSR test</b>                                                        | $p = 0.095$  | $p = 0.285$  |                             |
| (50)                                                                                                                                                                                                                                                                                                                                                                                                            | H4         | V2 So bad must his health be that the doctors can no longer help him.  | 3.4          | 4.1          | $p > 0.1$                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                 | H4'        | V3 *So bad his health must be that the doctors can no longer help him. | 3.13         | 4.63         | $p > 0.1$                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                 |            | <b>WSR test</b>                                                        | $p = 0.611$  | $p = 0.915$  |                             |
| (51)                                                                                                                                                                                                                                                                                                                                                                                                            | I1         | V2 "No problem", said Mary.                                            | 4.47         | 4.6          | $p > 0.1$                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                 | I1'        | V3 "No problem", Mary said.                                            | 5.33         | 5.2          | $p > 0.1$                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                 |            | <b>WSR test</b>                                                        | $p = 0.027$  | $p = 0.217$  |                             |
| (52)                                                                                                                                                                                                                                                                                                                                                                                                            | I4         | V2 "Let's go home", said he.                                           | 3.83         | 3.27         | $p > 0.1$                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                 | I4'        | V3 "Let's go home", he said.                                           | 5.57         | 5.57         | $p > 0.1$                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                 |            | <b>WSR test</b>                                                        | $p < 0.0001$ | $p < 0.0001$ |                             |
| <p><b>U test = Mann-Whitney U test</b><br/> <b>WSR test = Wilcoxon signed-rank test</b></p> <p><b>Interpretation of p-value:</b><br/> <math>p \leq 0.001</math>: highly significant evidence:<br/> <math>0.001 &lt; p \leq 0.05</math>: significant evidence<br/> <math>0.05 &lt; p \leq 0.1</math>: marginally significant evidence<br/> <math>p &gt; 0.1</math>: no significant evidence for a difference</p> |            |                                                                        |              |              |                             |

**Appendix 8:** Two Groups' Acceptability Judgment of Continuous and Discontinuous VPCs

| No.                       | Word Order                 | Stimuli                                               | M1                  | M2                   | p-value<br>(U test) |
|---------------------------|----------------------------|-------------------------------------------------------|---------------------|----------------------|---------------------|
| <b>Compositional VPCs</b> |                            |                                                       |                     |                      |                     |
| <b>1. Directional</b>     |                            |                                                       |                     |                      |                     |
| (1)                       | <i>Discontinuous order</i> | S1-1 They bring the food in.                          | 4.93                | 5.03                 | $p > 0.1$           |
|                           | <i>Continuous order</i>    | S1-2 They bring in the food.                          | <b>4.43</b>         | <b>5.3</b>           | $p = 0.019$         |
|                           |                            | <b>WSR test</b>                                       | 0.5<br>$p > 0.1$    | -0.17<br>$p > 0.1$   |                     |
| (2)                       | <i>Discontinuous order</i> | S2-1 The old man and the boy bring the food in.       | 5.23                | 4.97                 | $p > 0.1$           |
|                           | <i>Continuous order</i>    | S2-2 The old man and the boy bring in the food.       | <b>4.7</b>          | <b>5.23</b>          | $p = 0.093$         |
|                           |                            | <b>WSR test</b>                                       | 0.53<br>$p = 0.067$ | -0.26<br>$p > 0.1$   |                     |
| (3)                       | <i>Discontinuous order</i> | S3-1 They bring three bowls of strawberries in.       | 4.93                | 4.67                 |                     |
|                           | <i>Continuous order</i>    | S3-2 They bring in three bowls of strawberries.       | <b>4.6</b>          | <b>5.53</b>          | $p = 0.002$         |
|                           |                            | <b>WSR test</b>                                       | 0.33<br>$p > 0.1$   | -0.86<br>$p = 0.006$ |                     |
| (4)                       | <i>Discontinuous order</i> | S4-1 The librarians put the books back.               | <b>4.93</b>         | <b>5.63</b>          | $p = 0.026$         |
|                           | <i>Continuous order</i>    | S4-2 The librarians put back the books.               | 5.03                | 5.43                 | $p > 0.1$           |
|                           |                            | <b>WSR test</b>                                       | -0.1<br>$p > 0.1$   | 0.2<br>$p > 0.1$     |                     |
| (5)                       | <i>Discontinuous order</i> | S5-1 My mom throws the garbage away.                  | 5.37                | 5.6                  | $p > 0.1$           |
|                           | <i>Continuous order</i>    | S5-1 My mom throws away the garbage.                  | 5.03                | 5.07                 | $p > 0.1$           |
|                           |                            | <b>WSR test</b>                                       | 0.3<br>$p > 0.1$    | 0.53<br>$p = 0.096$  |                     |
| (6)                       | <i>Discontinuous order</i> | S6-1 They took the very expensive ruby necklace away. | 5.1                 | 5.3                  | $p > 0.1$           |
|                           | <i>Continuous order</i>    | S6-2 They took away the very expensive ruby necklace. | 5.3                 | 5.37                 | $p > 0.1$           |
|                           |                            | <b>WSR test</b>                                       | -0.2<br>$p > 0.1$   | -0.07<br>$p > 0.1$   |                     |

| No.                 | Word Order          | Stimuli                                         | M1                   | M2                   | p-value (U test) |
|---------------------|---------------------|-------------------------------------------------|----------------------|----------------------|------------------|
| (7)                 | Discontinuous order | S7-1 The workers carry the tables out.          | 4.97                 | 5.13                 | $p > 0.1$        |
|                     | Continuous order    | S7-2 The workers carry out the tables.          | 5.17                 | 5.47                 | $p > 0.1$        |
|                     |                     | WSR test                                        | -0.2<br>$p > 0.1$    | -0.34<br>$p > 0.1$   |                  |
| (8)                 | Discontinuous order | S8-1 The students write the notes down.         | 4.97                 | 4.93                 | $p > 0.1$        |
|                     | Continuous order    | S8-2 The students write down the notes.         | 5.47                 | 5.8                  | $p > 0.1$        |
|                     |                     | WSR test                                        | -0.5<br>$p = 0.057$  | -0.87<br>$p = 0.002$ |                  |
| (9)                 | Discontinuous order | S9-1 Write the notes down!                      | 5.33                 | 5.1                  | $p > 0.1$        |
|                     | Continuous order    | S9-2 Write down the notes!                      | 5.6                  | 5.8                  | $p > 0.1$        |
|                     |                     | WSR test                                        | -0.27<br>$p > 0.1$   | -0.7<br>$p = 0.003$  |                  |
| (10)                | Discontinuous order | S10-1 The students raise the hands up.          | 5.03                 | 5.37                 | $p > 0.1$        |
|                     | Continuous order    | S10-2 The students raise up the hands.          | 5.03                 | 5.5                  | $p = 0.039$      |
|                     |                     | WSR test                                        | 0<br>$p > 0.1$       | -0.13<br>$p > 0.1$   |                  |
| <b>2. Aspectual</b> |                     |                                                 |                      |                      |                  |
| (11)                | Discontinuous order | S11-1 The boy ate the soup up.                  | 4.63                 | 4.53                 | $p > 0.1$        |
|                     | Continuous order    | S11-2 The boy ate up the soup.                  | 5.13                 | 5.5                  | $p > 0.1$        |
|                     |                     | WSR test                                        | -0.5<br>$p > 0.1$    | -0.97<br>$p = 0.1$   |                  |
| (12)                | Discontinuous order | S12-1 The boy ate a big bowl of tomato soup up. | 4.77                 | 4.23                 | $p > 0.1$        |
|                     | Continuous order    | S12-2 The boy ate up a big bowl of tomato soup. | 5.07                 | 5.47                 | $p > 0.1$        |
|                     |                     | WSR test                                        | -0.3<br>$p > 0.1$    | -1.24<br>$p = 0.001$ |                  |
| (13)                | Discontinuous order | S13-1 We used our supplies up.                  | 4.3                  | 4.5                  | $p > 0.1$        |
|                     | Continuous order    | S13-2 We used up our supplies.                  | 5.37                 | 5.67                 | $p > 0.1$        |
|                     |                     | WSR test                                        | -1.07<br>$p = 0.009$ | -1.17<br>$p < 0.001$ |                  |
| (14)                | Discontinuous order | S14-1 Work the project through!                 | 4.87                 | 4.53                 | $p > 0.1$        |
|                     | Continuous order    | S14-2 Work through the project!                 | 5.2                  | 5.63                 | $p = 0.021$      |

