Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

Heritage Bilingualism and the Acquisition of English as an Additional Language (L3) in the German Context: A Longitudinal Study

Dissertation zur Erlangung des Grades der Doktorin der Philosophie (Dr. phil.)

an der Fakultät Geisteswissenschaften der Universität Hamburg

im Anglistische Linguistik

vorgelegt von

Tugba Elif Toprak Yildiz

Hamburg, 2025

1.überarbeitete Version

17.12.2025

1. Gutachter: Prof. Dr. Peter Siemund

2. Gutachterin: Prof. Dr. Silvia Maria Martins Melo-Pfeifer

3. Mitglied der Prüfungskommission: Prof. Dr. Eva Berlage

Datum der Disputation: 10.12.2025

Acknowledgements

First and foremost, I would like to express my deepest gratitude to my advisor, Prof. Dr. Peter Siemund, for his intellectual support and guidance throughout this journey. I feel incredibly fortunate to have had the opportunity to work under his supervision and am particularly grateful to him for welcoming me as part of his research team. I would also like to extend my heartfelt thanks to Dr. Eliane Lorenz, my dear friend and collaborator. Her friendship and partnership were indispensable during this process, and I am deeply grateful for her continuous support, insights, and contributions. My sincere thanks go to dear Sharareh Rahbari, who provided invaluable assistance at the beginning of this journey. Her support during this critical time helped me focus on my work, and it meant a great deal to me. I would like to thank the members of my doctoral examination committee, Prof. Dr. Silvia Maria Martins Melo-Pfeifer and Prof. Dr. Eva Berlage, for their insightful comments and constructive feedback. I also extend my heartfelt thanks to every member of the MEZ Project Team and to the MEZ participants for providing the data on which this study is based. All analyses and interpretations presented in this dissertation are my own.

Finally, I would like to thank my dear family. Their love, support, and belief in me kept me grounded throughout this experience. I could not have done this without them.

Contents

List of Figures

List of Tables

Abbreviations

AoA	Age of Acquisition
AL	Additional Language
CEM	Cumulative Enhancement Model
CFA	Confirmatory Factor Analysis
CLI	Cross-linguistic Influence
CLIL	Content and Language Integrated Learning
CTT	Classical Test Theory
DESI	Deutsch Englisch Schülerleistungen International
EFL	English as a Foreign Language
HISEI	Highest Socioeconomic Status
HL	Heritage Language
IQ	Intelligence Quotient
i	Intercept Parameter
L1	First Language
L2	Second Language
L3	Third Language
LPM	Linguistic Proximity Model
LGCM	Latent Growth Curve Modelling
ML	Majority Language

MEZ	Mehrsprachigkeitsentwicklung im Zeitverlauf
MPT	Measurement Time Point
s	Slope parameter
SEM	Structural Equation Modelling
SES	Socioeconomic Status
SLA	Second Language Acquisition
TLA	Third Language Acquisition
TPM	Typological Primacy Model

1. Introduction

Investigating the potential cognitive and linguistic benefits of bi/multilingualism has received continued scholarly interest for decades across various disciplines, including linguistics, psychology, and education (Cenoz, 2013a; Maluch, Kempert, Neumann, & Stanat, 2015). Earlier studies examining the possible impact of bi/multilingualism mostly yielded results which demonstrated the negative effect of the phenomenon (e.g., Harris, 1948; Manuel, 1935; Saer, 1923) and particularly associated bi/multilingualism with relatively low cognitive performance (Hesse, Gobel, & Hartig, 2008; Higby, Gámez, & Mendoza, 2023). Since the groundbreaking work of Peal and Lambert (1962), challenging the findings of previous research and showing that bilinguals could outperform monolinguals on cognitive measures, a new strand of research, which focused more on the methodological issues prevalent in earlier research and associated bi/multilingualism with various cognitive and linguistic advantages, emerged (Cenoz, 2003).

Since bilinguals need to coordinate two separate language systems, it is usually assumed that this continuous processing across two languages results in several cognitive advantages, particularly in cognitive functions that are related to attentional control, cognitive flexibility, working memory and symbolic representation skills (Adesope, Lavin, Thompson, & Ungerleider, 2010; Barac, Bialystok, Castro, & Sanchez, 2014; Bialystok, Luk, Peets, & Yang, 2010; Sekerina, Spradlin, & Valian, 2019). Most notably, previous research has suggested a link

between bilingualism and heightened metalinguistic awareness in bilingual individuals (e.g., Bialystok, 1986, 1991, 2001; Bialystok & Barac, 2012; Cromdal, 1999; Jessner, 1999; Ransdell, Barbier, & Niit, 2006; Rauch, Naumann, & Jude, 2012). Metalinguistic awareness refers to the ability to reflect on the nature and functions of language and treat language as an abstract entity (Jessner, 1999, 2006; Pratt & Grieve, 1984; Thomas, 1988, 1992). Further empirical evidence has shown that these enhanced cognitive functions are particularly prominent in balanced bilinguals who can be described as individuals with equal proficiency in both languages (Barac & Bialystok, 2012; Barac, Bialystok, Castro, & Sanchez, 2014).

When operating in a new linguistic system, bilinguals are assumed to have a wider linguistic reserve (*i.e.*, linguistic repertoire) to draw on when compared to their monolingual counterparts (De Angelis, 2007). For instance, bilinguals have been found to be able to apply morphological rules to unfamiliar forms they encounter (Barac & Bialystok, 2012), have heightened levels of phonological (Bruck & Genesee, 1995) and morphological/syntactic awareness (Reder, Marec-Breton, Gombert, & Demont, 2013), and benefit from mediative effect of metalinguistic awareness in additional language acquisition (Rauch et al., 2012; Ter Kuile, Veldhuis, Van Veen, & Wicherts, 2011; Thomas, 1988). There is also further research demonstrating that bilingual children are able to retain this improved level of executive functions and benefit from metalinguistic awareness even during their young adulthood (e.g., Bialystok, 1986, 2006; Bialystok, Peets, & Moreno, 2014).

On the other hand, there is also another strand of research which has documented negative, null, or inconclusive results concerning such bilingual advantages or suggested previously reported advantages are conditional, and restricted to fairly specific circumstances (e.g., Kousaie & Phillips, 2012; Paap &

Greenberg, 2013; Paap, Johnson, & Sawi, 2015; Von Bastian, Souza, & Gade, 2016). The presence and the extent of bi/multilingual advantages is an open question, particularly with respect to unbalanced bilingual and adult bi/multilingual groups (Hopp, Vogelbacher, Kieseier, & Thoma, 2019). Moreover, existence and steadiness of these advantages have been documented to be conditional, reported advantages becoming more or less observable depending on the age of acquisition (AoA) (Birdsong, 2018; Bylund, Hyltenstam, & Abrahamsson, 2021), proficiency levels in both languages (Bialystok et al., 2010), language proximity (Bialystok, Majumber, & Martin, 2003), and the availability of instruction in the first language (Rauch et al., 2012). Considering the potential impact of these factors and the complexity they introduce, examining the putative bi/multilingual advantages becomes highly challenging.

Traditionally, a substantial body of bi/multilingualism research has mainly compared and contrasted monolingual groups with bi/multilingual groups in order to gain insights into the supposed bilingual advantages by examining the performances of both groups on various cognitive and linguistic measures (Rothman et al., 2023; Rothman, Gonzáles Alonso, & Puig-Mayenco, 2019). However, it has become more difficult to find pure monolingual speakers in an increasingly multilingual world, where all categorical differences seem to have disappeared and "the search for bilingual advantages becomes a moving target" (Siemund, 2023; p. 33). As a result, researchers now need to come up with new research directions and methodologies when examining bi/multilingual advantages (Siemund, 2023). This pressing issue warrants consideration, particularly in the context of Europe, which has become increasingly more multilingual (Bartelheimer, Hufeisen, & Montanari, 2019).

Although multilingualism is not a new phenomenon, its significance in

continental Europe has grown more recently, mainly due to the impact of increasing globalisation, international mobility, immigration and advances in communication and internet technologies (Cenoz, 2013a). This situation is also evident in recent statistics and censual data on the share of foreign-born populations and multilingual speakers to the overall population, particularly in metropolitan cities, such as London, Berlin, Hamburg, and Paris (see Siemund, 2023 for a comprehensive treatment of this issue). Furthermore, within the last decades, promoting multilingualism and ensuring that every individual is able to speak at least three languages has emerged as a key aspect of European educational policies (Extra & Yağmur, 2011; Hesse, Gobel, & Hartig, 2008). European Union member states agree that all children, along with their national languages, should acquire at least two languages at schools (Gogolin, Gabriel, Brandt, & Dünkel, 2021). Consequently, there is an expanding number of bi/multilingual students in classrooms, who usually have a migration background, are raised in a bi/multilingual environment from an early age (Benmamoun, Montrul, & Polinsky, 2013), and acquire their first language in a home setting along with their majority language—either simultaneously or sequentially (Arnaus Gil & Jiménez-Gaspar, 2022; Montrul, 2018; Rinke, Flores, & Santos, 2019). Relevant research characterises these individuals as "heritage bilingual speakers" (Benmamoun et al., 2013; Montrul, 2018).

Within the last decade, this particular group of bilingual speakers has become a matter of inquiry in a growing number of scholarly efforts that examine bi/multilingual development or bi/multilingual advantages in various contexts across the world, including but not limited to Denmark (e.g. Højen & Bleses, 2023), Finland (e.g. Ansó Ros, Maijala, & Maijala, 2024), Germany (e.g., Edele, Kempert, & Schotte, 2018; Lorenz, Toprak-Yildiz, & Siemund, 2021, 2023, 2024; Kolb,

Mitrofanova, & Westergaard, 2022; Kupisch, Kolb, Rodina, & Urek, 2021), Switzerland (e.g., Berthele & Udry, 2022; Berthele & Vanhove, 2020), the Netherlands (e.g., Stoehr, Benders, Van Hell, & Fikkert, 2018), Spain (e.g., Vorobyeva, Bel, & Voeikova, 2024) and the USA (e.g., Gironzetti & Belpoliti, 2021; Montrul & Ionin, 2010).

Additionally, more scholarly efforts have been made to demystify the similarities and differences across first, second, and additional language acquisition in the context of heritage bilingualism (Benmamoun et al., 2013), particularly targeting the acquisition of English as an additional language. Within the European context, English holds a privileged status, fostering widespread bilingualism and facilitating its transition from a foreign language to an additional language (Siemund, 2023). As a result, there is a continued scholarly interest in examining the impact of heritage bilingualism on the acquisition of English as a third/additional language (e.g., Agustín-Llach, 2019; Berthele & Udry, 2022; Edele et al., 2018; Hopp et al., 2019; Lorenz, Toprak-Yildiz, & Siemund, 2021, 2023, 2024; Maluch, Neumann, & Kempert, 2016; Rauch et al., 2012; Rothman et al., 2019; Siemund & Lechner, 2015; Siemund, Lorenz, Toprak-Yildiz, 2024a). Particularly, in the German context, where English is the most significant and compulsory foreign language taught at schools (Lorenz et al., 2024), several studies have focussed on the interplay between the majority language German proficiency, heritage language proficiency and English language proficiency (e.g., Edele et al., 2018; Hopp et al., 2019; Klieme et al., 2006; Lorenz et al., 2021; Lorenz, Toprak-Yildiz, & Siemund, 2023; Maluch & Kempert, 2019; Maluch et al., 2015, 2016; Siemund & Lorenz, 2024).

Historically, earlier studies investigating L3 English acquisition in heritage bilinguals focused on educational contexts and produced findings which lent support

to the L3 advantage in heritage bilingual students. It should be noted that these studies were primarily conducted in specific contexts (e.g., Spain and Switzerland) where both the majority and heritage languages can be instructionally supported (Hopp et al., 2019). Notably, a group of earlier studies conducted in the Basque Country and Catalonia context (Cenoz, 1991; Lasagabaster, 1997; Muñoz, 2000; Sagasta, 2003; Sanz, 2000), which investigated the L3 English performance of bilingual students, demonstrated that bilingual advantage existed when a set of personal and contextual factors (e.g., intelligence, socioeconomic status, etc.) were controlled for. For instance, Lasagabaster (1997) demonstrated that there was a link between bilingual background and L3 English proficiency, and bilinguals possessed increased metalinguistic awareness. Similar results were obtained in Sanz (2000) and Sagasta (2003), demonstrating a bilingual advantage. Likewise, Muñoz's (2000) correlational study revealed that there were significant correlations between participants' proficiency in Catalan, Spanish, and English. Recently, del Pilar Agustín-Llach (2019) investigated the impact of heritage bilingualism in the context of L3 English acquisition and identified a slight bilingual advantage in most measures, albeit not strong enough to have statistical significance. These findings, overall, demonstrated the positive impact of heritage bilingualism on L3 acquisition, in settings where individuals possessed a higher level of proficiency in both languages.

On the contrary, studies examining the links between heritage bilingualism and additional language acquisition in majority language contexts, including Germany, have yielded relatively less conclusive results (Edele et al., 2018). A notable study demonstrating the so-called bilingual advantage in L3 acquisition is the DESI study (Assessment of Student Achievements in German and English as a Foreign Language) (Hesse et al., 2008), which examined a large national sample of

monolingual and bilingual German students. Bilingual students were found to outperform monolingual students when a set of contextual factors (e.g., cognitive ability, socioeconomic status, etc.) were controlled for. Nevertheless, a reanalysis of the DESI data by Göbel, Rauch, and Vieluf (2011) revealed that Turkish and Polish heritage language students who mainly used their heritage languages with their families did not outperform German monolinguals with similar characteristics. Furthermore, a bilingual advantage was detected in bilingual students who might have benefited from higher literacy skills in L1. The significance of literacy skills was also identified by Rauch et al. (2012), who found that fully biliterate students performed better than monolingual and partially biliterate bilingual students in terms of L3 proficiency and metalinguistic awareness.

In another study conducted in the German context, Maluch et al. (2015) examined the relationship between heritage bilingualism and the acquisition of English as an additional language in a large national sample by controlling for contextual variables. Maluch et al. (2015) found a positive relationship between heritage bilingual background and L3 English proficiency. However, the strongest predictor for L3 proficiency was proficiency in the majority language, German. Similarly, Maluch et al. (2016) identified bilingual advantages in bilingual students attending elementary school. Nevertheless, this advantage decreased in secondary school and was reserved for bilinguals who reported mainly using the majority language, German, at home.

Edele et al. (2018) investigated the impact of heritage bilingual background on L3 English using the data obtained from the German National Educational Panel Study (NEPS). The authors found L3 English advantages for balanced bilinguals at a high level compared to the monolingual cohort. Furthermore, the majority language

competence, German, was found to be the strongest predictor for L3 competence. In another study, Siemund & Lechner (2015) examined whether a high score in the heritage language in addition to L2 German contributed positively to L3 English scores and found that higher scores in both German and the heritage language contributed to higher scores in L3 English. The authors also demonstrated that there were individual thresholds while there was no bilingual advantage in L3 English acquisition, possibly due to contextual factors. Hopp et al. (2019), likewise, examined whether heritage language or the majority language leads to transfer in L3 English among young heritage speakers in a monolingual and bilingual children sample. The results revealed that both groups performed similarly in L2/L3 English. Hopp et al. (2019) also examined whether childhood bilingualism is associated with benefits in English L3, which factors predicted the L3 acquisition in bilingual children, and whether bilingual effects on L3 acquisition changed over time. The study produced mixed findings: the bilingual group scored lower than the monolingual group. However, bilingual advantage existed through several measures, such as the early stages of foreign language acquisition and when socioeconomic factors were controlled. The bilingual advantage diminished over time.

In the German context, a more recent line of research has examined the links between heritage bilingualism and L3 English acquisition, particularly using the Structural Equation Modelling (SEM) approach (e.g., Lorenz et al., 2021, 2023, 2024; Siemund et al., 2024a, 2024b). In their first study, Lorenz et al. (2021) investigated the impact of bilingualism on L3 English acquisition and the relationships between linguistic and extra-linguistic factors, using a large national monolingual and bilingual sample obtained from MEZ project (Mehrsprachigkeitsentwicklung im Zeitverlauf [MEZ], 2014–2019; Gogolin et al., 2017). The results revealed that there

was no statistically significant bilingual advantage. In Lorenz et al. (2023), the authors further examined the relationships between linguistic and extra-linguistic factors by running two separate structural equation models. They demonstrated that bilingual and monolingual groups performed similarly. The authors also found a facilitative impact of the majority language German proficiency on English L2/L3 proficiency. In a subsequent study, Siemund et al. (2024a) examined language interdependence in relation to cognitive ability in two groups of heritage bilingual students. The findings indicated that proficiency in German contributed to L3 English proficiency positively, while this independence effect became more substantial with increasing cognitive ability. No such interdependence effect was present between heritage languages and L3 English proficiency. In a similar vein, Siemund et al. (2024b) tested whether high cognitive ability yielded more substantial language interdependence effects than low cognitive ability by comparing two groups of heritage bilingual students and a monolingual German control group in terms of their L2/L3 English proficiency. The authors placed students in three groups based on their performance on a cognitive ability measure and ran SEM analysis to determine whether proficiency in heritage languages and majority language influenced L2/L3 English differently. The results indicated that language interdependence exists, nevertheless, this effect was not independent of cognition.

Finally, Lorenz et al. (2024) longitudinally examined the influence of several cognitive, social, and linguistic variables on L2/L3 English acquisition in a monolingual and bilingual national sample participating in the MEZ project. The authors determined that cognitive ability and German proficiency influenced L2/L3 English proficiency, while heritage language proficiency was not a significant predictor.

Overall, studies conducted in the German context seem to yield inconclusive results concerning bi/multilingual advantages, possibly due to these reasons: i) heritage bilinguals are usually dominant in the majority language German, ii) most heritage bilinguals do not receive formal instruction in their respective heritage languages, iii) heritage bilinguals mostly have uneven and heterogeneous linguistic profiles and iv) socioeconomic and cultural background of their families might exert an impact on the results obtained (Edele et al., 2018; Hopp et al., 2019; Lorenz et al., 2024; Siemund et al., 2024a). Moreover, from a methodological perspective, variations in findings may result from differences in methodologies employed in these studies, notably in sample characteristics, data collection tools, and analysis methods.