| No.                   | Word Order                 | Stimuli                                          | M1                                   | M2                   | p-value<br>(U test) |
|-----------------------|----------------------------|--------------------------------------------------|--------------------------------------|----------------------|---------------------|
|                       |                            |                                                  | -0.33<br><i>WSR test</i> $p > 0.1$   | -1.1<br>$p = 0.001$  |                     |
| (15)                  | <i>Discontinuous order</i> | S15-1 Switch the gas off!                        | 5.07                                 | 4.9                  | $p > 0.1$           |
|                       | <i>Continuous order</i>    | S15-2 Switch off the gas!                        | 5.13                                 | 5.5                  | $p > 0.1$           |
|                       |                            |                                                  | -0.06<br><i>WSR test</i> $p > 0.1$   | -0.6<br>$p = 0.03$   |                     |
| (16)                  | <i>Discontinuous order</i> | S16-1 We switch the gas off.                     | 4.70                                 | 4.83                 | $p > 0.1$           |
|                       | <i>Continuous order</i>    | S16-2 We switch off the gas.                     | 5.43                                 | 5.80                 | $p > 0.1$           |
|                       |                            |                                                  | -0.73<br>$p = 0.038$                 | -0.97<br>$p = 0.001$ |                     |
| <b>Idiomatic VPCs</b> |                            |                                                  |                                      |                      |                     |
| (17)                  | <i>Discontinuous order</i> | S17-1 He looks the word up.                      | 4.53                                 | 4.27                 | $p > 0.1$           |
|                       | <i>Continuous order</i>    | S17-2 He looks up the word.                      | 5.33                                 | 5.67                 | $p > 0.1$           |
|                       |                            |                                                  | -0.8<br><i>WSR test</i> $p = 0.027$  | -1.4<br>$p < 0.001$  |                     |
| (18)                  | <i>Discontinuous order</i> | S18-1 He looks the answer to the question up.    | 3.67                                 | 3.3                  | $p > 0.1$           |
|                       | <i>Continuous order</i>    | S18-2 He looks up the answer to the question.    | 5.33                                 | 5.5                  | $p > 0.1$           |
|                       |                            |                                                  | -1.66<br><i>WSR test</i> $p = 0.001$ | -2.2<br>$p < 0.001$  |                     |
| (19)                  | <i>Discontinuous order</i> | S19-1 They leave that part out.                  | 5                                    | 5.43                 | $p > 0.1$           |
|                       | <i>Continuous order</i>    | S19-2 They leave out that part.                  | 5.77                                 | 5.77                 | $p > 0.1$           |
|                       |                            |                                                  | -0.77<br><i>WSR test</i> $p = 0.057$ | -0.34<br>$p > 0.1$   |                     |
| (20)                  | <i>Discontinuous order</i> | S20-1 They leave that not well-written part out. | 4.03                                 | 3.43                 | $p > 0.1$           |
|                       | <i>Continuous order</i>    | S20-2 They leave out that not well-written part. | 5.1                                  | 5.47                 | $p = 0.099$         |
|                       |                            |                                                  | -1.07<br><i>WSR test</i> $p = 0.004$ | -2.04<br>$p = 0.002$ |                     |
| (21)                  | <i>Discontinuous order</i> | S21-1 His uncle is making a story up.            | 4.13                                 | 4.23                 | $p > 0.1$           |

| No.                                                                                                                                                                                                                                          | Word Order       | Stimuli                               | M1                  | M2                  | p-value<br>(U test) |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------------------------|---------------------|---------------------|---------------------|
|                                                                                                                                                                                                                                              | Continuous order | S21-2 His uncle is making up a story. | 5.53                | 5.83                | $p = 0.061$         |
|                                                                                                                                                                                                                                              |                  | WSR test                              | -1.4<br>$p < 0.001$ | -1.6<br>$p < 0.001$ |                     |
| Interpretation of p-value:<br>$p \leq 0.001$ : highly significant evidence:<br>$0.001 < p \leq 0.05$ : significant evidence<br>$0.05 < p \leq 0.1$ : marginally significant evidence<br>$p > 0.1$ : no significant evidence for a difference |                  |                                       |                     |                     |                     |