1.1.Remaining Issues and The Present Study

This section presents the rationale for the dissertation research, emphasising the key reasons that motivated the study, pointing to gaps in relevant literature and discussing the significance of addressing these gaps. The key reasons that motivated the study, discussed in greater detail below, stem from both research-area and methodology related considerations.

To date, a significant number of studies have suggested that bilingualism exerts a positive impact on additional language acquisition. Nevertheless, the validity and extent of this advantage, particularly for heritage bilingual speakers, remains an open question (Edele et al., 2018; Hopp et al., 2019; Maluch & Kempert, 2019). In particular, research on L3 English acquisition in heritage language bilinguals has either revealed positive effects or no evidence of a bilingual advantage, resulting in a body of inconclusive and conflicting findings (Edele et al., 2018). Therefore,

exploring the relationship between heritage bilingualism and L3 acquisition remains essential and offers a promising research avenue (Lloyd-Smith, 2023).

Concerning the German educational context, examining heritage language speakers' multilingual development is well-justified from practical, educational, and theoretical perspectives. First, the growing number of students from bi/multilingual backgrounds has exerted a considerable impact on the linguistic landscape of the German educational context (Maluch & Kempert, 2019; Maluch et al., 2015). For instance, almost every second child is reported to be born into a migrant family (Gogolin, 2021), and the heritage bilingual speakers of Arabic, Farsi, Polish, Russian and Turkish background comprise almost half of the adolescent school population in German schools (Gogolin, 2021). Second, heritage language speakers could be considered an ideal group for investigating the factors that underlie multilingual development and additional language acquisition, given their rich linguistic repertoire. In the German educational context, it is mandated that all students learn at least one foreign language at school. Particularly, at the secondary level academic track (*i.e.*, Gymnasium), studying a second foreign language is obligatory (Gogolin, 2021; Gogolin et al., 2021). Thus, students with a migration background may speak the majority language, German, their respective heritage languages, and two foreign languages—the first choice of a foreign language likely being English (Lorenz & Siemund, 2020). Third, relevant literature has demonstrated that heritage language-speaking students may attain varying educational outcomes, lag behind their monolingual counterparts and only show comparable performance to their monolingual counterparts once contextual factors (e.g., linguistic and socioeconomic factors) are controlled for (Hopp et al., 2019; Maluch & Kempert, 2019). Likewise, a sizeable envelope of studies has scrutinised the educational outcomes of heritage

language students alongside their linguistic proficiency, particularly in large-scale assessment settings (e.g., Hardy & Jurecka, 2018; Stanat & Christensen, 2006; Stanat, Rauch, & Segeritz, 2010). Fourth, heritage bilingual speakers are a unique group of bilinguals, varying considerably in terms of their proficiency in the heritage language and exhibiting different acquisition patterns and heterogeneous linguistic profiles (Benmamoun et al., 2013; Paradis, 2023). Put differently, heritage language speakers "fit neither into the model of a monolingual native speaker that is the basis of most linguistic research nor into the model of a canonical (balanced) bilingual" (Chang, 2016, p. 791). To summarize, the links between heritage bilingualism and multilingual development warrant further inquiry due to educational, practical and theoretical reasons outlined earlier, the inconclusiveness of findings obtained in relevant research (Edele et al., 2018), and the need for further research in this relatively underexplored area (Lloyd-Smith, 2023).

From a methodological perspective, existing literature has mainly focused on one-shot comparisons between bilingual cohorts with monolingual cohorts (Rothman et al., 2019, 2023). Most studies have specifically concentrated on examining the relationships between heritage bilingualism and L3 acquisition using cross-sectional designs (Maluch et al., 2016). Most importantly, there is a notable absence of longitudinal studies (Lorenz et al., 2024). This issue is reflected in a paucity of studies which have specifically employed a longitudinal perspective or methodology to examine multilingual development in heritage bilinguals (e.g., Hopp et al., 2019; Lorenz et al., 2024; Maluch et al., 2016).

Furthermore, excessive reliance on a comparison between monolingual and bilingual cohorts deserves further scrutiny (Rothman et al., 2019), for monolinguals have traditionally represented a significant normative benchmark in multilingualism

research (Siemund et al., 2024a). Nevertheless, this typical comparison of monolingual and multilingual groups in multilingualism research may pose serious problems (Rothman et al., 2023), mainly due to the challenges associated with defining monolingualism and multilingualism (Berthele, 2021). The existence of different types of monolingualism and multilingualism, the difficulty of finding true monolinguals amid the continuous spread of English all around the world, and the linguistic and cultural diversity in multilingual groups challenge the long-established tradition of comparing monolinguals with multilinguals (Siemund et al., 2024a). As a result, the relevant literature suggests that researchers should focus more on comparing different multilingual groups rather than sticking to the tradition of comparing monolinguals with bi/multilinguals (Rothman et al., 2023; Siemund et al., 2024a).

Considering these critical issues, this dissertation aims to investigate the links between heritage bilingualism and the longitudinal development of English as an additional language in the German secondary education context by employing a longitudinal design and analysis methodology (i.e., the Latent Growth Curve Modelling approach in the context of Structural Equation Modelling [Rosseel, 2024]). Given the need to shift focus to heritage bilingual groups rather than employing the traditional monolingual vs. multilingual perspective (Rothman et al., 2023; Siemund et al., 2024a), this dissertation concentrates on a national sample featuring Russian-German and Turkish-German heritage bilinguals participating in the first three waves of MEZ project (Mehrsprachigkeitsentwicklung im Zeitverlauf [MEZ], 2014–2019; Gogolin et al., 2017).

1.2. Research Questions

The dissertation seeks explicit answers to these research questions:

i) How is the latent growth trajectory of Russian-German and Turkish-German heritage bilinguals in L3 English characterised?

ii) Which linguistic variables influence the L3 English latent growth trajectories and growth rate of heritage bilinguals?

iii) Which extra-linguistic variables influence the L3 English latent growth trajectories and growth rate of heritage bilinguals?

In the dissertation, multilingual development in heritage bilinguals is expressed in terms of "growth rate" and "growth trajectory" since these two terms are usually used in longitudinal research to express development (e.g., Ellis, Ozgur, Kulow, Dogan, & Amidon, 2016; Kim, Petscher, Schatschneider, & Foorman, 2010). In the context of multilingual development, "growth rate" would mean the pace at which L3 English acquisition would progress each wave while "growth trajectory" would refer to the overall pattern of multilingual development over time.

In addition to examining L3 English longitudinal growth trajectories and growth rate in heritage bilingual students, the study demystifies which linguistic (i.e., heritage language proficiency, majority language proficiency, and L1 background) and extra-linguistic (i.e., cognitive ability, socioeconomic status, and school type) factors exert an impact on L3 English development. Hence, the present study aims to contribute to a relatively uncharted growing body of research which has investigated the links between heritage bilingualism and L3 acquisition in a longitudinal fashion

(e.g., Hopp et al., 2019; Lorenz et al., 2024).

1.3.Structure of The Dissertation

The dissertation consists of several sections (See Figure 1., for an overview of the dissertation structure). The first section of the dissertation, the *1. The Introduction* section provides a general overview of the field, reviews main trends, issues, and debates in multilingualism research from a historical perspective, and focuses on the research conducted on L3 (English) acquisition in the German context. Furthermore, the introduction section identifies gaps and issues in the existing literature, establishes the background of the study, and provides a rationale for the dissertation within the context of relevant research. The introduction also outlines the aims of the study and presents the research questions addressed within the context of the dissertation (See "*1.1. Remaining Issues and The Present Study*").

The second section of the dissertation, "*2. Literature Review*", consists of several subsections and provides more detailed background information about the issues and notions of interest, such as multilingualism, heritage bilingualism, and third language acquisition. The section features subsections "*2.1. Multilingualism as a Concept", "2.2. An Overview of Bi/Multilingual Advantages", "2.3. An Overview of Research on Bi/Multilingual Advantages", "2.4. Reflections on Bi/Multilingual Advantages", "2.5. Heritage Bilingualism", "2.6. Third Language Acquisition", "2.7. Cross-linguistic Influence", "2.8. Linguistic Interdependence", "2.9. Research on Heritage Bilingualism and L3 Acquisition", "2.9.1. Multilingualism in the German Context", and "2.9.2. Multilingualism Research in the German Context".*

The "*3. Methodology*" section presents a detailed overview of the study design, sample, instruments used, data collection procedures, and data analysis processes. The subsection *"3.1. Design"* presents details concerning the general research strategy of the present study. The subsection *" 3.2. Sample"* provides detailed information about the participants of the study. "*3.3. Data Collection"* provides detailed information about how the data were obtained. "3.4. *Variables of Interest*" introduces linguistic and extra-linguistic variables that were examined in the context of the dissertation. *"3.5. Instruments"* describes the data collection tools used in the present study. "*3.6. Data Screening*" elaborates on the procedures that were applied to the data to prepare it for the analyses. The subsection "*3.7. Data Analysis"* provides detailed information about the methods used for data analysis and the process of data analysis itself.

The "*4. Results*" section presents the results of the analyses in the subsections entitled "*4.1. Results for Descriptive Statistics, "4.2. Results for Correlation Analyses", "4.3. Results Concerning the Latent Growth in L3 English", "4.3.1. Model Fit", "4.3.2. Bilingual Latent Growth Trajectories in L3 English", "4.4. Results on The Variables Influencing L3 English Growth", "4.4.1. The L3 English Growth Model" and "4.4.2. Latent Growth Curve Model Regression Parameters".*

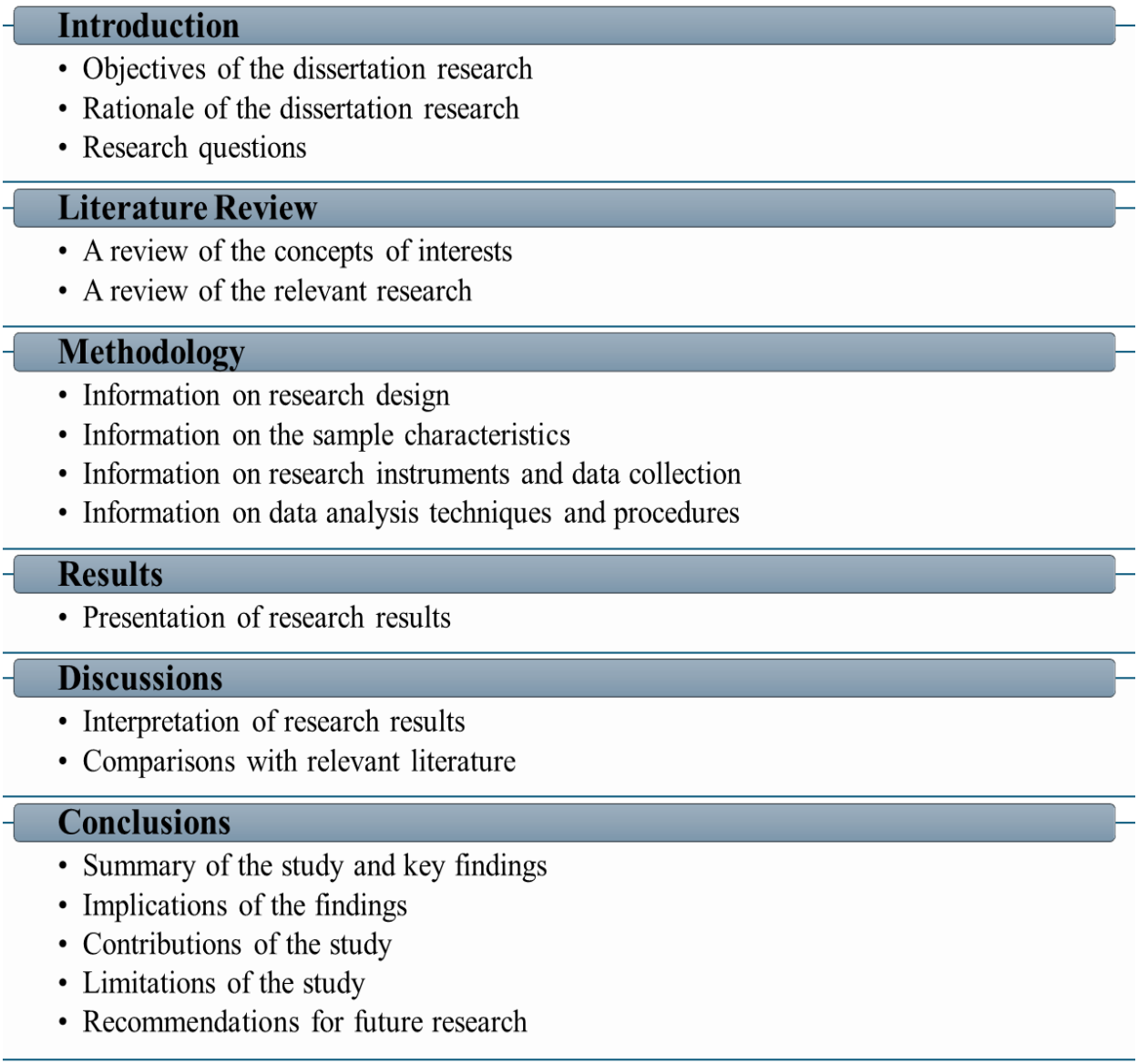
The "*5. Discussions*" section provides an interpretation of the findings and evaluates the findings in the light of the relevant literature. The section includes the subsections entitled "*5.1. Heritage Bilingual Students' L3 English Growth Trajectories*", "*5.2. The Impact of Linguistic and Extra-linguistic Variables on L3 English Growth*", "*5.2.1. The Impact of Linguistic Variables on L3 English Growth*", "*5.3. The Impact of Language Background*", "*5.4. The Impact of Extra-*

Linguistic Variables on L3 English Growth", "*5.4.1. Cognitive Ability*", "*5.4.2. School Type*", and "*5.4.3. Socioeconomic Status*". These subsections are arranged based on the research questions of the dissertation.

Finally, "*6. Conclusions*", presents an overall assessment of the whole study, elaborates on the potential contributions and limitations of the study and provides readers with relevant pedagogical implications. The section features "*6.1. Pedagogical Implications*" and "*6.2. Limitations and Future Research*".

Figure 1

An Overview of The Dissertation Structure



2. Literature Review

This section provides essential background information on the key issues and concepts that are central to the study. It explores the concepts of bi/multilingualism, advantages of bi/multilingualism, heritage bilingualism, additional (third) language acquisition, cross-linguistic influence, and language interdependence. Additionally, the section examines and discusses previous research related to these topics, with a particular focus on the European and German contexts.

2.1. Multilingualism as a Concept

Multilingualism can be characterised as both a common and remarkable accomplishment for much of the global population (Flynn, Foley, & Vinnitskaya, 2004). Multilingualism is a prevalent phenomenon all around the world and has been shaped by different processes including migration, trade, cultural exchanges, and conquests. The significance of multilingualism has grown more over the decades, particularly due to the impact of globalisation, international mobility, immigration and the advances in communication and internet technologies (Cenoz, 2013a). This increasing trend is evident in recent statistics and censual data on the share of foreign-born populations and the share of multilingual speakers to overall population in urban areas (e.g., London, Hamburg, New York, and Sydney) in various parts of the world (see, Siemund (2023) for a comprehensive treatment of this trend).

Multilingualism can generally be defined as the ability to communicate in more than one or multiple languages (Cenoz, 2013a). However, multilingualism can

be understood on different levels as well (Siemund, 2023). First, countries can be multilingual at the official level, meaning they have multiple official languages in their legislation, as in the case of Luxembourg, Belgium, Switzerland, and Malta. Second, at the societal level, multilingualism refers to the coexistence of multiple languages or the use of multiple languages in a community (Cenoz, 2013a). Third, at the individual level, multilingualism would represent a person's ability to speak multiple languages. Individuals that are members of a multilingual community usually speak and function in multiple languages. A critical aspect of individual multilingualism is that it features a broad spectrum of language skills. It can be considered a continuum rather than a dichotomy, ranging from essential conversational ability to assuming full proficiency in multiple languages.

In the relevant literature, there have been various definitions involving the nature and properties of multilingualism, particularly addressing the relationships between two associated terms: multilingualism and bilingualism. While the term multilingualism has grown more popular recently, usually at the expense of bilingualism, distinctions between the two terms remain somehow unclear. Some scholars even use these terms interchangeably on some occasions. To illustrate, on one hand, even though bilingualism typically refers to the use of two languages, it can also involve more than two languages (Cook & Bassetti, 2011). On the other hand, multilingualism typically refers to two or more languages; accordingly, bilingualism can be regarded as an instance of multilingualism (Aronin & Singleton, 2008). According to another view, bilingualism is solely reserved for using two languages, while multilingualism refers to using three or more languages (De Groot, 2011; Kemp, 2009).

Another crucial issue in the scholarly debate concerns the assumptions and

evolving trends in multilingualism over the centuries, especially in the context of discussions favouring linguistic purism and institutional monolingualism. For centuries, studying at least a lingua franca such as Greek, Latin, and French symbolised having an elite status or belonging to an upper class (Siemund, 2023). Namely, one of the essential qualities of most Renaissance authors was having been trained in classical languages such as Latin or ancient Greek, or their study of ancient texts as part of their education (Peck & Coyle, 2002).

However, especially around the eighteenth and nineteenth centuries, during the inception of nation-states, monolingualism came to be considered the norm, and was regarded to be quite essential to the formation of national identities (Siemund, 2023). This ideology remained popular through the 1950s and 1960s, when monolingualism was deemed a prerequisite for modernisation, prosperity, and unity as well (Ricento, 2006). Nevertheless, particularly in recent decades, multilingualism has experienced a revival, largely driven by migration (Siemund, 2023), despite the persistence of a strong monolingual habitus (Gogolin, 2008, 2021).

Even though it appears that the Western world has more recently rediscovered multilingualism (Siemund, 2023), currently, major European cities such as Berlin, London, Paris, and Stockholm host a great degree of ethnic and linguistic diversity (Bonnet & Siemund, 2018). Similarly, linguistic diversity has become a prominent property of European identity (Extra & Yağmur, 2011; Häggman, 2010). Moreover, immigration, political and economic developments near or far from the continent, and globalisation have considerably contributed to the linguistic diversity in Europe (Bartelheimer, Hufeisen, & Montanari, 2019; Dockrell et al., 2021). Consequently, an increasing number of people living in Europe are in fact multilingual since they are likely to speak a regional language, a majority (i.e., national) language, a heritage

language, and additional foreign languages at the same time (Extra & Yağmur, 2011; Siemund, 2023).

Following this trend, fostering multilingualism and ensuring that everyone can speak at least three languages have become an essential part of European educational policies (Hesse et al., 2008). Consequently, European Union member states concur that all children, along with their national languages, should learn at least two languages during their education (Gogolin, 2021; Gogolin et al., 2021). Considering these developments, it is safe to conclude that multilingualism will remain an integral part of European identity and ideals.

2.2. An Overview of Bi/Multilingual Advantages

Bialystok (2017) maintained that language is "the most intense, sustained, and integrative experience", which renders bilingualism a suitable context for examining the links between language, brain structure, and cognitive ability (p. 4). According to Bialystok (2017), language is essential to not only communication but also for forming new human experiences as well as these experiences. Moreover, language is considered to be a sustained experience, for its use takes a great part of waking, and perhaps non-waking, time (Bialystok, 2017). Likewise, language is considered to be integrative, requiring the use of various parts of the brain. For instance, previous research investigating the neurobiological foundations of language processing has revealed that different brain regions in the left and right hemisphere assist various language functions (Friederici, 2011).

To date, a substantial body of literature has claimed that bilingualism offers advantages that are associated with increased creativity (e.g., Baker, 2001; Leikin, 2013), enhanced metalinguistic awareness (e.g., Bialystok, 1991; Bialystok & Barac,

2012; Cummins, 1978; Jessner, 1999; Rauch et al., 2012; Ter Kuile et al., 2011), increased cognition (e.g., Ben-Zeev, 1977; Bialystok, Craik, & Luk, 2008; Cenoz & Genesee, 1998; Genesee, Tucker, & Lambert, 1975; Jessner, 1999; Thomas, 1992), language aptitude (e.g., Eisenstein, 1980, Huang, Loerts, & Steinkrauss, 2022), increased selective attention (e.g., Bialystok, Craik, Green, & Gollan, 2009; Chung-Fat-Yim, Sorge, & Bialystok, 2017; Comishen, Bialystok, & Adler, 2019) and certain cognitive advantages and flexibility, even at the later stages of life (e.g., Chertkow et al., 2010; Craik, Bialystok, & Freedman, 2010; Degirmenci et al., 2022). According to Cenoz (2003), the positive impact of bilingualism could be indirect rather than a direct one. In other words, bilingualism may exert an impact on relevant variables such as cognition and metalinguistic awareness, and these consequently may facilitate further language acquisition.

Concerning bilingual advantages, it is particularly worth noting the well-documented links between bilingualism and metalinguistic awareness. Different hypotheses regarding these links have been put forward in the relevant literature. Metalinguistic awareness can be defined as the ability to reflect on the nature and functions of language and consider language as an abstract entity (Jessner, 1999, 2006; Pratt & Grieve, 1984; Thomas, 1988, 1992). It is assumed that bilingual children are aware that concepts and objects can be expressed with different words, which may help them grasp the arbitrary nature of language (Bialystok & Miller, 1999). It has also been shown that using multiple languages may facilitate comparative processes that further promote the acquisition of explicit knowledge of linguistic features (Cromdal, 1999). When individuals can concentrate on formal aspects of a language, they are expected to better reflect on the language itself.

Relevant literature has suggested that handling multiple languages may

enhance executive function or control, which refer to cognitive abilities responsible for integrating, regulating, and managing other mental processes, including planning, inhibition, and cognitive flexibility (Sekerina et al., 2019). The act of turning implicit knowledge into explicit knowledge involves the effective use of executive functions, in which bilinguals are assumed to have significant advantages (Adesope et al., 2010; Barac et al., 2014; Bialystok, 2001; Bialystok et al., 2014). For instance, Bialystok (2001) reported that bilinguals outperformed monolingual individuals on tasks that target word awareness and require a higher level of attention control. She concluded that bilingual advantages would be more pronounced among balanced bilinguals. This advantage is linked to a specific assumption—bilinguals' ability to think about language more abstractly and consider it an object (Cenoz, 2013b; Jessner, 2008; Ransdell et al., 2006).

Along with these executive function related advantages, bilinguals are documented to have a broader range of learning strategies at their service due to their previous language learning experiences (Kemp, 2007). Bilinguals have also been reported to use language learning strategies more frequently (Psaltou-Joycey & Kantaridou, 2009). Particularly, if the languages in a bilingual's linguistic repertoire are closely related, their previous experience is assumed to facilitate the third language acquisition process to a greater extent (Cenoz, 2003; De Angelis, 2007).

2.3. An Overview of Research on Bi/Multilingual Advantages

To date, the scientific evolution of bilingualism, multilingualism, and even monolingualism research has witnessed significant shifts. Initially, from the late 1800s until around 1950, the prevailing view strongly favoured monolingualism and rejected bilingualism, while from the 1950s to the 1990s, substantial efforts were

made to demonstrate that bilingual children can acquire their two languages as successfully as monolingual children (Siemund, 2023). More recent research seems to have increasingly concentrated on the positive aspects of bilingualism and multilingualism, aiming to identify and explain so-called bilingual advantages (Siemund, 2023).

Early studies on bi/multilingualism were often influenced by confounding variables and usually focused on a comparison of bilinguals from lower socioeconomic backgrounds, with monolinguals sampled from middle or higher socioeconomic groups. These methodological issues ultimately contributed to findings which revealed the negative impact of bi/multilingualism on additional language acquisition (Hesse et al., 2008; Higby et al., 2023).

For instance, using a sample of 1.400 children in the Welsh context, Saer (1923) showed that bilingual children were at a disadvantage on the Stanford-Binet cognitive measure when they were compared to their monolingual counterparts. The findings demonstrated that the difference between these two groups became larger over time, from 7 to 11 years of age. Saer (1923) accounted for this outcome by referring to a mental confusion claimed to be experienced by bilingual children. However, socioeconomic status, which is a key factor, was not controlled for in the study. In another study conducted in the US context, Mitchell (1937) examined 237 Spanish-speaking children to determine whether bilingualism exerts an impact on children's thinking in either language by using a set of assessments in English and Spanish, and a nonverbal intelligence measure. The author concluded that bilingual children functioned under a serious handicap.

Similarly, Darcy (1946) administered a revised version of the Stanford-Binet Scale and the Adkins Object-fitting Test (i.e., a nonlanguage test of intelligence) to

two groups of bilingual and monolingual preschool age children (N=212). The author matched both groups concerning age, gender, and parental occupations. The results revealed that monolinguals were superior on the Stanford-Binet scale while bilinguals were superior on the Adkins test. However, the author concluded that bilingual children were handicapped on the Stanford-Binet test.

After considering the implications and methodological shortcomings of previous research, Peal and Lambert (1962), aimed to investigate the impact of bilingualism on the cognitive ability of children and examine the links between bilingualism, achievement at school, and students' attitudes to the second language. The participants were 10-year-old students attending French schools in the Canadian context. The authors investigated the impact of bilingualism on cognitive development by examining the performances of French-English bilinguals and French or English monolinguals on several cognitive measures. The findings demonstrated that the bilinguals performed significantly better than their monolingual counterparts on the Raven Progressive Matrices, the Lavoie-Laurendeau Nonverbal IQ test, and the majority of subtests of the nonverbal measures. Moreover, it was found that the monolingual and bilingual cohorts performed in different ways on subtests on intelligence. While on specific subtests of the nonverbal type no differences were found between the two groups, on other subtests bilinguals outperformed the monolinguals. Additionally, on none of the measures the monolinguals were found to perform better than the bilinguals, and on contrary to the observation that bilinguals were often lagging behind in school grade, the bilinguals participating in the study were found to be in a higher grade than the monolinguals.

This study was groundbreaking in the field of bi/multilingualism since it challenged the findings of previous research, which predominantly associated

bilingualism with low cognitive ability and relatively poor performance. Moreover, the study demonstrated the methodological flaws of previous research, which usually had sampling issues and overlooked the impact of significant variables such as age, gender, and socioeconomic background. The study also paved the way for subsequent studies, which paid more attention to methodological problems associated with previous studies.

While the studies carried out between 1920 and 1960 usually depicted the potential impact of bilingualism in a negative light, following Peal and Lambert's study (1962), bilingualism became increasingly recognized for its various cognitive advantages (Cenoz, 2003). Moreover, during the 1980s and the 1990s, a growing number of studies suggested the existence of a bilingual advantage. For instance, these studies revealed that bilinguals possess greater flexibility than their monolingual counterparts when employing learning strategies (Nation & McLaughlin, 1986; Nayak, Hansen, Krueger, & Mclaughlin, 1990) and benefit from an increased metalinguistic awareness (e.g., Bialystok, 1991; Cummins, 1978; Jessner, 1999) and cognition (e.g., Ben-Zeev, 1977; Cenoz & Genesee, 1998; Genesee, Tucker, & Lambert, 1975; Jessner, 1999; Thomas, 1992).

Multilingualism research around the 1990s and early 2000s concentrated on another significant concept, third language acquisition, particularly in the Canadian immersion settings (e.g., Bild & Swain, 1989; Genesee, 1998; Swain, Lapkin, Rowen, & Hart, 1990) and the Spanish context (e.g., Cenoz & Valencia, 1994; Sanz, 2000). Studies conducted in the Canadian and Spanish contexts usually indicated an advantage for bilingual students over monolingual students, while studies conducted in European contexts compared immigrant learners with non-immigrant monolingual learners and tended to yield more inconclusive results (Cenoz, 2013b).

The difference in research findings might have to do with the study objectives, the languages examined, and participants' proficiency in the respective languages (Cenoz, 2003). To illustrate, while a strand of research concentrated on the impact of bilingualism on third language proficiency, another strand of research examined several aspects of linguistic competence, assuming that bilingualism does not necessarily impact all aspects of third language competence in the same way (Cenoz, 2003). Furthermore, Cenoz (2003) claimed that studies focusing on the impact of bilingualism on third language proficiency were usually conducted in instructional settings and featured at least one minority language. These minority languages were less common, received various levels of institutional support, and functioned as the first and second language of participants.

For instance, several studies were conducted in the Basque Country and Catalonia to examine the L3 English performance of students who were bilingual in Spanish and Basque or Spanish and Catalan (e.g., Cenoz, 1991; Lasagabaster, 1997; Muñoz, 2000; Sanz, 2000) after a set of personal factors (e.g., intelligence, motivation, socio-economic status) were controlled for. Cenoz (1991) and Cenoz and Valencia (1994) demonstrated that when these factors were controlled for, bilingualism influenced four language skills and grammar and vocabulary competence in L3 English. However, it was found that the impact of intelligence and motivation was more significant than the impact of bilingualism. In another study conducted in the Basque Country, Lasagabaster (1997) found that the level of bilingualism and L3 English proficiency were related, and bilinguals exhibited a higher degree of metalinguistic awareness when factors such as intelligence, motivation, and socio-economic level were controlled for. Sanz (2000) also presented similar results which suggested a bilingual advantage in L3 English acquisition, in a

comparative study featuring Catalan and Spanish-speaking and monolingual Spanish-speaking subjects. Likewise, Sagasta (2003) investigated the L3 English acquisition in the Basque Country by comparing bilingual learners with different proficiency levels. The findings suggested that a higher level of bilingualism was linked to higher proficiency in L3 English.

In a similar vein, Muñoz (2000), in a correlational study conducted in the Catalonian context, found significant correlations between performances in Catalan, Spanish and English and demonstrated that individuals with a high proficiency level in the L1 and L2 had a higher English L3 proficiency. In a more recent study, del Pilar Agustín-Llach (2019) investigated the effect of bilingualism on lexical knowledge, lexical fluency, and lexical cross-linguistic influence (CLI) in the Spanish context by employing a sample of Spanish monolingual (86) and Spanish–Basque bilingual (87) English L3 learners. The findings indicated a slight bilingual advantage in most measures, yet the effects were not strong enough to exhibit statistical significance. Bilinguals were mainly found to perform better at lexical knowledge than their monolingual counterparts. The author concluded that these results might be due to the typological distance between Basque and English and the effect of school instruction.

Many studies investigating the links between bilingualism and L3 acquisition were conducted in various contexts, including Canadian, the US, Dutch, and Swiss contexts. For instance, in the Canadian context, Bild and Swain (1989) examined L3 French proficiency with a sample of English monolinguals, Italian and English bilinguals, and non-Romance language and English bilinguals controlling for contextual factors (e.g., gender, age, and parental occupation). The findings pointed to a bilingual advantage in L3 French acquisition. Swain et al. (1990) also examined

the impact of heritage language bilingualism on L3 French in the Canadian context and found a facilitative effect of bilingualism on third language acquisition.

In a study conducted in the US context, Thomas (1988) examined L3 French acquisition by comparing monolingual English speakers and bilingual English-Spanish speakers and controlling for personal and contextual factors such as socio-economic status, language exposure, and teacher. The findings pointed to a bilingual advantage in L3 French acquisition. Upon dividing the bilingual sample into two subgroups, Thomas (1988) found that instruction in L1 positively impacted L3 French. Thomas (1988) accounted for this finding by referring to the metalinguistic awareness that bilingual individuals who received L1 instruction had.

In the Dutch context, several studies yielded conflicting results. To illustrate, Jaspaert and Lemmens (1990) examined L3 Dutch acquisition in immigrant children speaking and receiving education in Italian and French. Compared to monolingual French-speaking individuals, the bilingual cohort showed no significant differences. Another study that found no differences between monolingual and bilingual groups was conducted by Sanders and Meijers (1995), who compared L3 English acquisition in Turkish-Dutch bilinguals, Moroccan-Arabic bilinguals, and Dutch monolinguals.

Similarly, in the Dutch context, Schoonen et al. (2002) examined the L3 English acquisition in monolingual Dutch speakers and bilinguals speaking L1 and Dutch. The findings showed no significant differences between groups, while immigrant participants demonstrated poor academic achievement. In another study, Van Gelderen et al. (2003) examined the links between L3 English reading comprehension and its constituent skills and compared bilingual Dutch and monolingual Dutch secondary school students in the context of SEM. The authors replicated the finding that monolingual Dutch students outperformed bilingual Dutch

students. Moreover, the authors demonstrated that the L3 English performance of the bilingual Dutch cohort was not superior to the performance of the monolingual Dutch group, on the contrary, the bilingual cohort scored significantly lower than the monolingual cohort on the EFL reading task. The authors concluded that this outcome may have to do with the linguistic distance between the immigrants' L1 and L3 and the status of L1. In the Swiss context, Brohy (2021) examined the acquisition of L3 French in Romansch-German bilinguals and German-speaking monolinguals in the Swiss context. The findings revealed a bilingual advantage in L3 French proficiency. However, it should be noted that the minority language, in this case, was the language of instruction.

2.4. Reflections on Bi/Multilingual Advantages

Despite a growing body of literature over decades, discussions concerning bi/multilingual advantages remain inconclusive for studies seem to yield conflicting results (Hesse et al., 2008). This outcome may have to do with multiple factors (Lorenz, Rahbari, Schackow, & Siemund, 2020). Arguably, the primary reason for the variability in findings on bi/multilingual advantages could be the methodologies employed in these studies. To be more specific, studies usually do not employ random samples due to ethical or practical grounds, and samples may vary considerably in number and linguistic background (Lorenz et al., 2020).

Furthermore, most studies have been conducted in subtractive contexts, where minority languages do not receive sufficient attention (Cenoz, 2003; Lambert, 1974). Previous research reveals that the type of bilingualism is also likely to affect the results of those studies, with multilingual advantages becoming more salient with balanced bilingualism (Cenoz, 2003). Additionally, previous research suggests that

instruction in a weaker language would be highly needed to unlock the advantages associated with bi/multilingualism (Rauch et al., 2012).

Another key factor could be related to cognition or interdependence. There has been an ongoing debate in the relevant literature over whether multilingual development results from a multilingual boost or general cognitive skills (e.g., Berthele & Udry, 2022; Berthele & Vanhove, 2020; Siemund et al., 2024a, 2024b). To illustrate, Berthele and Udry (2022), aimed to investigate whether a multilingual advantage or a general cognitive ability explained language proficiency better in the Swiss context. The authors tested these two assumptions in a sample of 115 students attending public schools of the German-speaking area bordering the French-speaking region of Switzerland. The authors administered tests in English, French, and German and several cognitive ability tests measuring IQ, verbal working memory, and visual working memory in a longitudinal design. The authors generated two models, one favouring the multilingual boost and the other one favouring the general cognitive ability and tested these models using the structural equation modelling framework. The results showed that the correlations between cognitive ability and linguistic abilities were positive. Moreover, both structural models exhibited an acceptable fit to the data at hand, however, more parsimonious model which did not include multilingual boost was preferred. The authors concluded that both models were acceptable yet including the interdependence of the three languages did not contribute significantly to the explanation of the data.