**Appendix 9:** Two Groups' Acceptability Judgment of Stimuli Featuring S-V-Adv-X Word Order

| <b>Word Order</b>            | <b>Stimuli</b>                                     | <b>M1</b> | <b>M2</b> | <b>p-value</b>                  |
|------------------------------|----------------------------------------------------|-----------|-----------|---------------------------------|
| <b>S-V-Adv-DO</b>            | A1-1 He tells probably a lie.                      | 3.87      | 2.57      | $p = 0.003$                     |
|                              | A2-1 She likes probably this feeling.              | 3.6       | 2.53      | $p = 0.009$                     |
|                              | A3-1 The team solved easily the problem.           | 4.23      | 2.43      | $p = 0.000033$                  |
|                              | A4-1 *The children read slowly the text.           | 4.3       | 2.63      | $p = 0.000159$                  |
|                              | A5-1 *Wendy smokes quite often cigarettes.         | 4.63      | 2.5       | $p = 8.0646E-7$<br>$< 0.000001$ |
|                              | A6-1 *He drinks every morning a glass of milk.     | 5.17      | 2.53      | $p = 6.1093E-8$<br>$< 0.000001$ |
|                              | A7-1 *I spend with my family the summer holiday.   | 3.5       | 3.27      | $p > 0.1$                       |
|                              | A8-1 We found only one mistake.                    | 5.5       | 4.57      | $p = 0.005$                     |
|                              | A9-1 *You can rebuild in this way your life.       | 3.63      | 2.4       | $p = 0.009$                     |
|                              | A10-1 *He is telling for sure the truth.           | 4.23      | 2.7       | $p = 0.0002$                    |
| <b>S-V-Adv-Ptcl</b>          | B1-1 *He fell quickly asleep.                      | 4.73      | 2.83      | $p = 0.00002$                   |
|                              | B2-1 *The child ran quickly away.                  | 4.37      | 3.57      | $p = 0.049$                     |
|                              | B3-1 *Children grow fast up.                       | 3.13      | 2.43      | $p = 0.097$                     |
|                              | B4-1 *The enemy gave easily up.                    | 3.93      | 2.97      | $p = 0.022$                     |
|                              | B5-1 *Her grandpa passed recently away.            | 4.17      | 2.33      | $p = 0.00003$                   |
|                              | B6-1 *The boy gets at seven o'clock up.            | 3.33      | 2.6       | $p = 0.075$                     |
| <b>S-V-(Adv)-DO-Adv-Ptcl</b> | C1-1 We shut the gas completely off.               | 5         | 3.77      | $p = 0.001$                     |
|                              | C2-1 We used our supplies completely up.           | 4.13      | 3.3       | $p = 0.027$                     |
|                              | C3-1a*The firefighter put the fire quickly out.    | 4.4       | 3.77      | $p = 0.101$                     |
|                              | C3-1b*The firefighter put quickly the fire out.    | 3.7       | 2.83      | $p = 0.029$                     |
|                              | C4-1*John figures the solution slowly out.         | 4.3       | 3.07      | $p = 0.004$                     |
|                              | C5-1*The children write the notes nicely down.     | 4.37      | 3.43      | $p = 0.018$                     |
|                              | C6-1*My mom throws every morning the garbage away. | 4.13      | 2.2       | $p = 0.00005$                   |
|                              | C7-1a*She looks the word in the dictionary up.     | 4         | 2.87      | $p = 0.007$                     |
|                              | C7-1b*She looks in the dictionary the word up.     | 2.73      | 2.37      | $p > 0.1$                       |
| <b>S-V-Adv-PP</b>            | D1-1 *Nick and I go every day at 7:00 to school.   | 3.83      | 2.4       | $p = 0.001$                     |
|                              | D2-1 *Nick goes at nine o'clock to bed.            | 4.1       | 2.77      | $p = 0.002$                     |
|                              | D3-1 I drive with my brother to the beach.         | 4.47      | 4.17      | $p > 0.1$                       |
|                              | D4-1 He paid immediately for the book.             | 5.07      | 4.07      | $p = 0.012$                     |

| <b>Word Order</b>                                                                                                                                                                                                                                                               | <b>Stimuli</b>                                                 | <b>M1</b>   | <b>M2</b>   | <b>p-value</b>                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|-------------|-------------|------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                 | D5-1 It depends largely on his decision.                       | 5.13        | 4.93        | $p > 0.1$                                                        |
|                                                                                                                                                                                                                                                                                 | D6-1 Tim cares mainly about the cost.                          | <b>5.23</b> | <b>4.47</b> | <b><math>p = 0.011</math></b>                                    |
|                                                                                                                                                                                                                                                                                 | D7-1 He thinks often about his mother.                         | <b>5.13</b> | <b>2.77</b> | <b><math>p = 8.5851E-7</math><br/><math>&lt; 0.000001</math></b> |
|                                                                                                                                                                                                                                                                                 | D8-1 The police are searching right now for the missing child. | <b>4.37</b> | <b>3.43</b> | <b><math>p = 0.022</math></b>                                    |
| <b>Interpretation of p-value:</b><br>$p \leq 0.001$ : <i>highly significant evidence:</i><br>$0.001 < p \leq 0.05$ : <i>significant evidence</i><br>$0.05 < p \leq 0.1$ : <i>marginally significant evidence</i><br>$p > 0.1$ : <i>no significant evidence for a difference</i> |                                                                |             |             |                                                                  |

**Appendix 10:** Two Groups' Acceptability Judgment of Stimuli Featuring S-Adv-V-X Word Order

| Word Order                                                                                                                                                                                                                                                                                                          | No.  | Stimuli                                                   | M1   | M2   | p-value       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------------------------------------|------|------|---------------|
| S-Adv-V-DO                                                                                                                                                                                                                                                                                                          | A1-2 | He probably tells a lie.                                  | 5.37 | 5.8  | $p = 0.086$   |
|                                                                                                                                                                                                                                                                                                                     | A2-2 | She probably likes this feeling.                          | 5.43 | 5.67 | $p > 0.1$     |
|                                                                                                                                                                                                                                                                                                                     | A3-2 | The team easily solved the problem.                       | 4.77 | 5.1  | $p > 0.1$     |
|                                                                                                                                                                                                                                                                                                                     | A4-2 | The children slowly read the text.                        | 4.27 | 4.67 | $p > 0.1$     |
|                                                                                                                                                                                                                                                                                                                     | A5-2 | Wendy often smokes cigarettes.                            | 4.8  | 5.67 | $p = 0.00041$ |
|                                                                                                                                                                                                                                                                                                                     | A6-2 | *He every morning drinks a glass of milk.                 | 3    | 3.87 | $p = 0.095$   |
|                                                                                                                                                                                                                                                                                                                     | A7-2 | *I with my family spend the summer holiday.               | 2.5  | 2.5  | $p > 0.1$     |
|                                                                                                                                                                                                                                                                                                                     | A8-1 | We only found one mistake.                                | 4.93 | 5.63 | $p = 0.101$   |
| S-Adv-V-Ptcl                                                                                                                                                                                                                                                                                                        | B1-2 | He quickly fell asleep.                                   | 4.73 | 5.63 | $p = 0.023$   |
|                                                                                                                                                                                                                                                                                                                     | B2-2 | The child quickly ran away.                               | 4.67 | 5.3  | $p = 0.103$   |
|                                                                                                                                                                                                                                                                                                                     | B3-2 | *Children fast grow up.                                   | 2.93 | 3.27 | $p > 0.1$     |
|                                                                                                                                                                                                                                                                                                                     | B4-2 | The enemy easily gave up.                                 | 4.33 | 4.97 | $p > 0.1$     |
|                                                                                                                                                                                                                                                                                                                     | B5-2 | Her grandpa recently passed away.                         | 4.53 | 5.57 | $p = 0.055$   |
|                                                                                                                                                                                                                                                                                                                     | B6-2 | *The boy at seven o'clock gets up.                        | 2.37 | 2.6  | $p > 0.1$     |
| S-Adv-Ptcl-DO                                                                                                                                                                                                                                                                                                       | C1-2 | We completely shut off the gas.                           | 4.87 | 5.37 | $p > 0.1$     |
|                                                                                                                                                                                                                                                                                                                     | C2-2 | We completely used up our supplies.                       | 5.13 | 5.77 | $p = 0.045$   |
|                                                                                                                                                                                                                                                                                                                     | C3-2 | The firefighter quickly put out the fire.                 | 4.93 | 5.63 | $p = 0.021$   |
|                                                                                                                                                                                                                                                                                                                     | C4-2 | John slowly figures out the solution.                     | 4.83 | 5.27 | $p > 0.1$     |
|                                                                                                                                                                                                                                                                                                                     | C5-2 | The children nicely write down the notes.                 | 4.43 | 5.3  | $p = 0.016$   |
|                                                                                                                                                                                                                                                                                                                     | C6-2 | *My mom every morning throws away the garbage.            | 3.43 | 4.4  | $p = 0.077$   |
| S-Adv-V-PP                                                                                                                                                                                                                                                                                                          | D4-2 | He immediately paid for the book.                         | 4.63 | 5.27 | $p > 0.1$     |
|                                                                                                                                                                                                                                                                                                                     | D5-2 | It largely depends on his decision.                       | 4.73 | 5.3  | $p = 0.086$   |
|                                                                                                                                                                                                                                                                                                                     | D6-2 | Tim mainly cares about the cost.                          | 5    | 5.73 | $p = 0.016$   |
|                                                                                                                                                                                                                                                                                                                     | D7-2 | He often thinks about his mother.                         | 5.1  | 5.87 | $p = 0.01$    |
|                                                                                                                                                                                                                                                                                                                     | D8-2 | The police right now are searching for the missing child. | 2.97 | 4    | $p = 0.028$   |
| <p><b>Interpretation of p-value:</b><br/> <math>p \leq 0.001</math>: highly significant evidence:<br/> <math>0.001 &lt; p \leq 0.05</math>: significant evidence<br/> <math>0.05 &lt; p \leq 0.1</math>: marginally significant evidence<br/> <math>p &gt; 0.1</math>: no significant evidence for a difference</p> |      |                                                           |      |      |               |