Also, previous research has revealed that these bi/multilingual advantages are more observable at a young age and may not be detectable as students age (Hopp et al., 2019; Maluch et al., 2016; Siemund & Lechner, 2015). To illustrate, Hopp et al., (2019) examined foreign language learning at early stages, specifically in the primary

school and investigated whether bilingual advantages were found during this period. The authors asked whether childhood bilingualism is linked with advantages in English vocabulary and grammar in the context of foreign language learning, which variables explained the acquisition of English vocabulary and grammar in bilingual students, and whether bilingual advantages changed over time. The authors predicted that the advantage might be more prominent in the early stages of learning and examined bilingual advantages in receptive English vocabulary at the end of grade 3, in receptive English grammar at the end of grade 4, in productive English vocabulary at the end of grades 3 and 4. The sample featured 88 monolingual and 103 multilingual students speaking various languages including but not limited to Afghan, Bosnian, Chinese, French, Greek, Persian, Polish, and Turkish. The results demonstrated that there was a bilingual advantage when group means of monolingual and bilingual cohorts were compared on several language measures. When the authors controlled for the differences in cognitive and social status variables, the findings indicated a significant bilingual advantage in English productive vocabulary and receptive grammatical skills at the end of grades 3 and 4. The findings also suggested that bilingual background functioned as an important predictor of foreign language attainment in line with linguistic and cognitive factors. For the receptive grammar skills, the contribution of bilingual background was smaller when compared to linguistic and cognitive factors. The authors inferred those bilingual advantages emerged in early stages of language learning particularly in two domains: vocabulary and grammar. However, when the course of this advantage was examined over time, the results revealed that monolingual students exhibited marginally greater learning from grade 3 to 4 than the bilingual students when previous achievement was controlled for. Thus, the authors maintained that bilingual advantages diminish over

time as proficiency in the foreign language increases and these findings lent support to the findings of Maluch et al. (2016) who obtained similar findings.

Previous research also suggested that the impact of linguistic variables might be dwarfed by extra-linguistic factors, such as parental education, socioeconomic status of the family and educational setting (De Angelis, 2015). For instance, Lorenz, Toprak-Yildiz, and Siemund (2023) investigated the interplay of linguistic and extra-linguistic factors in monolingual and bilingual learners of English and examined which extra-linguistic factors explained the variance in L2/L3 English attainment. The extra-linguistic factors at hand were cognitive ability, socioeconomic status, gender, school type, age, self-concept, motivation, and self-assessment. The study employed a cross-sectional design and analysed the data from the first wave of the MEZ project. The sample featured 1403 students comprising 849 German monolingual students, 236 Russian-German students, and 318 Turkish-German students. The authors conducted the analyses in the structural equation modelling framework and tested several structural models that best explained the proficiency in L2/L3 English in both overall sample and the bilingual sample. In the overall sample, the findings revealed that the impact of the background, a latent variable included in the model was found to be comparably strong. This latent variable featured four factors: cognitive ability, school type, gender, and socioeconomic status. The path coefficients obtained revealed the significant role that these factors played in L2/L3 English acquisition. Overall, it was found that the extra-linguistic factors, except gender, explained L2/L3 English proficiency and German proficiency. The authors emphasised the positive impact of cognitive ability and school type on English proficiency. The findings also revealed the effect of socioeconomic status on L2/L3 English proficiency even though the impact of socioeconomic status was not as strong

as that of cognitive ability and school type. Another set of extra-linguistic factors which were added to the model were self-concept, motivation, and self-assessment, which were attitudinal factors. The impact of these attitudinal factors was not found to be as strong as that of background factors, and their impact on L2/L3 English proficiency was positive. Specifically, the impact of the attitude construct was found to be greater in the German monolingual group. Hence, the authors concluded this difference might stem from the higher socioeconomic status reported in the monolingual group. The authors demonstrated that the impact of extra-linguistic variables in their model on L2/L3 English proficiency was positive, suggesting that additional language acquisition is a highly dynamic process. The three groups in the sample performed similarly and a bilingual advantage was not present. This finding led the authors to conclude that the extra-linguistic factors might override linguistic factors. The authors maintained that a bilingual advantage might be counterbalanced by disadvantages associated with socioeconomic status and attitudinal factors.

Considering the inconclusive findings of existing body of research which examined bi/multilingual advantages, it might be safe to posit that a bilingual advantage might not reveal itself unconditionally. Moreover, in the context of heritage bilingualism, the impact of extra-linguistic factors and the impact of institutional support that heritage languages receive might be overriding (Lorenz et al., 2023).

2.5. Heritage Bilingualism

Various definitions of a heritage language speaker are offered in the relevant literature, highlighting both commonalities and slight differences. To begin with, a heritage language can be defined as a home language that is spoken in a home setting

and “is not the dominant language from the larger (national) society” (Rothman, 2009, p.156). A heritage language speaker can also be regarded as an individual who has picked up their heritage language in a home setting along with the majority language either simultaneously or sequentially (Arnaus Gil & Jiménez-Gaspar, 2022; Montrul, 2018; Rinke et al., 2019).

In another definition, Benmamoun et al., (2013, p.132) characterised heritage language speakers as “second generation immigrants, the children of the original immigrants, who live in a bilingual/multilingual environment from an early age.” This characterisation is reasonable considering the continuous growth in the number of heritage language speakers due to globalisation, immigration, and increased global mobility (Wiener & Tokowicz, 2021). Furthermore, in most cases the majority language is the dominant language of heritage language speakers while the heritage language itself remains the weaker one (Benmamoun et al., 2013). Since the majority language, L2 is the dominant language of the community, heritage bilinguals are “not foreign-L2 learners” but characterised as “community-L2 learners” (Paradis, 2023, p. 794).

Heritage bilinguals can be considered a unique group of bilingual speakers (Armon-Lotem, Rose, & Altman, 2021). They usually exist along a continuum and vary considerably in terms of heritage language proficiency, which result in various heritage language speaker profiles and acquisition patterns (Paradis, 2023). For instance, while some heritage bilinguals are immigrants and learn the majority language at school, some are born in the host country and acquire both the majority and heritage language at the same time. Some may have a parent who is a native speaker of the majority language (Hayakawa, Chung-Fat-Yim, & Marian, 2022). Moreover, some may exhibit a native-like command of both languages; some may be

able to speak in both languages but not able to read and write in the heritage language, while some have a limited understanding of their heritage language but are not able to express themselves in the language (Hayakawa et al., 2022).

However, it should be noted that these outcomes can be asymmetric. Previous research has shown that heritage language speakers may have gaps in lexis, morphology, and discourse-pragmatic features when compared to native speakers or balanced fluent bilinguals of the same language (Montrul, 2018). For instance, their vocabulary might be limited to home and childhood words (Armon-Lotem et al., 2021), or they may have a slower speech rate (Chang, 2016).

This outcome may have to do with several factors, including socioeconomic status, quantity of input, quality of input, frequency of use, family size, parental education, parents' proficiency, family attitudes, birth order, chronological age, and age of onset (Armon-Lotem et al., 2021; Hayakawa et al., 2022; Montrul, 2018; Paradis, 2023; Polinsky & Scontras, 2020; Rinke et al., 2019). To illustrate, even though simultaneous bilingual development may result in balanced bilingualism in adulthood when both languages are supported, this pattern seems to be relatively rare in heritage bilingual children (Montrul, 2018). A more prevalent pattern is this one: heritage bilingual children exhibiting balanced development until ages 3 or 4, with some degree of divergence around ages 5 or 6 when they start receiving formal education in the majority language, followed by a stagnation or recession in the heritage language development (Montrul, 2018).

This outcome is reasonable considering that in the early years, heritage language speakers would have more exposure to the heritage language in their home environment when they spend more time with other heritage language speakers, such as family members, which may lead to a boost in their heritage language proficiency

(Armon-Lotem et al., 2021; Hayakawa et al., 2022). Furthermore, there is empirical evidence suggesting that the later a heritage language speaker is exposed to the majority language, the higher the chances that s/he will be able to maintain their heritage language proficiency, as in the case of sequential bilinguals (Hayakawa et al., 2022) or simultaneous bilinguals' scoring lower on heritage language measures (Armon-Lotem et al., 2021). When heritage language speakers' primary language becomes the secondary, due to shifting sociolinguistic conditions, there would also be a shift in dominance (Armon-Lotem et al., 2021; Polinsky & Scontras, 2020). It might also be the case that when bilingual children realise that their home language is not widely spoken outside their household, they tend to rely on their majority language to navigate society (Montrul, 2018).

More recently, research on the characteristics of heritage language speakers has been proliferating. This strand of research explores how heritage bilingual speakers differ from monolingual speakers or second language learners since heritage speakers are assumed to "fit neither into the model of a monolingual native speaker that is the basis of most linguistic research nor into the model of a canonical (balanced) bilingual" (Chang, 2016, p. 791). In other words, heritage bilinguals are not usually typical bilinguals; even though they attain proficiency in the majority language, they can be less proficient, prone to attrition or incomplete acquisition in their heritage languages (Chang, 2016).

Additionally, various comparisons between heritage language speakers and second language (L2 speakers) have been made in terms of several aspects. Rinke et al. (2019, p. 223) outlined the following differences between the two groups: onset of acquisition (from birth vs after acquiring L1), type of input (more colloquial vs. more formal), type of knowledge (implicit vs. explicit), cross-linguistic influence

(less relevant vs. more critical), timing of acquisition and linguistic complexity (early acquisition advantage vs. no clear advantage).

However, there is also empirical evidence highlighting the advantages of heritage language speakers, especially in phonological aspects of language, where they seem to maintain the perceptual abilities of both heritage and majority languages—even when their proficiency in the heritage language is weak or uneven (Chang, 2016). In a comprehensive review on heritage bilingualism research, Polinsky and Scontras (2020) asserted that heritage language speakers exhibit competence in phonological and phonetic aspects of the heritage language, often outperforming L2 learners of the respective language. Despite gaps, they could be quite flexible with vocabulary control, do not exhibit marked production or comprehension deficits in various morphosyntactic features, and are able to retain the abstract knowledge of grammar even when this knowledge is not actively used. However, authors also cited research which reported that heritage speakers may have difficulties in associating meaning with the absence of form or silence, a phenomenon known as the "silent problem" (Polinsky & Scontras, 2020, p.15) or struggle dealing with ambiguity.

Heritage language bilingualism remains a relatively uncharted territory for researchers. A growing body of research continues to demystify how heritage bilingual development unfolds, examining the similarities and differences across heritage bilingualism, first and second language acquisition (Benmamoun et al., 2013). This ongoing work on heritage bilingualism provides valuable insights into the phenomenon and suggests new research directions for future research.

2.6. Third Language Acquisition

Even though the terms second language acquisition and third language acquisition are often used interchangeably in the relevant literature, with the former usually encompassing the latter, there are notable differences between these two experiences. Cenoz (2003), for instance, defined third language acquisition as "the acquisition of a non-native language by learners who have previously acquired or are acquiring two other languages" (p. 71). The first two languages can be acquired either simultaneously, as in early bilingualism, or consecutively (Cenoz, 2003).

Some scholars asserted that acquiring a third language is a distinct process rather than being a form or extension of second language acquisition (De La Fuente & Lacroix, 2015). According to this perspective, which treats third language acquisition as a distinct phenomenon, third language acquisition is more complex than second language acquisition and more susceptible to the effects of various factors, such as proficiency, socio-cultural status, and distances between previously learnt languages (Cenoz, 2001; Cenoz, Hufeisen, & Jessner, 2001; Mayo, 2012).

Cenoz (2003) maintained that third language acquisition, as a field, brings two fields that seem to ignore each other together: second language acquisition and bilingualism. While third language acquisition shares commonalities with second language acquisition, it also differs significantly in that third language learners tend to be more experienced than second language learners, can often be influenced by the cognitive effects of bilingualism, and may draw on two linguistic systems while acquiring the third (Cenoz, 2003).

Another significant distinction between second and third language acquisition lies in the differences between learning contexts (Cenoz, 2013b). Second language

acquisition usually refers to a language acquired chronologically after the first language in various settings, such as a foreign language in a school or the primary language in a community. Variables including age, motivation, and gender may also impact the second language acquisition process. In third language acquisition, the way the target and the second language are acquired would impact the process considerably as well.

The field of third language acquisition, though relatively new, has garnered increasing interest from scholars conducting research on various languages, establishing itself as a field in its own right (Cenoz, 2013b; De La Fuente & Lacroix, 2015). This growing interest is understandable, as gaining insight into the competences of L3 learners, how additional languages are acquired and processed in the multilingual mind, and how existing languages interact is essential (Slabakova, 2017). Similarly, a growing recognition that acquiring multiple languages is not identical to bilingualism, and these two processes may differ in terms of many aspects, has led to a surge of interest in third language acquisition (Alonso, Rothman, Berndt, Castro, & Westergaard, 2017).

According to Cenoz (2013b), two prominent lines of research have emerged within the scope of third language acquisition; the first line has examined the cross-linguistic influence on third language acquisition (e.g., Cenoz 2001; De Angelis, 2007; Hammarberg, 2009; Lindqvist & Bartel, 2010; Ringbom, 1986, 2007; Wrembel, Gut, & Mehlhorn, 2010) while the second line has investigated the impact of bilingualism on third language acquisition (e.g., Cenoz & Valencia, 1994; Lorenz et al., 2020; Lorenz & Siemund, 2020; Lorenz et al., 2021, 2023; Pugés & Pérez Vidal, 2008; Ringbom, 1987; Thomas, 1988).

Particularly, studies examining the impact of bilingual background on third

language acquisition consists of two groups, one strand showing that bilingualism positively influences the acquisition of an additional language (e.g. Cenoz, 2001; Cenoz & Valencia, 1994; Pugés & Vidal, 2008; Ringbom, 1987; Thomas, 1988) while the other strand suggesting the opposite and showing no significant differences across monolingual and bilingual groups of individuals (e.g., Fessi, 2015; Gallardo del Puerto, 2007; Lorenz et al., 2023; Sanders & Meijers, 1995; Schoonen et al., 2002). Based on a review of existing research, one can infer that the findings remain inconclusive, and more research in various contexts would be needed to gain deeper insights into the process in different settings (del Pilar Agustín-Llach, 2019). Potential reasons for these inconclusive or contradictory findings have been discussed in previous sections (see, for instance, the section entitled 2.4. Reflections on Bi/Multilingual Advantages).

Moreover, since multilingualism is not simply "bilingualism squared" (Slabakova, 2017, p. 652), how various contextual factors (e.g., linguistic, cognitive, personal) come into play needs to be investigated in the context of third language acquisition as well. A review of existing research on third language acquisition, particularly in the context of heritage bilingualism, is presented in the following section entitled "2.9. Research on Heritage Bilingualism and L3 Acquisition".

2.7. Cross-linguistic Influence

A substantial body of research has shown that languages in an individual's linguistic repertoire can influence and interact with newly learnt languages. This influence, which can be positive or negative, is called "transfer," a notion that has been extensively studied as a part of first, second, and additional language acquisition research. A broader term, "cross-linguistic influence", is also used to refer to transfer,

interference, and attrition processes by some researchers (Bonnet & Siemund, 2018).

Examining the cross-linguistic influence in the context of third language acquisition, learning a chronologically third language after the first and second languages have been acquired, has attracted growing scholarly attention (Bonnet & Siemund, 2018). An individual who grows up monolingually, learns a second language at school, and later studies a third language would be a subject of study in a traditional third language acquisition scenario. Nevertheless, given the number of individuals with bilingual and multilingual backgrounds, such cases are becoming increasingly rare these days (Bonnet & Siemund, 2018). To illustrate, if a bilingual student speaking their heritage language and the majority language also learns English, English would count as the third language, but the "third language" in this scenario would refer to a learning situation that is essentially different from the first scenario presented (Bonnet & Siemund, 2018).

There are many variables which are assumed to impact cross-linguistic influence. These variables can be learner-based, associated with certain characteristics of individuals (e.g., learner proficiency, language exposure and use, age). The variables can also be language-based, for instance, associated with language typology (Falk & Bardel, 2010; Murphy, 2003).

Language proficiency is commonly believed to impact cross-linguistic influence. It has been assumed that language transfer is possible particularly at lower language proficiency levels (Odlin, 1989). Since most multilingual individuals are not essentially dominant in the heritage language, a well-defined link between proficiency level and order of acquisition might be missing (De Angelis & Selinker, 2001).

Language exposure is another important variable that can exert an impact on

cross-linguistic influence. For instance, it has been assumed that increased L3 exposure would result in less language transfer (Dewaele, 2001). Additionally, it has been hypothesised that increased L2 exposure may raise the prospects of L2 to become the source of cross-linguistic influence on L3 (Ringbom, 1986). Age is another significant variable that may impact cross-linguistic influence. Cenoz (2001) previously demonstrated that even though older participants were more proficient in L3 English, they were also more likely to employ language transfer. Cenoz (2001) accounted for this finding by referring to older participants' metalinguistic awareness. Finally, language typology has been empirically shown to be the most significant of the variables that impact cross-linguistic influence. Relevant research demonstrated that typological closeness between L2 and L3 would increase cross-linguistic influence (Cenoz, 2001; De Angelis & Selinker, 2001; Ringbom, 2001).

Various theories concerning cross-linguistic influence have been proposed in the relevant literature. There is scholarly work on L3 acquisition (e.g., Hermas, 2010) suggesting that the only source of transfer is the native language (Puig-Mayenco, González Alonso, & Rothman, 2020). Nevertheless, no distinct L1 transfer model has been proposed in the L3 literature (Westergaard, Mitrofanova, Mykhaylyk, & Rodina, 2017).

One notable theory concerning the cross-linguistic influence is the "Cumulative Enhancement Model" (Flynn, Foley, & Vinnitskaya, 2004), which postulates that previously acquired languages would transfer positively to newly acquired languages or would exert no impact, meaning debilitative transfer would not occur. Flynn et al. (2004) investigated whether the properties of the L1 grammar determine language learning in L3 development and whether grammatical properties of all previously acquired languages can influence following patterns. The authors

predicted that language learning is cumulative, all languages in the linguistic repertoire can impact the further language acquisition process, and L1 does not assume a privileged role in further language acquisition. They also hypothesised that languages other than L1 can also impact subsequent language acquisition positively. The authors tested these hypotheses with data obtained from studies which examined adults and children whose L1 was Kazakh, L2 was Russian, and L3 was English. The findings confirmed authors' previous hypotheses. The findings suggested that L1 does not have a privileged status in subsequent language acquisition and any previous language experience can be drawn upon in further language acquisition. To illustrate, a Turkish-German bilingual person learning English in the German educational context would be expected to transfer from both Turkish and German to L3 English.

Another crucial theory proposed in the literature is the "L2 Status Factor Model" (Bardel & Falk, 2007, 2012). Bardel and Falk (2007) tested four hypotheses in two groups of learners who had different L1s and L2s and were acquiring Swedish or Dutch as L3. These four hypotheses were: a) there would be no transfer from any previously acquired languages, b) properties of the L1 would be transferred, c) properties of the L2 would be transferred and d) transfer would take place in line with the Cumulative Enhancement Model of Flynn et al. (2004). In other words, there were four conditions tested: no transfer, the L1 transfer, the L2 transfer, and the transfer occurring according to the Cumulative Enhancement Model. The authors concluded that their findings lent support to the hypothesis that properties of the L2 would be transferred and the L2 status factor is greater than the typology factor in the context of L3 acquisition. The authors demonstrated that the typological proximity between L1 and L3 was not sufficient for L2 English learners to opt for L1 transfer. Their data indicated that typological proximity may favour transfer from L2 to L3 but not from

L1 to L3. They concluded that L2 functions as a filter in L3 acquisition, rendering the L1 inaccessible. To illustrate, a Turkish-German bilingual person learning English in the German educational context would be expected to transfer from German rather than Turkish. Several studies focusing on English and Germanic languages, particularly investigating word order, has presented evidence for the "L2 Status Factor model" (Falk & Bardel, 2011).

As noted previously, language typology has empirically shown to be the most significant variable which exerts an impact on cross-linguistic influence. One significant theory focusing on transfer from typologically close languages is Rothman's (2011, 2015) "Typological Primacy Model". The model postulates that cross-linguistic influence is linked to language distance; meaning close typological proximity in vocabulary, phonology, morphology, and syntax between languages of interest would enhance cross-linguistic influence (Rothman, 2011, 2015).

Rothman (2011) investigated what determined syntactic transfer when there was more than one option and what L3/Ln transfer patterns revealed about the mental constitution of linguistic systems. Rothman (2011) examined the data obtained from a sample of 60 participants comprised of native speakers of Spanish and Brazilian Portuguese (control group) and two L3 intermediate level cohorts featuring Italian natives of L2 English learning L3 Spanish and English-native L2 Spanish learners of L3 Portuguese. The findings indicated that regardless the L1 or the L2, L3 learners exhibited target knowledge of subtle adjectival semantic nuances obtained via noun-raising, an aspect which English lacks while the other languages possess. Rothman (2011) asserted that such knowledge was transferred to the L3 from Italian (L1) and Spanish (L2) and maintained typological proximity, if relevant, was the strongest factor that resolves syntactic transfer. If we revisit the scenario mentioned above, it

is more likely that German rather than Turkish transfers positively to English, considering structural similarities between German and English.

Rothman's Typological Primacy Model (TPM) can be considered as similar to the Cumulative Enhancement Model (CEM) (Flynn et al., 2004) in that it recognizes the influence of multiple sources of transfer in multilingual syntactic acquisition, postulating that the initial state of L3 acquisition allows access to both the L1 and L2 (Rothman, 2015). However, unlike the CEM, the TPM also considers the possibility of a non-facilitative transfer and even predicts it in certain situations. This possibility of non-facilitative transfer still aligns with the original CEM's underlying principle that L3 developmental patterns, starting with initial transfer, may reflect cognitive efficiency, rendering language acquisition a non-redundant process (Rothman, 2015). While both models agree that multilingualism can be shaped by the cumulative effect of previous language acquisition, the TPM considers language selection as influenced by structural similarity between languages, rather than just facilitation (Rothman, 2015). Moreover, as opposed to the CEM, which postulates that initial and later transfers will either facilitate or be neutral, the TPM proposes that transfer is complete (from either the L1 or L2) and particularly occurs early in L3 development, influenced by structural similarities between languages (Rothman, 2015)

One recent model that accounts for cross-linguistic influence is "The Linguistic Proximity Model", proposed by Westergaard et al. (2017). Westergaard et al. (2017) examined the effects of crosslinguistic influence in third language acquisition in the context of simultaneous bilingualism. The authors aimed to determine whether both languages contribute to crosslinguistic influence in third language acquisition, or whether either of these languages were selected as the source

of transfer. The authors also aimed to demystify if crosslinguistic influence is always from the typologically more similar language and if crosslinguistic influence is always positive. The authors conducted an experiment using three cohorts: Norwegian-Russian bilinguals, Norwegian-speaking monolinguals and Russian-speaking monolinguals. The findings indicated that while L1 Norwegian children over-accepted ungrammatical sentences in English with a word order exhibiting verb movement, bilingual Norwegian-Russian children were able to notice of these errors comparably more frequently, as did the L1 Russians. The bilinguals were found to score lower than their L1 Russian counterparts on grammatical tests, demonstrating a non-facilitative influence from Norwegian.

The Linguistic Proximity Model (LPM) emerges as a response to problems associated with typology-based models, which do not explain cross-linguistic existence across distant languages or the non-facilitative influence found in L3 (Westergaard et al., 2017). According to the Linguistic Proximity Model, structural similarity at an abstract level is the primary cause of cross-linguistic influence rather than typological proximity. At the same time, both facilitative and non-facilitative impact is possible. Moreover, the authors argued that all previously acquired languages would be available during the process of L3 acquisition.

All models proposed in the literature focusing on cross-linguistic influence are based on linguistic data and are plausible (Bonnet & Siemund, 2018). However, more research is also needed since the investigation of cross-linguistic influence in L3 is a relatively new area and existing models differ considerably in their predictions.

2.8. Linguistic Interdependence

Anecdotally, it makes sense that individuals who have proficiency in one language can pick up another language in a relatively easier fashion (Cox, Lynch, Mendes, & Zhai, 2019) and this assumption has also been held by researchers in the 60s and 70s (e.g., Albert & Obler, 1978; Jacobsen & Imhoof, 1974; Lerea & Kohut, 1961; Saif & Sheldon, 1969; Vildomec, 1963). Consequently, the possible impact of previously acquired languages on a newly acquired language has long captured the attention of researchers (De La Fuente & Lacroix, 2015).

In particular, Cummins' (1976, 1978) notions of "underlying proficiency" and "linguistic interdependence hypothesis" have had a considerable impact on bilingual research. These notions have been tested in a significant number of studies (e.g., Abu-Rabia, 2001; Berthele & Udry, 2022; Berthele & Vanhove, 2020; Bournot-Trites & Reeder, 2001; Daller & Ongun, 2018; Fleckenstein, Möller, & Baumert, 2018; Haenni Hoti et al., 2011; Huguet, 2014; Talebi, Fallahi, & Amjadi, 2024; Verhoeven, 1994).

Cummins (1976, 1991) discussed the outcome of bilingualism in terms of the proficiency level attained in two languages (e.g., threshold hypothesis) and the transfer of proficiency across languages, labelled as the "interdependence hypothesis". According to Cummins (1976), individuals' previous language learning experiences form a common underlying proficiency that can be transferred across different languages. Put differently, proficiency in one language can be expected to boost proficiency in another language (Lorenz et al., 2022). However, in order to benefit from this underlying proficiency and avoid any cognitive deficits, learners are expected to possess a threshold level of linguistic competence (Cummins, 1976;

Daller & Ongun, 2018).

Cummins (1980a, 1980b) proposed that to the degree that instruction in language A (La) helps support proficiency in La, the transfer of this proficiency to language B (Lb) would take place if there were sufficient exposure to Lb. Cummins (1991) supported his argument by referring to the effectiveness of the French immersion programmes, in which students who were instructed through French later caught up with comparison cohorts in English, shortly after formal English classes started. He went on to report on a series of earlier studies demonstrating a facilitative transfer between French and English (e.g., Falter, 1988; Genesee, 1979; Malakoff, 1988), Finnish and Swedish (e.g., Linde & Löfgren, 1988; Skutnabb-Kangas & Toukomaa, 1976), Spanish and English (e.g., Carlisle, 1986; González, 1986; Hakuta & Diaz, 1985; Hallman & Fradd, 1983; Ramirez, 1985), therefore providing evidence for interdependence hypothesis. While reaching an upper threshold is assumed to lead to positive cognitive outcomes and impact language acquisition positively, reaching a low threshold is assumed to result in neutral and even negative results (Cenoz, 2003). This negative effect is also labelled as subtractive bilingualism or semi-bilingualism, in which a desired language level cannot be attained in any of the languages acquired (Cummins, 1979; Wright, Taylor, & Macarthur, 2000).

Cummins (2009) asserted that the interdependence theory which postulates that a shared underlying proficiency facilitates the transfer across concepts, language structures, and learning strategies between languages has received considerably empirical support. Nevertheless, according to Cummins (2009) mainstream language classes and even immersion contexts have yet to fully embrace the theory.

In more recent treatments of linguistic interdependence, Cummins (2009, p. 267) operationalised the notion of linguistic interdependence as comprising

"conceptual knowledge", "metacognitive and metalinguistic strategies", "pragmatic aspects of language use", "specific linguistic elements", and "phonological awareness". According to Cummins (2009), five types of transfer is possible. The first dimension "conceptual knowledge" refers to the understanding of a concept, for instance, "photosynthesis." The second dimension "metacognitive and metalinguistic strategies" refers to the transfer of various strategies including visualisation, using mnemonic devices and vocabulary learning strategies. The third dimension "pragmatic aspects of language use" refers to the willingness to communicate in L2 and the ability to use paralinguistic features to facilitate communication. The fourth dimension "specific linguistic elements" entails the transfer of the knowledge of the meaning of photo in photosynthesis. Finally, the fifth dimension "phonological awareness" involves the transfer of the knowledge that words are made up of different sounds. It should be noted that this approach to interdependence and the associated dimensions may have commonalities with the construct of general cognition (Berthele & Vanhove, 2020) and it examines the effect of interdependence not only in overall proficiency but also across various language domains.

The examination of linguistic interdependence has remained to be a fruitful research endeavour among multilingualism researchers since the inception of the notion. In a recent study, Granados, Lorenzo-Espejo and Lorenzo (2021) carried out a longitudinal analysis which examined the patterns in the biliteracy development in L1 Spanish and L2 English with a sample of 20 students in an CLIL immersion programme over two years. The authors compiled a bilingual learner corpus of history content. The essays featured in the corpus were analysed through computational methods to determine whether any dimensions evolved in both languages. The findings demonstrated that several aspects, such as length measures, nominalisation,

subordination, and lexical development changed in comparable ways in L1 Spanish and L2 English over two years. The authors also found that time and the language used exerted an impact on this pattern. The authors concluded that these findings supported the linguistic interdependence hypothesis.

Another recent study providing support to the linguistic interdependence hypothesis was conducted by Rodina (2017), who examined the macro and micro structure of the initial phases of narrative development in Norwegian-Russian simultaneous bilinguals by employing a sample of preschool Norwegian-Russian bilingual children, Norwegian monolingual children and Russian monolingual children. The study aimed to examine whether narrative structure and narrative productivity were linked to linguistic interdependence and determine whether language exposure influenced narrative abilities. The result of the study lent support to the linguistic interdependence hypothesis. The bilingual cohort exhibited an equally developed ability to understand and compose a story in both heritage and majority language. However, exposure effects demonstrated that Norwegian, the majority language, was dominant particularly in the microstructure measures that were linked to lexical and grammatical ability. A comparison between monolingual and bilingual cohorts hinted those narrative abilities in Russian, the heritage language, were sensitive to the exposure, and the acquisition of the heritage language could thus be vulnerable.

Even though the notion that languages existing in an individuals' repertoire may influence each other has been a core tenet of multilingualism research, some scholars argue that linguistic interdependence theory have various limitations. Berthele and Vanhove (2020), for instance, argued that the theory has become so widely accepted in the field that few scholars challenge its significance in

understanding multilingual competence. The authors claimed that several theoretical and methodological issues remained unresolved and, depending on how these issues are addressed, the notion of interdependence might either be impossible to disprove or, would not carry a practical or persuasive argument in the context of bilingual education. The authors maintained that expanding the scope of the theory to feature general cognitive abilities would shift the focus from interdependence to general cognition, altering original intent of the theory. As a result, correlations between language skills would simply reflect general cognitive effects, thereby shifting the educational focus from language development to enhancing cognitive abilities. This particular interpretation, according to Berthele and Vanhove (2020), weakens the core argument that supports the practical benefits of bilingual education. Instead, they suggested concentrating on the key question of to what degree multilingual learners could use literacy skills gained in one language to support learning in another language.

To empirically discuss the relevance of interdependence hypothesis, Berthele and Vanhove (2020) reported on "The heritage language and school language: are literacy skills transferable? (HELASCOT)" project. The project addressed whether there was empirical evidence for cross-linguistic influence in heritage language learners in the Swiss context. Specifically, the project investigated literacy skill development in Portuguese heritage language students in primary school. The results demonstrated that students' performance in one language at a specific time could be estimated using their heritage language and the school language scores from the previous year. Moreover, no evidence was found to suggest that students' school language (French or German) contributed more to future literacy skills in their HL (Portuguese) than the other way around. Finally, the evidence for typological

influence on cross-linguistic longitudinal effects was found to be inconsistent. Stronger cross-linguistic effects were not found between French and Portuguese compared to German and Portuguese. Instead, a complex pattern was found. Cross-linguistic effects in reading were relatively stronger between French and Portuguese initially but weakened over the next year, while effects between German and Portuguese started weaker but grew stronger over time.

Based on these findings, Berthele and Vanhove (2020) shared their doubts concerning the linguistic interdependence hypothesis. They argued that, first, almost any data pattern could be interpreted as lending support to the theory, which may hinder theoretical advancement and would not help policymakers. Secondly, they suggested that testing interdependence requires randomised experiments, and the theory cannot be effectively tested in non-experimental studies. Thirdly, they argued that the hypothesis provides trivial predictions that can be accounted for by factors other than linguistic interdependence, such as measurement errors or general cognitive skills. Finally, they concluded that without clear boundaries between linguistic proficiency and general cognitive abilities, research investigating interdependence may result in a circular process that does not advance the theory.

Another potential issue with the linguistic interdependence theory, as indicated in the relevant literature, is its tendency to overlook the key role of contextual factors such as socioeconomic status, language exposure, or motivation (Verhoeven, 1994). For instance, in an interesting study, Prevoo et al. (2015, p. 449) examined what they called “the hypothesis of context-dependent linguistic interdependence”. The authors investigated language use and socioeconomic status as moderating factors in the links between L1 vocabulary and L2 vocabulary growth. The study focused on a sample of 104 Turkish-background bilingual children that

were aged between 5 and 6 in the Dutch context. In the study, socioeconomic status was operationalised as the annual gross income of the family and parents' highest completed educational level at the start of the study. The findings indicated that language use moderated the link between L1 Turkish and L2 Dutch vocabulary development. Positive transfer from L1 to L2 existed in the group who spoke more Turkish than Dutch with family and friends. Socioeconomic status was not found to be a moderator of interdependence but predicted vocabulary development in Dutch. The authors concluded that these finding lent support to context-dependent linguistic interdependence concerning the language use variable but not socioeconomic status. The findings revealed that socioeconomic status was a significant predictor of Dutch vocabulary growth after controlling for the age factor, Dutch vocabulary score, and child language use. The analyses demonstrated that socioeconomic status was not linked to L1 vocabulary scores.

The authors commented that one possible explanation for this lack of relationship was that high-SES parents may encourage their children's L1 development due to a greater appreciation for bilingualism, while low-SES parents might use L1 more because it is the language they are most comfortable with, which could also promote their children's L1 use. The authors concluded that linguistic interdependence effects were similar across socioeconomic groups, linguistic interdependence hypothesis was dependent on context and was valid only in situations where there was greater use of the first language. Considering the limitations of linguistic interdependence theory indicated in the relevant literature (Verhoeven, 1994), there is need for further research investigating context-dependent linguistic interdependence (Prevoo et al., 2015), particularly in experimental and quasi experimental designs.

2.9. Research on Heritage Bilingualism and L3 Acquisition

Earlier sections have reviewed research on multilingualism, heritage bilingualism, and additional language acquisition. Given the purpose and context of this dissertation, the current section focuses specifically on studies conducted in the German context and examines the links between heritage bilingualism and third language acquisition.

2.9.1. Multilingualism in the German Context

A growing number of studies in the European context have concentrated on speakers of various heritage languages, such as, Arabic, Turkish, Russian, and German (e.g., Ansó Ros et al., 2024; Højen & Bleses, 2023; Stoehr et al., 2018; Vorobyeva et al., 2024). Nevertheless, most of these studies seem to pose a psycholinguistic or sociolinguistic focus on heritage language bilingualism and aim to determine the variables that impact heritage language acquisition and the relationships between heritage and majority language acquisition. Hence, third language acquisition particularly in heritage language speakers remains a relatively unchartered territory, presenting a valuable avenue for further research (Lloyd-Smith, 2023).

Consequently, within the last decade, there has been a growing interest in examining the potential effect of heritage bilingualism on subsequent language learning experiences, most notably in the acquisition of English (Lorenz, Toprak-Yıldız, & Siemund, 2024). Currently, English assumes the role of a third language in European educational systems, remains a privileged language, and transitions from a foreign language into an additional language (Siemund, 2023).

Germany, in particular, serves as a representative case of the European context, reflecting the current state of multilingualism across the continent. Historically, a considerable number of immigrants, notably from the former Eastern European zones entered the country until the 1960s. The period between the early 1950s and the 1970s witnessed an influx of migrant workers entering the country and increasing the linguistic diversity of Germany (Gogolin, 2021). Within the last two decades, new waves of migration emerged, particularly due to conflicts and crises experienced in various parts of the world. Furthermore, globalisation, mobility of the skilled labour, and internationalisation of higher education have driven migration on an international scale. Currently, people from around 190 countries contribute to Germany's linguistic and cultural diversity (Gogolin, 2021).

Furthermore, across Germany, particularly in major urban areas, almost every second child is born into a migrant family (Gogolin, 2021) while heritage bilinguals of Arabic, Farsi, Polish, Russian and Turkish constitute nearly half of the adolescent school population (Gogolin, 2021). Germans with migration backgrounds usually speak German and their respective heritage languages (e.g., Turkish, Polish, Russian, Farsi, etc.) in varying proficiency levels, usually depending on their generation (Lorenz & Siemund, 2020). Heritage languages function as the home language of these bilingual individuals, however they mostly develop dominance in the majority language, German (Hopp et al., 2019).