# Appendix 11: Two Groups' Acceptability Judgment of Ditransitive Construction

| No.                                                     | Stimuli  |                                                                 | M1   | M2   | p-value   |
|---------------------------------------------------------|----------|-----------------------------------------------------------------|------|------|-----------|
|                                                         | Pattern  | 1. Nominal DO, Nominal IO                                       |      |      |           |
| (1)                                                     | DO>to>IO | She always tells stories to her son.                            | 5.03 | 5.8  | p = 0.019 |
| (2)                                                     |          | Uncle Sam gave a present to Margaret.                           | 5.4  | 5.77 | p = 0.009 |
| (3)                                                     |          | I bring a necklace to my cousin.                                | 5.63 | 5.83 | p = 0.292 |
| (4)                                                     |          | The secretary sends weekly reports to the manager every Friday. | 5.17 | 5.4  | p = 0.356 |
| (5)                                                     |          | Pass the water to the farmers!                                  | 5.27 | 5.63 | p = 0.199 |
|                                                         |          | Nominal DO, Pronominal IO                                       |      |      |           |
| (6)                                                     | DO>to>IO | She always tells stories to him.                                | 5.03 | 5.67 | p = 0.054 |
| (7)                                                     |          | Uncle Sam gave a present to her.                                | 5.17 | 5.63 | p = 0.029 |
| (8)                                                     |          | I bring a necklace to him.                                      | 5.57 | 5.87 | p = 0.161 |
| (9)                                                     |          | The secretary sends weekly reports to him every Friday.         | 5.1  | 5.5  | p = 0.158 |
| (10)                                                    |          | Pass the water to them!                                         | 5.27 | 5.47 | p = 0.669 |
| (11)                                                    |          | Give the money to me!                                           | 5.3  | 5.43 | p = 0.731 |
|                                                         |          | Pronominal DO, Pronominal IO                                    |      |      |           |
| (12)                                                    | DO-to>IO | She always tells them to him                                    | 3.97 | 3.9  | p = 0.927 |
| (13)                                                    |          | Uncle Sam gave it to her.                                       | 5.5  | 5.7  | p = 0.285 |
| (14)                                                    |          | I bring it to him.                                              | 5.5  | 5.83 | p = 0.237 |
| (15)                                                    |          | The secretary sends it to him every Friday.                     | 5.37 | 5.6  | p = 0.168 |
| (16)                                                    |          | Pass it to them!                                                | 5.33 | 5.1  | p = 0.419 |
| (17)                                                    |          | Give it to me!                                                  | 5.57 | 5.77 | p = 0.491 |
| (18)                                                    | IO-DO    | She always tells him them.                                      | 2.6  | 2.67 | p = 0.982 |
| (19)                                                    |          | Uncle Sam gave her it.                                          | 2.8  | 2.97 | p = 0.982 |
| (20)                                                    |          | I bring him it.                                                 | 3.3  | 3.03 | p = 0.546 |
| (21)                                                    |          | The secretary sends him it every Friday.                        | 3.43 | 3.23 | p = 0.602 |
| (22)                                                    |          | Pass them it!                                                   | 2.67 | 3.17 | p = 0.336 |
| (23)                                                    |          | Give me it!                                                     | 3.8  | 3.5  | p = 0.553 |
| (24)                                                    | DO-IO    | She always tells them him.                                      | 1.8  | 1.93 | p = 0.621 |
| (25)                                                    |          | Uncle Sam gave it her.                                          | 2.13 | 2.13 | p = 0.818 |
| (26)                                                    |          | I bring it him.                                                 | 2.17 | 2.23 | p = 0.786 |
| (27)                                                    |          | The secretary sends it him every Friday.                        | 2.23 | 2    | p = 0.755 |
| (28)                                                    |          | Pass it them!                                                   | 1.7  | 1.87 | p = 0.571 |
| (29)                                                    |          | Give it me!                                                     | 1.6  | 2.13 | p = 0.324 |
| Interpretation of p-value:                              |          |                                                                 |      |      |           |
| p ≤ 0.001: extremely strong evidence:                   |          |                                                                 |      |      |           |
| 0.001< p ≤0.05: strong evidence                         |          |                                                                 |      |      |           |
| 0.05 <p ≤0.1: marginal evidence (non-significant trend) |          |                                                                 |      |      |           |
| p > 0.1: no significant evidence of a group difference  |          |                                                                 |      |      |           |