Educational factors may also influence language diversity in Germany. To illustrate, all students typically learn at least one foreign language at school, especially at the secondary level. Studying a second foreign language is obligatory for the students attending the academic track schools (i.e., Gymnasium) while this endeavour is optional for lower academic tracks (i.e., Hauptschule and Realschule)

(Gogolin, 2021; Gogolin et al., 2021).

Within the German education system, English is usually the first foreign language offered to students at schools (Lorenz & Siemund, 2020). English instruction is usually delivered in the spoken register at the beginning, while alphabetisation follows toward the end of primary school (Siemund & Lechner, 2015). Nevertheless, it should be noted that along with many advantages, students' varying personal trajectories and linguistic experiences may also pose educational and practical challenges in language classrooms, which need to be addressed carefully (Lorenz & Siemund, 2020).

2.9.2. Multilingualism Research in the German Context

Building on the background elaborated in the previous section, several studies have examined the potential effect of German, the majority and educational language, and the heritage languages on the acquisition of English as an additional language (e.g., Edele et al., 2018; Hesse et al., 2008; Hopp, 2019; Hopp et al., 2019, 2020; Klieme et al., 2006; Lechner & Siemund, 2014; Lorenz et al., 2020, 2021, 2023, 2024; Maluch & Kempert, 2019; Maluch et al., 2015, 2016; Schnoor & Usanova, 2023; Siemund et al., 2024a). This increasing scholarly interest seems reasonable as English is the most significant and usually the first choice for a compulsory foreign language in the German education system. A common endeavour in this research strand is examining whether previous bilingual experience influences additional language acquisition and, if so, determining the direction of such influence.

Hesse et al. (2008) was one of the earlier studies that demonstrated a positive link between heritage bilingualism and the acquisition of English in DESI (Deutsch Englisch Schülerleistungen International) study. The authors investigated whether

multilingual learning environments could provide favourable conditions that would support learning German and English. By making comparisons between monolingual and bilingual cohorts, the authors also examined whether there was a link between proficiency in the first language and the acquisition of other languages. The results of the descriptive and regression analyses demonstrated that while German monolingual students achieved higher scores in German, students with multilingual backgrounds performed better in German than non-German monolingual speakers. Moreover, in the secondary school, no significant difference was found between monolingual German and multilingual students in terms of German performance. In English, multilingual students were found to score better than their German monolingual and non-German monolingual counterparts, indicating a bilingual advantage. The authors maintained that multilingual learning environments provided favourable conditions for acquiring English as an additional language, and students with a bilingual background had the potential to achieve superior performance in the additional language English. The authors concluded that not only multilinguals, but also non-German native speakers benefited from their multilingual learning environment when learning a foreign language at school. These individuals, according to authors, also played a role in improving the overall language performance of their classes.

Similarly, Maluch et al. (2015) investigated the links between heritage bilingualism and learning English as an additional language. The authors were interested in examining whether speaking a heritage language and the majority language yielded any advantages in learning L3 English at school and whether the majority language proficiency contributed to English achievement in bilingual students. The authors were also interested in examining if different bilingual groups

varied in terms of their L3 English attainment. Using a large national sample of 2835 sixth-grade German students and controlling for variables such as cognitive abilities, age, gender, socioeconomic status, parental education, and cultural capital, Maluch et al. (2015) found a positive relationship between heritage bilingual background and proficiency in English. The results indicated that given comparable background characteristics, students who speak a heritage language exhibited stronger achievement in L3 English. The authors commented that their findings lent support to Hesse et al. (2008) who reported bilingual advantages and contrasted with the findings of earlier studies (e.g., Schoonen et al. 2002; Van Gelderen et al. 2003), reporting no bilingual advantages. The authors suggested that this difference was most possibly due to variation in methodologies, sample size, and the impact of confounding factors observed in earlier studies. The results of the multiple regression analyses demonstrated that this positive relationship varied across different bilingual cohorts. Contrary to their previous expectations concerning language typology and distance, the Chinese-German and Polish-German cohorts had a significant bilingual advantage when compared to other cohorts. Moreover, the results demonstrated that the strongest predictor for English proficiency was proficiency in German, the instructional and majority language. Specifically, a one-point increase in the majority language proficiency corresponded to almost ten points on English achievement. The authors concluded that recognising the linguistic resources of bilingual students and providing support for the instructional language are essential in language classes not only for foreign language learning but also for improving learning outcomes in other subjects.

In another study investigating the links between heritage bilingualism and English acquisition, Rauch et al. (2012) examined differences between individuals

that were fully biliterate, partially biliterate or monolinguals in L3 reading proficiency and metalinguistic awareness. The authors tested whether full biliterate individuals possessed higher levels of L3 reading proficiency and metalinguistic awareness than their partial biliterate and monolingual counterparts. The authors also tested the hypothesis that partial biliterate individuals had neither higher level of L3 reading proficiency nor higher levels of metalinguistic awareness than monolingual individuals. The participants were 299 German and Turkish-German secondary school students. The findings indicated that fully biliterate participants performed better than monolingual and partially biliterate bilinguals in L3 proficiency and metalinguistic awareness. Moreover, this advantage remained consistent when contextual variables such as SES, gender, general cognitive ability, and school track were controlled for. The authors concluded that in reading skill, both L1 and L2 proficiencies are needed to ensure that bilingualism boosts metalinguistic awareness and L3 reading proficiency. Moreover, they argued that the positive impact of full biliteracy on L3 reading proficiency is due to a heightened metalinguistic awareness.

Sahingoz (2014) examined the role of the cross-linguistic influence in English and French by using a sample of Turkish-German and Russian-German heritage speakers. The findings suggested that word order in English is influenced by the language in which the participants were most proficient, for the bilinguals at hand, their dominant language, German. Some transfer was observed for the participants with higher proficiency in the heritage languages, Russian and Turkish. Since word order in Russian and Turkish is less rigid than in English, these individuals made more mistakes compared to individuals that are proficient in Russian, Turkish or German monolinguals. Moreover, the Turkish-German bilingual cohort obtained significantly lower scores in the German and English language proficiency tests in

comparison to the other two cohorts. Furthermore, the Turkish-German bilingual group obtained significantly lower scores in the German and English language proficiency tests than both control groups. No significant differences were detected in the results of the French proficiency test.

In another study, Lechner and Siemund (2014) examined whether 52 participants with high literacy assessment scores in L3 English also achieved high scores in the majority language, German, and their heritage languages. The authors also investigated whether a high score in the heritage language, in addition to L2 German, contributed positively to L3 English scores. The authors relied on the data obtained from a panel study entitled "Linguistic Diversity Management in Urban Areas (LiMA-LiPS, 2009-2013)", investigating the development of heritage languages and majority language for children having different heritage language backgrounds (e.g., Russian, Turkish, Vietnamese) in Hamburg. The results of the descriptive and correlation analyses showed that higher scores in German and heritage languages aligned with higher scores in L3 English. Furthermore, it was found that comparatively higher scores in German were more positively related to high scores in English, while higher scores in heritage languages coinciding with comparatively lower scores in German yielded lower scores in English. Finally, the lowest scores in bilingual participants' heritage language aligned with the low scores in L3 English. The authors maintained that their findings lent support to Cummins' threshold hypothesis; there were also individual thresholds and no bilingual advantage in L3 English attainment. They specifically pointed to the highly heterogenous nature of the bilingual data and the impact of the contextual factors. The authors concluded that bilinguals performing well in German and in their respective heritage languages also performed well in L3 English, with socioeconomic

factors strengthening the effects. On the other hand, bilinguals from lower socioeconomic backgrounds could achieve high literacy in English if they attained strong literacy in German and their heritage languages.

In a similar vein, Maluch et al. (2016) investigated the differences between heritage language students and monolingual students in the L3 English learning context from elementary to secondary school with a national sample of 1032 German students. The authors sought to determine whether speaking a heritage language in addition to the majority language, German, provided advantages in L3 English acquisition and whether heritage language exposure at home influenced L3 English attainment over time. Heritage languages included in the study were Turkish, Arabic, Chinese, Polish, French, Italian, Russian, Vietnamese, and others. The authors used secondary data obtained from the Assessment of Reading and Mathematics Development Study (ELEMENT, Lehmann & Lenkeit, 2008). The results of the multiple regression analyses indicated that the sixth-grade heritage language speakers performed better than their monolingual peers in English after controlling for several background variables.

According to the authors, this finding supported the idea that bilingualism facilitates further language learning through metalinguistic awareness. However, in the eighth grade, findings did not indicate a positive link between bilingualism and L3 English acquisition. Furthermore, it was found that the only heritage language cohort outperforming the monolingual cohort was the one that spoke German at home. This finding, according to the authors, revealed a stronger link between the majority language proficiency and L3 English acquisition. The authors suggested that this shift could indicate that while early learning relies more on metalinguistic skills, subsequent learning may depend more on explicit linguistic knowledge taught in the

majority language. Concerning the longitudinal development, both monolingual and heritage bilingual students seemed to make gains in English proficiency between the sixth and eighth grades. However, heritage bilingual groups showed less development compared to monolinguals, particularly the non-German group. By the eighth grade, heritage bilingual students did not outperform their monolingual peers in L3 English acquisition. Overall, the findings indicated that while heritage language proficiency initially supports L3 acquisition, the bilingual advantage later diminishes.

Edele et al. (2018) investigated the impact of heritage bilingualism on English as a third language acquisition using the data obtained from the German National Educational Panel Study (NEPS), a longitudinal nationwide study of education. The sample included a nationally representative group of 8752 German 10th-grade students. The heritage bilinguals were divided into two cohorts, Turkish-German and Russian-German students. The study examined the role of different proficiency levels in L1 and L2 and the subsequent L3 English bilingual profiles. The authors made a distinction between four types of bilingualism associated with different bilingual profiles. These types were balanced bilingualism at a high level, balanced bilingualism at a low level, dominance in the first language and dominance in the second language. The authors examined whether L3 English proficiency varied across these bilingual profiles. Edele et al. (2018) first compared the attainment in L3 English across bilingual and monolingual cohorts based on the bilingual profiles and took the monolingual students with high German proficiency as the reference group. The authors also examined whether L1 and L2 predicted L3 achievement in the bilingual sample by considering the interaction among these linguistic variables. The results of the ordinary least square regression analyses indicated that balanced bilinguals at a high proficiency level had L3 advantages compared to the monolingual

cohort. On the other hand, the balanced bilinguals at a low level and the L1 dominant students attained L3 English levels below the average. The authors also found that heritage bilingual students with high levels of L2 German proficiency performed better than the average monolingual student in L3 English. In contrast, heritage bilingual students with low levels of L2 proficiency scored below the average in L3 English, regardless of their level in L1. In other words, the findings suggested that the majority language, German, was the strongest predictor of heritage bilinguals' L3 English competence.

Hopp (2019) investigated whether transfer in L3 English acquisition was from the heritage language or from a dominant L2 in a sample featuring young heritage language speakers. The author specifically tested two samples of 31 Turkish-German bilingual and 31 German monolingual children acquiring English in the primary school context and examined grammatical aspects that exhibit differences and similarities across English, German and Turkish. The author compared the dynamics of grammatical transfer in child L3 vs. adult L3 acquisition. The author assessed the two cohorts by using sentence repetition tasks and picture storytelling tasks. To make sure that the groups were matched, the author controlled for the differences between cognitive and linguistic background variables. However, it was not possible to fully match groups on social variables. Yet, the findings did not reveal any significant differences between the two groups on vocabulary or receptive and productive grammar tasks measuring German or English. On the contrary, there were consistent similarities between the two groups on both receptive and productive English grammar tasks.

Overall, the results revealed that both groups performed similarly on tasks, and both groups demonstrated selective transfer of grammatical properties from the

majority language, German. Moreover, the author concluded that the findings did not lend support to the CEM (e.g. Flynn et al., 2004), which postulates that learners rely on both previous languages. The author concluded that the findings supported the TPM (e.g., Rothman, 2015) since German functioned as the only source of transfer in both groups.

In another study, Hopp, Vogelbacher, Kieseier and Thoma (2019) investigated whether childhood bilingualism was associated with benefits in English L3, which factors predicted the L3 English acquisition in bilingual children, and whether bilingual effects on L3 acquisition changed over time. The study used a sample of 200 students comprising 88 monolingual German and 112 heritage bilingual students from various first language backgrounds. The authors carried out assessments concerning lexical knowledge in English, German and the heritage languages, productive vocabulary in English, category fluency in German and heritage languages, grammatical knowledge in English, non-verbal IQ, phonological awareness, working memory, executive function, and social background. The data were analysed by using linear mixed effects hierarchical regression analyses. The results revealed a bilingual disadvantage when the means of monolingual and bilingual cohorts in several English measures were compared. These results indicated an achievement gap for bilingual students.

However, once cognitive and social background variables were controlled for, the findings indicated a significant bilingual advantage in English productive vocabulary and receptive grammatical skills at the end of grades 3 and 4. In particular, the regression models for productive vocabulary in grade 3 revealed that a bilingual background was a significant predictor for English attainment along with linguistic and cognitive factors. For receptive grammar skills, compared to other factors at

hand, the bilingualism effect was smaller. Moreover, L1 productive vocabulary was found to be the strongest linguistic predictor for English receptive vocabulary, suggesting that heritage language proficiency influenced L3 English development more strongly in comparison to the majority language German. It was also found that monolingual students exhibited greater attainment from grade 3 to 4 than the bilingual students when the achievement in grade 3 was controlled for. The authors concluded that the bilingual advantages became smaller as L3 English proficiency increased. An alternative explanation was that this might result from an increased metalinguistic awareness in monolingual students due to the instruction they received in English. The authors also argued that bilingual advantages do not persist if they are not supported in a learning environment.

Maluch and Kempert (2019) also investigated the impact of bilingualism on L3 English acquisition by considering the impact of manner and sequence of bilingualism and language use practices in heritage bilingual children. The study specifically focused on examining which bilingualism factors provided advantages for additional language acquisition and how the manner of learning, sequence of bilingual acquisition and code switching influenced L3 English attainment in heritage bilingual students. The data were obtained from the pilot study of the 2015 German National Comparative Study. The sample featured 1,295 students; 456 heritage bilinguals and 839 monolinguals who were classified based on their bilingual language acquisition and use. The bilingual group was categorised based on whether they received formal instruction in the heritage language or learnt the language at home.

A distinction was made between the bilinguals based on whether they learnt both languages from birth (i.e., simultaneous bilinguals) or learnt a second language

after age three (i.e., sequential bilinguals). A final distinction was made between non-switchers, seldom switchers, often switchers and continuous switchers. The results of the ordinary least-squares linear regression analyses demonstrated that once background factors were controlled for, heritage bilingual students who were formally instructed in their home language exhibited significant advantages in L3 English compared to monolinguals or bilinguals who acquired their L1 at home setting. Moreover, when background factors were controlled for, simultaneous bilinguals had significant advantages when compared to their sequential counterparts and monolinguals. Finally, bilinguals who rarely performed codeswitching were found to perform similarly to monolinguals in L3 English reading and listening. On the contrary, bilinguals who codeswitched frequently exhibited significant advantages in English proficiency even when background factors were controlled for.

The authors concluded that bilingualism alone does not guarantee advantages while certain bilingual factors may promote the development of mechanisms which yield bilingual advantages. They further added that high proficiency in both heritage and majority language, early language acquisition, receiving formal training in the heritage language and using the heritage language frequently may boost metalinguistics skills. These metalinguistic skills, according to the authors, may support additional language learning.

In another study, Hopp, Jakisch, Sturm, Becker, and Thoma (2020) reported on a project entitled "MEG-SKoRe—Sprachliche und kognitive Ressourcen der Mehrsprachigkeit im Englischerwerb in der Grundschule" which examined the contribution of heritage languages to early foreign language acquisition in the German primary school context. The project specifically concentrated on children attending primary school in order to examine the potential positive impact of

bilingualism before they transitioned into secondary school. MEG-SKoRe project evaluated students' language skills in all languages of interest by using comparable data collection tools. These tools featured various linguistic measures, such as receptive vocabulary, productive vocabulary, and receptive grammar to capture the effect of heritage languages. In addition to linguistic measures, the project used measures assessing non-verbal IQ, working memory, phonological awareness, executive functions, and contextual factors including but not limited to SES, parental education, age, gender. The project yielded evidence which suggested heritage language skills and metalinguistic awareness may help heritage bilingual students to close the achievement gap they had in foreign language learning compared to monolingual students.

Hopp et al. (2020) also introduced a framework entitled "Multilingual Language (Learning) Awareness" which considers key aspects in early foreign language acquisition and aims to enhance students' language awareness to foster foreign language learning (p.151). Based on the cognitivist model of language awareness by Bialystok and Ryan (1985), the proposed model features two key components, which are language analysis and language control. The language analysis component refers to understanding linguistic structures and relationships between languages, and involves metalinguistic knowledge which enables learners identify similarities, contrasts, and patterns across languages. The language control component involves managing attention, managing conflict, resolving ambiguity, and switching between languages. It is closely related to cognitive control and executive functions, which enable learners to process language in real time. The framework postulates that these two components are quite crucial for foreign language learning, however they function independently.

Consequently, a learner might be good at language analysis, and for instance, might compare languages but lack strong control and may not be fluent in real life, or vice versa. The authors elaborated on the practical applications of this framework by focusing on specific linguistic domains, such as grammar, vocabulary, and phonological awareness. They also maintained that the framework is adaptable, helping modify activities based on students' proficiency, age, and curricular goals, presenting a flexible and psycho-linguistically grounded method for multilingual foreign language teaching. The framework was used to measure and improve language learning outcomes through specific tasks and activities in the second phase of the MEG-SKoRe project.

In a recent study, Schnoor and Usanova (2023) conducted a longitudinal analysis using the MEZ data to examine within and between language effects in multilingual writing development across the first three waves of MEZ. The authors specifically investigated whether there were any links between multilingual writing proficiencies, and whether multilingual writing proficiency functioned as mutual resources in writing development. Their sample featured 965 students participating in MEZ (364 Russian-German and 601 Turkish-German).

The authors estimated several measurement and structural models in the context of SEM, as well as autoregressive panel models with cross-lagged effects. The findings indicated positive initial correlations between all languages at MPT 1. Concerning within-language effects, they captured only positive correlations over time. The findings also indicated between language positive effects. From the first to second wave, the authors detected a positive link between heritage languages and the majority language German. The authors also found a positive link between German and English, and this relationship was more substantial than that of heritage languages

and German. The authors concluded that their findings suggested multilingual writing skills are mutual resources, as proposed by the Focus on Multilingualism (FoM) approach (Cenoz & Gorter, 2011).

A series of studies examining the relationships between heritage bilingualism and third language acquisition was conducted by Lorenz et al. (2021, 2023, 2024). Lorenz et al. (2021) examined the impact of bilingualism on third language acquisition, by testing the assumption that whether previously acquired two languages would promote the acquisition of a third language. The authors employed a national representative sample of 1,409 bilingual (Turkish-German and Russian-German) and monolingual (German) students in the German context who participated in the MEZ project. The authors, based on Cummins (1976, 1979, 1996), hypothesised that previous language experiences may facilitate further language acquisition processes if language thresholds are met. The authors specifically examined how their model of L3 English proficiency functioned in the bilingual and monolingual cohorts and whether the model accounted for L3 English performance of the three language cohorts featured in the study. The authors investigated the links between L3/L2 proficiency in English, reading comprehension in the heritage languages and German, cognitive ability, and socioeconomic status by employing structural equation modelling. The R^2 values and the fit indices results indicated that the two models had considerable explanatory power. The background variables, cognitive ability and socioeconomic status were found to contribute significantly to L2/L3 English proficiency. The path coefficient between English proficiency and background variables were more substantial than the path coefficients between German and English proficiency.

The results of the further multi-group analyses showed that the relationship

between English proficiency and background variable remained positive and statistically significant in the German monolingual group while this was not the case in the bilingual cohort. In the expanded model which featured the heritage language proficiency variable, the relationship between English proficiency and background variable reached significance for the Russian-German cohort while the models did not converge for the Turkish-German cohort. Concerning interdependence, the findings indicated that there was a positive relationship between German and the additional language English. Nevertheless, this link was weaker than the link between English proficiency and background variable and was only statistically significant in the overall sample rather than the individual groups. Moreover, in the extended model, heritage language proficiency did not contribute to L3 English proficiency in the Russian-German cohort. The authors, thus, concluded that the findings did not reveal any bilingual advantage or striking differences across the cohorts however, some slight differences between the monolingual and bilingual cohorts in several relationships were observed.

In a follow-up study, Lorenz, Toprak-Yıldız, and Siemund (2023) went on to further examine the links between a set of linguistic, extra-linguistic factors and L2/L3 English proficiency by using a national sample 849 monolingual German, 236 Russian-German and 318 Turkish-German bilingual students participating in the MEZ project. Two separate structural equation models, which featured a set of variables including proficiency in German, heritage languages, L2/L3 English proficiency, cognitive ability, school type, gender, socioeconomic status, self-concept, motivation, and self-assessment, were estimated comparatively. The first research question of the study targeted the links between the linguistic and extra-linguistic variables, ignoring the heritage languages while the second research

question concentrated specifically on the effect of the heritage languages Russian and Turkish as well. In the overall sample, all relationships were found to be statistically significant except for the relationship between gender and the background variable, as well as the relationship between German and English proficiency. Moreover, the impact of age variable on English and German proficiency was found to be negative while the impact of the background variable on both English and German proficiency was found to be positive. When the base model was tested on all language groups individually, a number of minor differences were detected.

The authors tested a second extended model featuring the heritage language proficiency in the bilingual sample. The results indicated a similar picture to that of the base model, except for the relationship between gender and background, and the relationship between German and English, which exhibited a negative effect. The relationship between heritage language proficiency and English proficiency was found to be negative. Overall, the findings showed that most variables included in the models were statistically significant, language groups performed similarly, and heritage languages Turkish and Russian had comparably little exploratory power compared to other variables. The authors concluded that language interdependence was mainly restricted to the relationship between the majority language German and L2/L3 English proficiency.

In another study, Siemund, Lorenz and Toprak-Yildiz (2024b) examined whether previous heritage bilingual experience influenced L3 English acquisition positively and provided advantages to heritage bilingual groups. The authors specifically sought to investigate whether previous language learning experience, i.e., multilingual background or general cognitive ability was a stronger predictor of L3 English proficiency. The authors employed a national sample of 557 bilingual

(Turkish-German and Russian-German) and 852 monolingual German students and utilised structural equation modelling framework for the analyses. The authors hypothesised that possessing high cognitive ability would yield more substantial language interdependence effects than low cognitive ability and tested whether there were differences between monolingual and bilingual cohorts in L2/L3 English proficiency. The first structural model was tested in the overall sample by comparing the three language groups based on high, mid, and low cognitive abilities. The results demonstrated that all three path coefficients predicted English proficiency while a monotonic increase from the low to the high cognitive ability groups was detected. Moreover, it was found that the impact of socioeconomic status on English and German proficiency was not consistent. A significant impact among the low cognitive ability group for both German and English proficiency was not detected. The same case applied to English proficiency among in the high cognitive ability group. The impact of socioeconomic status variable on English and German proficiency was found to be positive in the mid cognitive ability group while in the high cognitive ability group, it was positive for only German proficiency.

The second model featuring the heritage language proficiency variable was tested in the bilingual cohort, across three cognitive ability groups. Similar to the case in first model, in the second model, all three path coefficients predicted English proficiency with a monotonic increase from the low to the high cognitive groups. However, the language interdependence between the heritage language and English was found to be weaker than the interdependence between German and English. Nevertheless, an obvious pattern based on cognitive ability was not detected. Socioeconomic status also yielded inconclusive results; the only significant positive relationship was detected for English proficiency in the mid cognitive ability group.

Finally, a third structural model was estimated in the monolingual group. The results indicated a monotonic but relatively slight increase from the lower to the higher cognitive ability groups. In the third model, the contribution of socioeconomic status to German and English proficiency was found to be greater. There was a positive effect for English proficiency in the low and mid cognitive ability groups, and a positive effect for German proficiency in the mid and high cognitive groups. The authors concluded that language interdependence was valid, yet it was not independent of cognition. Hence, the authors supported the arguments of Berthele and Udry (2022) and suggested that language interdependence was a function of cognitive ability. Furthermore, the results showed that bilinguals benefited from more substantial interdependence gains between the majority language, German and L3 English, with increasing cognitive ability.

In another study, Lorenz, Toprak-Yıldız, and Siemund (2024) conducted a longitudinal analysis to examine the impact of a set of cognitive, social, and linguistic variables on the acquisition of L2/L3 English by using a national sample of 600 monolingual German and 374 heritage language (Turkish-German and Russian-German) secondary school students participating in MEZ project. The authors specifically were interested in understanding which personal, linguistic, and contextual variables predicted L2/L3 English proficiency in monolingual and bilingual participants. These variables were cognitive ability, socioeconomic status, German proficiency, language background, heritage language proficiency, gender, school type, and school year. The authors also wanted to address how the impact of these variables changed in both groups over time. The data obtained from the first three waves of the MEZ project were examined by using a set of multiple regression analyses separately. The analyses yielded three models that were different in terms

of the variables they featured while the predictive power of these models was similar across the three measurement time points.

The results of multiple regression analysis indicated that cognitive ability remained a significant predictor for L2/L3 English proficiency over time, with the exception of the bilingual sample at measurement time point two. Likewise, proficiency in German remained a significant predictor over time, although a systematic increasing pattern was not observed. Furthermore, heritage language proficiency was not found to be significant across all three measurement time points in bilingual data. The authors previously hypothesised that the monolingual and bilingual students of English would become similar over time due to the English instruction they received in the secondary school context. The results revealed that language background was not significant at the first measurement point, conditionally significant at the second measurement point and significant at the third measurement point, contrary to previous assumptions. The results revealed that at the measurement time point three, belonging to the Russian-German or the monolingual German group influenced L2/L3 English scores positively. This was not the case for the Turkish-German group. Moreover, it was found that neither socioeconomic status nor gender could explain the variance in L2/L3 English proficiency meaningfully while school type and school year variables contributed to the models significantly. The authors concluded that there were differences between the Turkish-German students and their Russian-German and monolingual German counterparts while these differences were not clearly observed between the German monolinguals and Russian-German bilinguals.

Based on a review of studies focusing on the links between heritage bilingualism and L3 English acquisition in the German context, the findings obtained

appear to remain partially conflicting; while several studies have reported on the advantages of bilingual background, some studies reported on partially or conditionally positive results, and some others reported on disadvantages. These differences in findings might stem from variations in methodologies employed in these studies (e.g., properties of particularly the samples, data collection tools, and analysis methods). Despite the variations across findings reported in these studies, overall, one common deduction from existing research has been that possessing a balanced bilingual profile, i.e., having proficiency in both heritage and majority languages, and receiving formal instructional support would help heritage bilinguals to make use of so-called bilingual advantages when acquiring an L3 (Lorenz et al., 2021, 2023; Schwartz, Geva, Share, & Leikin, 2007; Swain et al., 1990).

3. Methodology

This section provides fundamental information about the design of the study, characteristics of the sample, properties of the instruments that were used, data collection process, and data analysis.

3.1. Design

This study is quantitative in nature. Quantitative research seeks to increase the objectivity, replicability, and generalizability of results and usually aims to come up with general inferences about the properties of a given population (Harwell, 2011). Quantitative researchers generally aim to examine the relationships between the variables of interest and on some occasions try to explain the potential causes of these relationships (Fraenkel, Wallen, & Hyun, 2011). Quantitative research usually relies on the use of instruments such as tests, scales, or questionnaires to obtain data and the analysis of the data through statistical methods and procedures (Harwell, 2011).

This dissertation employs a longitudinal research design, which is suited to examine how intraindividual change takes place. Longitudinal designs propose that variations in the level of a construct can be studied over a defined period. As a result, changes within an individual can be tracked and measured (Grimm, Davoudzadeh, & Ram, 2017). Additionally, longitudinal designs prove helpful since they allow researchers to examine multiple constructs at the same time and understand how changes in a specific construct might take place before, at the same time as, or follow changes in another construct.

There are different types of modelling approaches in longitudinal research that are suited to different purposes. The present study uses the Latent Growth Curve Modelling technique (LGCM) in the structural equation modelling (SEM) framework (Kline, 2011). SEM based analytic approaches have been used to analyse longitudinal data in various social sciences fields (Curran & Hussong, 2002). The LGCM can be estimated in the context of SEM. More detailed information about the latent growth curve analysis has been presented in the data analysis section below.

3.2. Sample

The data utilised in the present study was drawn from the MEZ project (Mehrsprachigkeitsentwicklung im Zeitverlauf [MEZ], 2014–2019; Gogolin et al., 2017), funded by the Federal Ministry of Education and Research (BMBF). MEZ acronym is derived from the project's name, which was translated as "Multilingual Development: A Longitudinal Perspective" into English.

MEZ focused on the multilingual development of secondary school students in the German educational context. The project featured cohorts of monolingual German and bilingual (Russian/German, Turkish/German) secondary school students and examined the multilingual development of those students comparatively.

The project sampled students from 72 schools across eight federal states in Germany (Baden-Wuerttemberg, Bremen, Hamburg, Hesse, Lower Saxony, North Rhine-Westphalia, Rhineland-Palatinate and Schleswig-Holstein) (Klinger, Brandt, & Dittmers, 2022). The schools had a relatively high proportion of students with

Russian and Turkish heritage language background and provided foreign language courses in French and/or Russian in addition to compulsory English classes (Brandt, Lagemann, & Rahbari, 2017). The students were considered to participate in the project if they had been enrolled in a German school since at least third grade and studied English as their first foreign language (Klinger et al., 2022).

Table 1

The Number of Overall Participants Across All MTPs

Sample	MTP1	MTP2	MTP3	MTP4
Overall	1818	1568	1698	1224
General	974	974	974	-
Bilingual	301	301	301	-

As shown in Table 1, the number of participants in the overall sample was greater than the participants in the general sample across all measurement points. Even though a greater number of students participated in the MEZ project (overall sample), a reduced number of students was included in the general sample, featuring monolingual and bilingual students. The decline was marked particularly between the third and fourth measurement points. During this period, students in the German educational system transition from lower secondary education to upper secondary education, vocational education or other placements, hence making older cohort less

accessible (Klinger et al., 2022). Also, some participants were excluded from the study due to inconsistent or missing data, especially on the heritage language tests (Lorenz et al., 2024).

In line with the research question of this dissertation, the analyses reported here relied on data collected from the bilingual sample across the first three MEZ measurement points. The last MEZ measurement time point was not included in the analysis, as mentioned previously, due to a considerable number of students dropping out of project, leaving school or providing missing data. Thus, the analyses relied on the bilingual data obtained from the first three MEZ measurement time points. The number of participants in the bilingual sample was 301. While the number of participants in the Russian-German bilingual group was 123, the number of participants in the Turkish-German bilingual group was 178. More information about other relevant characteristics of the sample (e.g., gender and school type) is presented in Table 2.

Table 2

Bilingual Sample Characteristics

	Gender	**School Type**	**Birth Year**
TUR-GER	Female=110	Gymnasium=103	1999=3
	Male=68	Other=75	2000=46
			2001=50
			2002=40
			2003=39
RUS-GER	Female=87	Gymnasium=66	1999=2
	Male=36	Other=57	2000=29
			2001=29
			2002=32
			2003=31

Note: TUR-GER=Turkish-German, RUS-GER=Russian-German

The bilingual participants constituting the sample at hand possessed specific characteristics which made them comparable. First, all participants attended formal education in German schools. Their heritage languages (i.e., Russian and Turkish) were mostly used in a home setting. Hence, these heritage languages could be considered as their comparably weaker languages. In this context, German could be viewed as the majority language of the participants (Gogolin, 2021; Lorenz et al., 2021). The participants had taken a so-called locator test (Hellrung et al., 2017) to ascertain their proficiency in heritage languages before participating in the project. The test was designed to measure basic listening comprehension in the heritage languages. In a three-minute task, the students listened to several statements in their

heritage languages and selected the corresponding pictures given in a booklet. Students who were not able to obtain minimum scores on this task were excluded from subsequent assessments in heritage languages (Klinger et al., 2022).

In addition to heritage languages (either Russian or Turkish) and the majority language, German, the bilingual participants started learning English as an additional language (L3) in primary school in either year one or three; therefore, they could be considered intermediate learners of English (Lorenz et al., 2023).

3.3. Data collection

The data were collected between 2016 and 2018 from a national sample, entailing four different measurement points and including two age cohorts. While the first cohort began in grade 7, the second cohort began in grade 9. Table 3 below provides more detailed information about the data collection time frames.

Table 3

The Four MTPs of The MEZ Project (adapted from Lorenz et al., 2024, p. 79)

Cohort 1	**Grade 7**	**Grade 8**		**Grade 9**
	MEZ1 January-March 2016 (First wave of data collection)	MEZ 2 October-December 2016 (Second wave of data collection	MEZ 3 May-July 2017 (Third wave of data collection)	MEZ 4 May-June 2018 (Fourth wave of data collection)
Cohort 2	**Grade 9**	**Grade 10**		**Grade 11**

The data were collected through various instruments that were administered in a group setting using the traditional paper and pencil method (Klinger et al., 2022). These sessions were carried out in schools by trained instructors over two separate days during regular school hours to minimize transfer effects between tests (Klinger et al., 2022).

3.4. Variables of Interest

In line with the research questions, the present study focused on two main categories of latent variables: linguistic variables and extra-linguistic variables. This section provides detailed information about the properties of the variables of

interest.

3.4.1. Linguistic Variables

The linguistic variables of interest in this longitudinal study were heritage language proficiency (either Russian or Turkish), majority language proficiency (German), third language proficiency (English), and L1 language background (either Russian or Turkish language background). Heritage and majority language proficiency were operationalised as reading comprehension performance in the respective languages. Previous research also suggests that reading comprehension can function as a useful approximation for measuring general language ability (Edele et al., 2018). Moreover, C-test scores in English functioned as a proxy for the general language proficiency in L3 English. These linguistic variables were measured across three points, resulting in nine different variables.

Finally, language background was another variable whose possible impact was examined. Since the present study focused on a multilingual sample, the impact of belonging to a specific heritage language background was also considered in the growth model. A distinction was made between the Turkish/German group (with a Turkish heritage language background) and the Russian/German group (with a Russian heritage language background). In line with Rosseel's suggestion (2024) concerning coding the groups, language background was treated as a dummy variable, 0 representing the Turkish heritage language background and 1 representing the Russian heritage language background.

3.4.2. Extra-linguistic Variables

The extra-linguistic variables employed in the present study were cognitive ability, socioeconomic status, and school type. Cognitive ability was operationalised as KFT scores (Heller & Perleth, 2000), and socio-economic status was operationalised as HISEI (Ganzeboom, De Graaf & Treiman, 1992; International Labour Office, 2012) scores.

Cognitive ability was assessed by using a subset of the standardized German cognitive ability test KFT 4-12+ R. The test is intended to measure students' non-verbal visual and spatial abilities (Heller & Perleth, 2000). More information about the cognitive ability variable and how it was assessed is presented in the following subsection, 3.5.3. KFT/Cognitive Ability Test.

School type was considered to be an extra-linguistic variable that could influence L3 English attainment and growth. A distinction was made between the higher education track, Gymnasium, and lower academic tracks, which were labelled as "other". The other category featured several different schools, including Realschule and Hauptschule. While Gymnasium was coded as 1 in the data, the other category was coded as 0. Based on Rosseel's recommendation (2024), school type was treated as a dummy variable, similar to how it could be coded in a regression model.

Finally, the Highest International Socio-Economic Index (HISEI) was used to operationalise socioeconomic status. The index was computed based on the occupation of parents whose children participated in the project, using the International Standard Classification of Occupations code, the ISCO-08-

categorisation (International Labor Office 2012). This code was transferred to the International Socio-Economic Index (ISEI) (Ganzeboom et al., 1992). The values obtained for HISEI ranged between 16 and 90.