## Appendix 12: Two Groups' Acceptability Judgment of Fillers in the ATJ

| No.                                           | Fillers                                             | M1          | M2          | p-value                         |
|-----------------------------------------------|-----------------------------------------------------|-------------|-------------|---------------------------------|
| <b>1. Fillers for Experiment on Inversion</b> |                                                     |             |             |                                 |
| (1)                                           | The boys must run into the house.                   | <b>5.33</b> | <b>5.93</b> | <b><math>p = 0.015</math></b>   |
| (2)                                           | The boys must into the house run.                   | 1.97        | 2.23        | $p = 0.89$                      |
| (3)                                           | Into the house did the boys run.                    | 2.8         | 2.8         | $p = 0.946$                     |
| (4)                                           | The farmer has back to the village come.            | 2.63        | 2.13        | $p = 0.52$                      |
| (5)                                           | Titanic has into the North Atlantic Ocean sunk.     | 2.53        | 2.27        | $p = 0.957$                     |
| (6)                                           | Titanic sank into the North Atlantic Ocean.         | 5.53        | 5.73        | $p = 0.412$                     |
| (7)                                           | The ball down the hill rolled.                      | 2.2         | 2.1         | $p = 0.832$                     |
| (8)                                           | The football rolled the hill down.                  | 4.23        | 3.8         | $p = 0.658$                     |
| (9)                                           | Along the riverside does a little dog run.          | 2.27        | 3.03        | $p = 0.047$                     |
| (10)                                          | At an old desk sits him.                            | 3.3         | 3.37        | $p = 0.998$                     |
| (11)                                          | The children are in a corner laughing.              | 3.17        | 3.33        | $p = 0.651$                     |
| (12)                                          | She went upstairs.                                  | 5.87        | 5.9         | $p = 0.665$                     |
| (13)                                          | She has gone upstairs.                              | 5.27        | 5.2         | $p = 0.65$                      |
| (14)                                          | The student writes down everything in his notebook. | 5.67        | 5.83        | $p = 0.426$                     |
| (15)                                          | The student in his notebook writes down everything. | 2.8         | 2.83        | $p = 0.832$                     |
| (16)                                          | All parents should with the class teacher talk.     | 2.03        | 2.33        | $p = 0.308$                     |
| (17)                                          | They should stay until midnight awake.              | <b>4.2</b>  | <b>2.9</b>  | <b><math>p = 0.005</math></b>   |
| (18)                                          | No employee has since 1999 the company left.        | 2.23        | 1.8         | $p = 0.588$                     |
| (19)                                          | The answer is in my opinion correct.                | <b>4.7</b>  | <b>2.83</b> | <b><math>p = 0.00002</math></b> |
| (20)                                          | This present means a lot to me.                     | 5.77        | 5.97        | $p = 0.151$                     |
| (21)                                          | The movie lasted for three hours.                   | <b>5.47</b> | <b>5.97</b> | <b><math>p = 0.005</math></b>   |
| (22)                                          | Probably has he us forgotten.                       | 2.07        | 1.37        | $p = 0.086$                     |
| (23)                                          | Probably he will early leave.                       | 2.53        | 2.63        | $p = 0.951$                     |
| (24)                                          | You absolutely should take a rest.                  | 4.1         | 4.73        | $p = 0.13$                      |
| (25)                                          | You should absolutely take a rest.                  | 5.3         | 5.47        | $p = 0.453$                     |
| (26)                                          | He was unfortunately killed.                        | 5.1         | 5.03        | $p = 0.781$                     |
| (27)                                          | It certainly was very good.                         | <b>3.73</b> | <b>4.37</b> | <b><math>p = 0.09</math></b>    |
| (28)                                          | He over and over again has made the same mistake.   | 2.67        | 2.5         | $p = 0.585$                     |
| (29)                                          | He has fallen quickly asleep.                       | <b>3.97</b> | <b>3.03</b> | <b><math>p = 0.035</math></b>   |
| (30)                                          | The problem was quickly solved.                     | <b>5.5</b>  | <b>5.9</b>  | <b><math>p = 0.045</math></b>   |
| (31)                                          | The opera singer beautifully sings.                 | 2.8         | 3.63        | $p = 0.061$                     |
| (32)                                          | The movie star talks elegantly.                     | 5.7         | 5.97        | $p = 0.151$                     |
| (33)                                          | The movie star elegantly talks.                     | 3.83        | 4.27        | $p = 0.307$                     |
| (34)                                          | The woman angrily speaks.                           | 3.57        | 4.37        | $p = 0.095$                     |
| (35)                                          | Angrily is the woman speaking.                      | 2.1         | 2.57        | $p = 0.323$                     |
| (36)                                          | The dog loudly barks.                               | <b>3.5</b>  | <b>4.47</b> | <b><math>p = 0.014</math></b>   |

| No.                                                                   | Fillers                                                            | M1          | M2          | p-value                          |
|-----------------------------------------------------------------------|--------------------------------------------------------------------|-------------|-------------|----------------------------------|
| (37)                                                                  | She twice a week comes.                                            | 2.03        | 2.3         | $p = 0.717$                      |
| (38)                                                                  | My grandpa rarely has felt so excited.                             | 4           | 4.53        | $p = 0.176$                      |
| (39)                                                                  | My grandpa has rarely felt so excited.                             | 5.3         | 3.7         | $p = 0.356$                      |
| (40)                                                                  | I never had seen such a wonderful thing!                           | 3.77        | 4.4         | $p = 0.223$                      |
| (41)                                                                  | You should on no account give up.                                  | 4.13        | 3.83        | $p = 0.349$                      |
| (42)                                                                  | You on no account should give up.                                  | 2.33        | 2.93        | $p = 0.083$                      |
| (43)                                                                  | You can only in this way earn enough money for your next holiday.  | 4.53        | 3.97        | $p = 0.132$                      |
| (44)                                                                  | He has tried so hard.                                              | <b>5.57</b> | <b>5.97</b> | <b><math>p = 0.04</math></b>     |
| (45)                                                                  | His health must so bad be that the doctors can no longer help him. | 1.93        | 1.87        | $p = 0.827$                      |
| (46)                                                                  | The river was so polluted that all the fish died.                  | 5.7         | 5.83        | $p = 0.871$                      |
| (47)                                                                  | You only can play video games when you finish the homework.        | <b>3.13</b> | <b>4.37</b> | <b><math>p = 0.006</math></b>    |
| (48)                                                                  | You will only see what I mean when you've read the book.           | 4.77        | 4.53        | $p = 0.696$                      |
| (49)                                                                  | We should think twice before we act.                               | <b>5.7</b>  | <b>5.97</b> | <b><math>p = 0.042</math></b>    |
| (50)                                                                  | We should do before we play games our homework.                    | 1.8         | 1.47        | $p = 0.306$                      |
| (51)                                                                  | Even if the chance is very low a try should you give.              | 2.03        | 2.13        | $p = 0.492$                      |
| (52)                                                                  | Mary said him, "No problem."                                       | <b>3.8</b>  | <b>2.57</b> | <b><math>p = 0.008</math></b>    |
| <b>2. Fillers for Experiment Part on Word Order Variation of VPCs</b> |                                                                    |             |             |                                  |
| (52)                                                                  | Back put the librarians the books.                                 | 2.1         | 1.6         | $p = 0.129$                      |
| (54)                                                                  | Up ate the boy the soup.                                           | 1.6         | 1.63        | $p = 0.547$                      |
| (55)                                                                  | Away throws my mom the garbage.                                    | 2.2         | 1.7         | $p = 0.169$                      |
| (56)                                                                  | Away they took the very expensive ruby necklace.                   | 2.17        | 2.4         | $p = 0.386$                      |
| (57)                                                                  | Out carry the workers the tables.                                  | 1.87        | 1.52        | $p = 0.39$                       |
| (58)                                                                  | His uncle is making now a story up.                                | <b>3.87</b> | <b>2.4</b>  | <b><math>p = 0.001</math></b>    |
| <b>3. Fillers for Experiment on Adverbial Placement in SV Clauses</b> |                                                                    |             |             |                                  |
| (59)                                                                  | You can rebuild in this way your life.                             | <b>3.63</b> | <b>2.4</b>  | <b><math>p = 0.005</math></b>    |
| (60)                                                                  | You in this way can rebuild your life.                             | 2.07        | 2.67        | $p = 0.055$                      |
| (61)                                                                  | He is telling for sure the truth.                                  | <b>4.23</b> | <b>2.7</b>  | <b><math>p = 0.0002</math></b>   |
| (62)                                                                  | He is for sure telling the truth.                                  | 4.57        | 4           | $p = 0.14$                       |
| (63)                                                                  | She visits her grandma twice a week.                               | 5.77        | 5.9         | $p = 0.633$                      |
| (64)                                                                  | Wendy smokes often cigarette.                                      | <b>3.97</b> | <b>1.9</b>  | <b><math>p = 0.000014</math></b> |
| (65)                                                                  | Wendy smokes cigarettes quite often.                               | 5.57        | 5.27        | $p = 0.499$                      |
| (66)                                                                  | Easily has the teams solved the problem.                           | 3.73        | 3.9         | $p = 0.752$                      |
| (67)                                                                  | I spend the summer holiday with my family.                         | 5.6         | 5.77        | $p = 0.504$                      |
| (68)                                                                  | The children read the text slowly.                                 | 5.77        | 5.97        | $p = 0.083$                      |
| (69)                                                                  | He tells a lie, probably.                                          | 5.47        | 5.27        | $p = 0.785$                      |

| No.                                                                                     | Fillers                                                       | M1          | M2         | p-value                       |
|-----------------------------------------------------------------------------------------|---------------------------------------------------------------|-------------|------------|-------------------------------|
| (70)                                                                                    | Quickly he fell asleep.                                       | 4.53        | 4.77       | $p = 0.399$                   |
| (71)                                                                                    | I must get up at 7:00.                                        | 5.8         | 5.97       | $p = 0.289$                   |
| (72)                                                                                    | The child ran away quickly.                                   | 5.47        | 5.8        | $p = 0.154$                   |
| (73)                                                                                    | We shut the gas off completely.                               | 4.93        | 5.3        | $p = 0.064$                   |
| (74)                                                                                    | Fast can children grow up.                                    | 2.87        | 2.73       | $p = 0.719$                   |
| (75)                                                                                    | Children grow up fast.                                        | 5.7         | 5.63       | $p = 0.739$                   |
| (76)                                                                                    | John figures the solution out slowly.                         | 4.83        | 5.27       | $p = 0.032$                   |
| (77)                                                                                    | The children write down the notes nicely.                     | <b>5.43</b> | <b>5.9</b> | <b><math>p = 0.01</math></b>  |
| (78)                                                                                    | We used our supplies up completely.                           | 4.37        | 4.8        | $p = 0.226$                   |
| (79)                                                                                    | The enemy gave up easily.                                     | 5.63        | 5.83       | $p = 0.188$                   |
| (80)                                                                                    | Easily has the enemy given up.                                | 3.3         | 3.8        | $p = 0.240$                   |
| (81)                                                                                    | Her grandpa recently has passed away.                         | 4.13        | 4.37       | $p = 0.773$                   |
| (82)                                                                                    | She ran to the city away.                                     | 3.27        | 2.8        | $p = 0.169$                   |
| (83)                                                                                    | She ran away to the city.                                     | 5.2         | 5.43       | $p = 0.545$                   |
| (84)                                                                                    | Tim cares about the cost mainly.                              | 3.87        | 4.2        | $p = 0.314$                   |
| (85)                                                                                    | I drive to the beach with my brother.                         | 5.6         | 5.67       | $p = 0.396$                   |
| (86)                                                                                    | He paid for the book immediately.                             | 5.63        | 5.67       | $p = 0.61$                    |
| (87)                                                                                    | The police are searching for the missing child right now.     | 5.37        | 5.77       | $p = 0.103$                   |
| (88)                                                                                    | Right now the police are searching for the missing child.     | <b>3.93</b> | <b>5.2</b> | <b><math>p = 0.001</math></b> |
| <b>4. Fillers for Experiment Part on Patterns in Forming Ditransitive Constructions</b> |                                                               |             |            |                               |
| (89)                                                                                    | She always tells her son stories.                             | 5.37        | 5.5        | $p = 1$                       |
| (90)                                                                                    | Uncle Sam gave Margaret a present.                            | 5.73        | 5.63       | $p = 0.826$                   |
| (91)                                                                                    | I bring my cousin a necklace.                                 | 5.5         | 5.6        | $p = 0.381$                   |
| (92)                                                                                    | The secretary sends the manager weekly reports every Friday.  | 5.3         | 5.3        | $p = 0.68$                    |
| (93)                                                                                    | Pass the farmers the water!                                   | 4.9         | 4.73       | $p = 0.743$                   |
| (94)                                                                                    | *She always tells stories her son.                            | 2.53        | 2.57       | $p = 0.878$                   |
| (95)                                                                                    | *Uncle Sam gave a present Margaret.                           | 1.83        | 2.03       | $p = 0.341$                   |
| (96)                                                                                    | *I bring a necklace my cousin.                                | 2.37        | 2.4        | $p = 0.731$                   |
| (97)                                                                                    | *The secretary sends weekly reports the manager every Friday. | 2.93        | 3.03       | $p = 0.784$                   |
| (98)                                                                                    | Pass the water the farmers!                                   | 2.23        | 2          | $p = 0.868$                   |
| (99)                                                                                    | She always tells him stories.                                 | 5.4         | 5.27       | $p = 0.57$                    |
| (100)                                                                                   | Uncle Sam gave her a present.                                 | 5.67        | 5.67       | $p = 0.56$                    |
| (101)                                                                                   | I bring him a necklace.                                       | 5.7         | 5.7        | $p = 0.96$                    |
| (102)                                                                                   | The secretary sends him weekly reports every Friday.          | 4.07        | 4.87       | $p = 0.112$                   |
| (103)                                                                                   | Pass them the water!                                          | 5.3         | 5.17       | $p = 0.873$                   |
| (104)                                                                                   | Give me the money!                                            | 5.8         | 5.9        | $p = 0.248$                   |

## Appendix 13: Questionnaire on Participants' Linguistic Background

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### What is your gender?

- ☐ Male ☐ Female ☐ Other: \_\_\_\_\_

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### How old are you?

- ☐ 21-25 ☐ 26-30 ☐ 31-35 ☐ 35-40  
☐ 40-45 ☐ 46-50 ☐ Other: \_\_\_\_\_

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### What is your highest level of education?/您的最高学历是什么?

- ☐ Bachelor/本科 ☐ Master/硕士  
☐ Doctor/博士 ☐ Other: \_\_\_\_\_

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### What is your profession?/您的职业是什么? (例如: 学生, 教师, 德企职工, 等等)

- ☐ \_\_\_\_\_

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### (only for trilinguals) When did you start to learn German? / 您什么时候开始学习德语?

- ☐ In senior high school/高中 ☐ At university: Bachelor Program/大学本科阶段  
☐ In university: Master Program/大学硕士/研究生阶段 ☐ Other: \_\_\_\_\_

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### (only for trilinguals) German language level/德语水平:

- ☐ B1: Pre-Intermediate (e.g., Goethe-Zertifikat B2)  
☐ B2: Intermediate (e.g., Goethe-Zertifikat B2, language course at the university, TestDaF3)  
☐ C1: Upper-Intermediate (e.g., DSH2, Goethe-Zertifikat C1, TestDaF4-5)  
☐ C2: Advanced (e.g., DSH3, Goethe-Zertifikat C2)  
☐ Other: \_\_\_\_\_

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### When did you start to learn English? / 您什么时候开始学习英语?

- ☐ since kindergarten/从幼儿园开始 ☐ 1-3. year in primary school/小学一到三年级  
☐ 4-6. year in primary school/小学四到六年级 ☐ since 1. year in secondary school/初一开始  
☐ Other: \_\_\_\_\_
-



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**English language level / 英语水平**

(若考托福、托业和雅思的话，请根据下面链接里的图片核对欧标英语等级):

[https://www.uni-bielefeld.de/einrichtungen/fsz/tests\\_and\\_certs/eng\\_chart/](https://www.uni-bielefeld.de/einrichtungen/fsz/tests_and_certs/eng_chart/)

- ☐ CET4/大学英语四级      ☐ CET6/大学英语六级      ☐ TEM4/英语专业四级
- ☐ TEM8/英语专业八级      ☐ B1                      ☐ C1                      ☐ C2
- ☐ Other: \_\_\_\_\_

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**(only for trilinguals) How long have you been living in Germany? / 您在德国生活了/生活过几年?**

- ☐ Less than one year      ☐ 1-2 years                      ☐ 3-4 years
- ☐ 5-7 years                      ☐ 8-10 years                      ☐ more than 10 years

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**How frequently do you use Chinese? (\*Use=Speaking, writing, listening, and reading) /**

综合来说，请问您平均每天有多大概率使用中文? (包括：与人交流，看中文书，看中文剧，等等。)

- ☐ 0-10%                              ☐ 10-30%                              ☐ 30-50%
- ☐ 50-75%                              ☐ 75-100%

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**(only for trilinguals) How frequently do you use German? (\*Use = Speaking, writing, reading, and listening) / 综合来说，请问您平均每天有多大概率使用德语? (比如：讲德语，写邮件，看德语书籍，看德语电视，等等。)**

- ☐ 0-10%                              ☐ 10-30%                              30-50%
- ☐ 50-75%                              ☐ 75-100%

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**How frequently do you use English? (\*Use=Writing, speaking, listening, and reading)/综合来说，请问您平均每天有多大概率接触英语? (比如：用英语交流，看美剧，写邮件，看英语书籍等等。)**

- ☐ 0-10%                              ☐ 10-30%                              ☐ 30-50%
  - ☐ 50-75%                              ☐ 75-100%
-

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**How often do you use each language during work or study?/请问您的学习或工作语言是什么？请进行描述。 例如：工作语言 10%汉语，30%英语，60%德语。**

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**How often do you speak each language in your personal life?/请问您在私人生活中说各种语言的几率有多大？请进行描述。例如：工作学习以外，我大概 10%说汉语，30%英语，60%德语。**

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**Have you ever learned other foreign languages? If yes, please indicate your language level. 请问您学过其他外语吗？若有，请注明语言水平。谢谢！**

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## **Abstract (English)**

This dissertation centers around the under-researched area of cross-linguistic influence (CLI) in multilingual contexts: *backward transfer*. It aimed to examine the impact of the syntactic features of the third language (L3) German on the word order perception of the second language (L2) English among L1 Chinese native speakers after the successful acquisition of both foreign languages. The research investigated three aspects of the backward transfer: (1) manifestation: whether it occurs and what is transferred; (2) characteristics: what nature it exhibits; and (3) mechanism: why it occurs. Also, it examined the applicability of the current CLI models in the advanced stage of foreign language acquisition.

The German word order contrasts sharply with that of English and Chinese due to the V2 constraint and the rules governing the linear order within the verbal bracket. This study detailed the syntactic contrasts between the three languages, based on which an acceptability judgment task (ATJ) was designed, where two groups of participants assigned scores on a six-point Likert scale to English stimuli either adhering to or violating German syntax. The experiment group was 30 Chinese-English-German trilinguals who lived in Germany for work or study, and the control group was 30 proficient Chinese-English bilinguals. The ATJ comprised word orders in four syntactic scenarios: (1) subject-simple verb inversion, including subject-simple verb inversion and subject-auxiliary inversion featuring various types of fronted elements; (2) word order variations for transitive verb-particle constructions (VPCs), including the discontinuous order and the continuous order; (3) position of the adverbial adjunct in SV main clauses with simple tenses; and (4) patterns for ditransitive constructions. Two general hypotheses were made: (1) compared with the bilingual controls, the trilinguals will show higher acceptability to stimuli whose word order aligned with German syntax. (2) When two syntactic representations are available for one grammar entity, the trilinguals will prefer the word order variant permitted by German over the variant that is disallowed by German syntax.

The results indicated that the syntax of L3 German influenced the trilinguals' perception of L2 English. First, the trilinguals showed greater acceptance of English stimuli featuring ungrammatical or non-canonical word orders that mirrored the syntactic alignments of German. Second, while being able to discern the overall grammaticality, the trilinguals exhibited slightly lowered acceptance of grammatical stimuli whose word order violated German syntax. Backward syntactic transfer from L3 German to L2 English exhibited a non-facilitative, indirect, and partial nature. It mitigated the trilinguals' implicit knowledge of English word order to a different extent. However, it did not completely alter their successfully acquired rules of English, nor did it manifest a transferability in every examined scenario. While structural dissimilarities turned out to be the major source of backward transfer, factors such as language dominance, language proficiency, and pedagogical instructions could also be the precursors of the phenomenon.

The *Linguistic Proximity Model* (Westergaard et al., 2017) and the *Scalpel Model* (Slabakova, 2017) can be extended to explain the characteristics and mechanisms of backward transfer: transfer occurs property-by-property, likely due to structural (dis)similarities; it can also be non-facilitative, and its accuracy can be led astray by other factors. Based on these two models, a novel model, the *Bi-Directional Transfer Model*, was introduced. This model focuses on the directionality of CLI, as multilingual acquisition is a dynamic, ongoing continuum.

**Keywords:** cross-linguistic influence, backward transfer, syntactic transfer, multilingual acquisition, second language, third language, German, English

## Abstract (German)

Diese Dissertation erforscht das Gebiet des *cross-linguistic transfer* („sprachübergreifenden linguistischen Transfer“, CLI) in mehrsprachigen Kontexten: *backward transfer* („Rückwärtstransfer“). Die meisten Forschungen über Transferphänomene konzentrieren sich auf die Rolle der sprachlichen Eigenschaften einer zuvor erworbenen Sprache beim Erwerb einer später erworbenen Fremdsprache. Da der Spracherwerb ein dynamischer Prozess ist, könnte sich die Richtung des Transfers jedoch im Zuge von Variablen wie Sprachkenntnissen und Sprachdominanz ändern. Ziel dieser Arbeit war es, den Einfluss der syntaktischen Merkmale der Drittsprache (L3), Deutsch, auf die Wahrnehmung der Wortstellung in der Zweitsprache (L2), Englisch, bei chinesischen Muttersprachler\*innen nach dem erfolgreichen Erwerb beider Fremdsprachen zu untersuchen.

Die Forschung untersuchte drei Aspekte des Rückwärtstransferphänomens: (1) seine Manifestation: ob er auftritt und was übertragen wird, (2) Merkmale: welche Art er aufweist, und (3) Mechanismen: warum er auftritt. Darüber hinaus wurde die Anwendbarkeit der aktuellen CLI-Modelle, die überwiegend die Merkmale und Mechanismen des Vorwärtstransfers während des Erwerbsprozesses veranschaulichen, in der fortgeschrittenen Phase des Fremdsprachenerwerbs bewertet, wo der Transfereffekt sich möglicherweise umkehrt.

Die Grundlage des Forschungsdesigns lag in den Unterschieden in der Wortstellung zwischen Deutsch und Englisch/Chinesisch. Deutsch unterscheidet sich deutlich von Englisch und Chinesisch aufgrund seiner V2-Position und der Regeln für die lineare Anordnung in der Verbalklammer. Diese Studie erforschte die syntaktischen Unterschiede zwischen den drei Sprachen, auf deren Grundlage ein *Acceptability Judgment Test* („Akzeptabilitätsurteilstest“, ATJ) entwickelt wurde, bei dem zwei Gruppen von Teilnehmer\*innen englische Sätze bewerteten, die entweder den Regeln der deutschen Syntax entsprachen oder diese verletzten. Die Experimentalgruppe bestand aus 30 chinesisch-englisch-deutschsprachigen Trilingualen, die in Deutschland für Arbeit oder Studium lebten, und die Kontrollgruppe bestand aus 30 chinesisch-

englischen Bilingualen. Der ATJ umfasste Wortstellungen in vier syntaktischen Szenarien: (1) Subjekt-Verb-Inversion, (2) Wortstellungsvarianten in Sätzen mit transitiven Partikelverben, (3) Stellung von adverbialen Angaben in einem SV-Hauptsatz mit einfachen Zeitformen und (4) Satzmuster in ditransitiven Konstruktionen. Zwei Haupthypothesen waren: (1) Im Vergleich zu den Bilingualen zeigen die Trilingualen eine höhere Akzeptanz von Stimuli, deren Wortstellung mit der deutschen Syntax übereinstimmt. (2) Wenn für eine Grammatikeinheit zwei Strukturen zur Verfügung stehen, bevorzugen die Trilingualen die im Deutschen erlaubte Struktur gegenüber der im Deutschen nicht erlaubten Variante.

Die Ergebnisse lieferten Nachweise für den Rückwärtstransfer. Die Syntax von L3 Deutsch beeinflusste das Urteil der Trilingualen über die Wortstellung von L2 Englisch. Einerseits wiesen die Trilingualen signifikant höhere Akzeptanz für Sätze auf, die die Wortstellungen im Deutschen widerspiegeln. Andererseits zeigten die Trilingualen bei der Unterscheidung grundlegender Grammatikalität eine leicht reduzierte Akzeptanz für Stimuli, deren Wortstellung gegen die deutsche Syntax verstieß. Hinsichtlich der Merkmale wurde festgestellt, dass der syntaktische Rückwärtstransfer vom Deutschen ins Englische nicht-fazilitativ, indirekt und partiell war. Er schwächte das implizite Wissen der Trilingualen über die englische Wortstellung in unterschiedlichem Ausmaß ab. Diese Beeinflussung veränderte jedoch nicht vollständig die Kenntnisse der bereits erworbenen englischen syntaktischen Regeln der Trilingualen, noch trat sie in jedem untersuchten Szenario auf. In Bezug auf Übertragungsmechanismen stellten strukturelle Unterschiede die Hauptquelle des Transfers dar, wobei auch andere Faktoren wie Sprachdominanz, Sprachniveau und pädagogische Anweisungen als potenzielle Vorläufer dieses Phänomens betrachtet werden können.

Das *Linguistic Proximity Model* (Westergaard et al., 2017) und das *Scalpel Model* (Slabakova, 2017) bieten Rahmenbedingungen, die zur Erklärung des Rückwärtstransferphänomens erweitert werden können. Diese Modelle schlagen vor, dass der Transfer eigenschaftsweise erfolgt und aus strukturellen Unterschieden und/oder Ähnlichkeiten resultiert. Sie postulieren, dass der Transfer auch nicht-

fazilitativ sein kann und seine Qualität durch andere Faktoren beeinflusst werden kann. Aufbauend auf diesen Rahmenbedingungen wurde ein neues Modell, das *Bi-Directional Transfer Model*, eingeführt. Dieses Modell betont das dynamische Kontinuum des mehrsprachigen Erwerbs und konzentriert sich auf die Richtung des sprachlichen Einflusses.

**Schlüsselwörter:** sprachlicher Transfer, Rückwärtstransfer, syntaktischer Transfer, mehrsprachiger Erwerb, Zweitsprache, Drittsprache, Deutsch, Englisch





## **Declaration of Academic Integrity**

### **Eidesstattliche Erklärung**

I declare on my honor that the present dissertation “Backward Transfer from L3 German to L2 English of L1 Chinese Speakers: A Cross-Linguistic Study on Word Order” is the result of my own independent scholarly work and that in all cases material from the work of others (in books, articles, essays, dissertations, and on the internet) is acknowledged, and quotations and paraphrases are indicated. No material other than that listed has been used. This doctoral thesis was not accepted or assessed in a previous doctoral procedure.

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(Name, Date)

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(Signature)