3.5. Instruments

The present study relied on quantitative linguistic data gathered by using several instruments. These instruments were a reading comprehension test in the majority language, German, a reading comprehension test in the heritage languages Russian and Turkish, and a collection of C-tests to measure general L3 English proficiency. Moreover, parental and student questionnaires were administered to collect data on participants' socioeconomic background, school type, gender, and age.

3.5.1. Reading Comprehension and Fluency Tests

Reading comprehension and fluency tests in German, Russian, and Turkish (LGVT – Lesegeschwindig-keits- und Verständnistest—Schneider, Schlagmüller, & Ennemoser, 2016) were administered to the participants across all measurement points. The test was initially available in German and was later adopted for Russian and Turkish. Heritage language versions of the reading test were not exactly translated versions of the original German test, yet all versions were quite similar in terms of genre and subject matter. Concerning structure, each test featured a text containing 47 gaps that participants had to fill by using one of the three options within six minutes. In line with the scoring approach suggested by Schneider et al. (2016), a participant earned two points for a correct response, zero points for failing to provide an answer, and a negative point (-1) for giving an incorrect answer.

According to this scoring procedure, scores on the measurement scale varied between 47 and +94 points. The test consisted of two major components: reading comprehension and fluency. The participants received separate scores for these components. The present study used only reading comprehension scores, as the instrument inherently includes reading speed. Reading comprehension serves as a more effective proxy for language ability than reading speed alone.

The instruments for reading comprehension were tested in order to ensure their reliability. The Cronbach's alpha reliability values for the majority language reading comprehension (German) tests were .82 for MTP1, .87 for MTP2, and .90 for MTP3. The Cronbach's alpha reliability values for the Russian heritage language reading comprehension tests were .86 (Cyrillic version) and .15 (the Latin alphabet version) for MTP1, .85(Cyrillic version) and .15 (the Latin alphabet version) for MTP2, and .84 (Cyrillic version) and .15 (the Latin alphabet version) for MTP3. The Cronbach's alpha reliability values for the Turkish heritage language reading comprehension tests were .64 for MTP1, .72 for MTP2, and .64 for MTP3 (MEZ, 2020a, 2020b, 2020c). The acceptable range for the Cronbach's alpha reliability values has been reported to vary, with estimates ranging from .70 to .95 (Tavakol & Dennick, 2011). Overall, the obtained values were within the acceptable range of alpha.

3.5.2. C-tests in L3 English

C-tests have been widely recognised as a means of evaluating foreign language proficiency in a relatively short time (Min & He, 2014; Schnoor, Hartig, Klinger, Naumann, & Usanova, 2023). Participants' proficiency in L2/L3 English was assessed using a set of C-tests. These tests targeted participants' lexical and

grammatical competence in L2/L3 English and were modelled after those used in the DESI study (Klieme et al., 2006). Each individual test used at all measurement points featured four texts with a total of 90 end-clipped words. While the first and last sentences were given in full, the participants had to complete all end-clipped words in the remaining sentences. It took 20 minutes to complete the task.

Below, an excerpt taken from the test, showcases the task:

(1) "As they wal___ [-ked] through the zoo th___ [-ey] came to a la___ [-rge] cage with monkeys".

The scoring procedure was as follows: the participants earned one point if they answered correctly, zero points for an incorrect, partial or unanswered response. The tests were scrutinised to ensure their reliability. The Cronbach's alpha scores for the four subtests in each C-test across three measurement time points were as follows: C-test 1 = .93, C-test 2 = .96, and C-test 3 = .95 (MEZ, 2020a, 2020b, 2020c).

To ensure the appropriate use of the C-tests in a longitudinal design, several measures were considered. Previously, Schnoor et al. (2023) investigated the longitudinal invariance of the C-tests in a study with a methodological focus and obtained empirical evidence by applying CFA on MEZ data. The authors reported on the appropriateness of altering texts in a longitudinal C-test design to ensure the measurement comparability over time.

Measurement invariance is significant in that researchers need to ensure that an instrument functions similarly in various data collection waves and participant groups, since these issues are not relevant to the construct being measured (Schnoor

et al., 2023). The authors tested four types of measurement invariance models to ensure the appropriateness of the C-tests for the longitudinal analyses. Their hypotheses were: i) C-tests' longitudinal measurement invariance was at least at the scalar level, meaning the change in the latent means can be attributed to development rather than measurement variation, ii) the C-tests functioned similarly across age groups in secondary education, iii) the C-tests were able to capture EFL development.

Measurement invariance can be tested at different levels by imposing certain restrictions on the model. These levels are configural invariance, metric invariance, scalar invariance and residual invariance. The results of the CFA analysis demonstrated that the C-tests' longitudinal measurement invariance was at least at the scalar level, ensuring that change in test scores was caused by changes in the ability rather than being the property of measurement instrument. Furthermore, the tests were found to function similarly across age groups included in MEZ waves, thus, allowing comparability. Finally, the C-tests were found to be able to capture development in EFL proficiency. The study is significant in that it empirically demonstrated the potential of C-tests for longitudinal designs and analysis.

Apart from empirical evidence obtained from Schnoor et al (2023), in the current study, the appropriateness of C-tests was ensured based on several measures taken. These measures were reviewing the construct definition and operationalisation of L2/L3 English proficiency across all MEZ waves by examining reports and manuals released about MEZ, examining item facility values reported for the C-test subtests in line with the principles of classical test theory (CTT), checking the Cronbach's alpha values of C- tests for ensuring the internal

consistency of the measures, and normalising the C-test scores on a common metric, ranging from 0 to 1, to facilitate comparability.

3.5.3. KFT/Cognitive Ability Test

A subtest of the Kognitiver Fähigkeitstest (KFT 4 -12 + R—Heller & Perleth 2000) was used to measure students' non-verbal visual and spatial abilities. The KFT is a validated instrument that is suitable for a wide range of ages and has been commonly used to measure cognitive ability in the German educational settings (Klinger et al., 2022).

The test included 25 partially different items targeting two age cohorts to cater to the age difference (MEZ, 2020a). Tasks exhibited two shapes of illustrations that had some common features and subsequently presented a third shape or illustration. The students had to select the correct option out of five different shapes or illustrations that were provided. The students earned one point for each correct answer given and received zero points for each incorrect answer, resulting in a scale of 0 to 25 points. The reliability of the instrument was ensured by using Cronbach's alpha internal consistency. The values obtained for this measure ranged between .85 and .90 (MEZ, 2020a).

3.6. Data Screening

Prior to primary analyses, the longitudinal data obtained from MEZ 1, MEZ 2, and MEZ 3 were initially checked for several key properties, namely validity, reliability, and missing cases. As mentioned earlier, several instruments using different scales were used to collect the data. Consequently, the data were

normalised to a standard scale ranging from 0 to 1 for all scores and participants. The normalised values were computed by using Microsoft Excel. Several descriptive (e.g., mean, standard deviation) and inferential statistics were computed, and results were visualised to better understand the data in the overall bilingual sample and separate subsamples, using SPSS 25 (IBM Corp., 2017). Particularly, a set of t-tests were computed in order to understand if the differences observed in the descriptive analyses were statistically meaningful. Furthermore, several correlational analyses were conducted to understand the relationship between linguistic variables, specifically heritage language proficiency, majority language proficiency and third language proficiency. The results of these analyses are presented in the Results section.

3.7. Data Analysis

Longitudinal data can be regarded as a specific type of multilevel data where time is nested within individual participants. This data type typically has three essential properties: the same individuals are observed repeatedly over time, consistent measurements, including parallel tests, are applied, and the timing of each measurement is known (Baltes & Nesselroade, 1979). MEZ data used in the present study met all these requirements.

Longitudinal data are particularly valuable because they allow researchers to examine changes over time, gain deeper insights into potential causal relationships, and explain events in relation to time. To fully leverage this data type, it is often necessary to go beyond traditional statistical methods like regression and ANOVA and instead use models that address the added complexity of longitudinal data (Boscardin, Sebok-Syer, & Pusic, 2022).

One widely used model for analysing longitudinal data is the Latent Growth Curve Modelling. This type of modelling has different names in research methodology and can also be referred to as Latent Curve Analysis and Growth Curve Modelling. For the sake of consistency, this dissertation opts for the term Latent Growth Curve Modelling (LGCM). By using LGCM, researchers can explore patterns of change or growth, understand the absolute or relative extent of change over time for an individual or group, create models to forecast individuals' status based on current and past data, and examine the causes of growth by linking the growth to explanatory variables (Boscardin et al., 2022).

LGCM can be used where an outcome is measured at multiple time points to examine changes over time and can be estimated in the context of Structural Equation Modelling (SEM) (Kline, 2011; Rosseel, 2024). A simple linear or quadratic curve can represent the progression. Random effects are incorporated to account for individual differences, typically expressed as continuous latent variables, often referred to as growth factors (Rosseel, 2024).

Applying the LGCM to the longitudinal data allows for understanding how changes occur over time, accounting for these change by incorporating time-varying and time-constant predictors and understanding the variance both between and within individuals. According to Zhang and Wang (2017-2022), a typical growth curve model can be represented as:

$$y_{it} = \beta_{0i} + \beta_{1i} \times time_{it} + e_{it}$$

$$\beta_{0i} = \gamma_0 + v_{0i}$$

$$\beta_{1i} = \gamma_1 + v_{1i}$$

Where y_{it} stands for the data for participant i at time t. A linear regression model can be estimated with an intercept β_{0i} and a slope β_{1i} for each given individual. The intercept refers to the average value at the start of the data collection, also known as the baseline, while the slope refers to the average rate of change in time.

In the present study, the growth trajectories of bilingual participants for each latent variable encompassing all three measurement points were estimated in the context of SEM (Kline 2011, Rosseel, 2024). In order to fit a linear growth model across the three measurement time points covered within the scope of the study, a growth model featuring two main latent variables, a random intercept and a random slope, was specified based on Rosseel (2024):

```
i =~ 1*t1 + 1*t2 + 1*t3

s =~ 0*t1 + 1*t2 + 2*t3
```

These growth curve equations aimed to capture both the intercept and slope of the observed data across the three measurement time points. The intercept factor (i)

is defined by a fixed loading of 1 at each of the three time points (t1, t2, t3), meaning that it represents the initial level of the outcome variable, L3 English proficiency, at the beginning. The slope factor (s) is modelled with increasing loadings at each time point: 0 at t1, 1 at t2, and 2 at t3. This structure made it possible to estimate individual growth trajectories and capture the rate of change over time. Thus, the model accounted for both the initial status and the linear progression of the outcome variable, L3 English proficiency, across the three measurement points.

The latent growth curve model was estimated using the "lavaan" package available in R (Rosseel, 2024). R is a programming language and environment that is widely used for statistical computing and visualisation (R Core Team, 2024). All latent growth curve modelling analyses were conducted in the R environment. LGCM analyses helped examine the L3 English latent growth trajectories and rate in the bilingual sample. Also, in order to understand the impact of the linguistic and extra-linguistic factors on the L3 English baseline and L3 English growth rate, several regressions were added to the growth model. The properties of the L3 latent growth model are explained in the Results section in greater detail.

4. Results

This section presents the results of the quantitative analyses and is structured based on the research questions of the dissertation. The section initially presents the results of the descriptive statistics (e.g., mean, standard deviation, minimum and maximum scores) and inferential statistics (i.e., correlation analyses), mainly concerning the linguistic variables of interest (i.e., heritage language proficiency (Russian/Turkish), majority language proficiency (German) and third language proficiency (English). Descriptive and inferential statistics are reported to provide insights into the data and provide a background to the main analyses. Then, the main analyses are presented. These analyses concentrate on the latent growth trajectories of heritage bilingual participants in the sample of the present study, as well as the variables that explain both the growth and the variation of growth across the three measurement time points.

4.1. Results for Descriptive Statistics

Prior to the main analyses, the data were scrutinised by conducting a series of descriptive and inferential statistical procedures. Table 4 provides detailed information about the results of the descriptive analysis (e.g., mean, standard deviation, minimum and maximum scores) concerning the latent variables, heritage language proficiency (Russian/Turkish), majority language proficiency (German) and third language proficiency (English) in the overall sample (N=301). Table 5

provides detailed information about the results of the descriptive analysis for the Russian-German (N=123) and Turkish-German (178) subgroups across the three measurement time points.

Overall, the mean scores for heritage language proficiency were low: 7.69 at the MTP1, 12.90 at the MTP2, and 9.16 at the MTP3 (N=301). The mean scores for the German language proficiency were higher when compared to the scores for the heritage language proficiency: 27.7 at the MTP1, 30.76 at the MTP2, and 37 at the MTP3. There is an increasing trend for the German proficiency scores, and the mean scores show that students are dominant in the majority language, German. Finally, the mean score for English language proficiency was 53.06 at the MTP1, 49.39 at the MTP2 and 50.29 at the MTP3. The trend in English language proficiency scores fluctuates comparably. Further descriptive statistics concerning the bilingual subgroups (i.e., Russian-German and Turkish-German cohorts) for the variables of interest are presented in Table 5. For the extra-linguistic variables, namely socioeconomic status (HISEI) and cognitive ability (KFT), the mean scores were 40.90 and 16.40 respectively.

The same descriptive analyses were conducted separately for the Turkish-German and Russian-German cohorts. The analyses revealed that for heritage language proficiency, the means for the Turkish-German cohort were higher across all MTPs (M=8.71, MTP1; M=15.65, MTP2; M=10.04, MTP3) than the means for the Russian-German cohort (M=6.21, MTP1; M=8.91, MTP2; M=7.90, MTP3). For German language proficiency, the trend is reversed; the mean scores for the Russian-German cohort were higher across all MTPs (M=29.13, MTP1; M=32.13, MTP2; M=38.54, MTP3) than the mean scores for the Turkish-German cohort (M=26.71, MTP1; M=29.81, MTP2; M=35.93, MTP3). There is an increasing trend for German

language proficiency scores across both groups. Finally, the mean scores for English language proficiency for the Turkish-German (M=52.41, MTP1; M=48.52, MTP2; M=48.85, MTP3) and Russian-German cohorts (M=54, MTP1; M=50.65, MTP2; M=52.37, MTP3) seem to be fluctuating over time.

The means for cognitive ability and socioeconomic status were also computed for each bilingual cohort. The mean socioeconomic status score was 38.83 for the Turkish-German cohort and 43.89 for the Russian-German cohort. The mean cognitive ability score was 15.59 for the Turkish-German cohort and 17.57 for the Russian-German cohort.

Table 4

Descriptive Statistics of The Variables for the Overall Sample Across Three MTPs

	HLT1	HLT2	HLT3	MLT1	MLT2	MLT3	TLT1	TLT2	TLT3	HISEI	KFT
N	301	301	301	301	301	301	301	301	301	301	301
Mean	7.69	12.90	9.16	27.70	30.76	37	53.06	49.39	50.29	40.90	16.40
Std. Deviation	9.68	11.24	11.29	10.99	13.79	15.82	18.07	15.44	15.22	19.18	5.67
Minimum	-18	-9	-22	0	3	-11	1	9	13	14.21	0
Maximum	52	58	61	85	92	91	89	78	77	88.69	25

Note. HLT1=heritage language proficiency MTP1, HLT2= heritage language proficiency MTP2, HLT3= heritage language proficiency MTP3; MLT1=majority language proficiency MTP1, MLT2=majority language proficiency MTP2, MLT3=majority language proficiency MTP3; TLT1= third language proficiency MPT1, TLT2= third language proficiency MPT2, TLT3= third language proficiency MPT3; HISEI=Socio-economic status; KFT=Cognitive ability.

Table 5

Descriptive Statistics for the Subgroups across Three MTPs

	HLT1		HLT2		HLT3		MLT1		MLT2		MLT3		TLT1		TLT2		TLT3		HISEI		KFT	
	Tur-Ger	Rus-Ger	Tur-Ger	Rus-Ger	Tur-Ger	Rus-Ger	Tur-Ger	Rus-Ger	Tur-Ger	Rus-Ger	Tur-Ger	Rus-Ger	Tur-Ger	Rus-Ger	Tur-Ger	Rus-Ger	Tur-Ger	Rus-Ger	Tur-Ger	Rus-Ger	Tur-Ger	Rus-Ger
N	178	123	178	123	178	123	178	123	178	123	178	123	178	123	178	123	178	123	178	123	178	123
M	8.71	6.21	15.65	8.91	10.04	7.90	26.71	29.13	29.81	32.13	35.93	38.54	52.41	54	48.52	50.65	48.85	52.37	38.83	43.89	15.59	17.57
SD	9.36	9.96	10.84	10.64	11.16	11.40	11.46	10.15	13.97	13.46	16.50	14.72	17.89	18.37	14.88	16.19	14.68	15.79	18.99	19.14	5.74	5.37
Min	-18	-9	-8	-9	-22	-12	0	9	3	4	-11	0	1	12	9	10	14	13	14.21	17.69	0	4
Max	46	52	49	58	49	61	85	57	92	77	91	79	87	89	76	78	76	77	86.72	88.69	25	25

Note: Tur-Ger=Turkish-German, Rus-Ger=Russian-German, N=Number, M=Mean, SD=Standard deviation, Min=Minimum score, Max=Maximum scoreHLT1=heritage language proficiency MTP1, HLT2= heritage language proficiency MTP2, HLT3= heritage language proficiency MTP3; MLT1=majority language proficiency MTP1, MLT2=majority language proficiency MTP2, MLT3=majority language proficiency MTP3; TLT1= third language proficiency MPT1, TLT2= third language proficiency MPT2, TLT3= third language proficiency MPT3; HISEI=Socio-economic status; KFT=Cognitive ability.

Descriptive results for the individual language groups revealed differences in the mean scores across all measures. To test whether these differences were statistically meaningful, particularly at the beginning (MTP1), a *t*-test was computed for each linguistic and extra-linguistic variable. The results of the independent samples *t*-test revealed statistically significant differences in cognitive ability, socioeconomic status, and heritage language proficiency between the Turkish-German and Russian-German cohorts. Specifically, the Turkish-German cohort scored significantly lower than the Russian-German cohort in cognitive ability and socio-economic status ($p < 0.05$). Conversely, the Turkish-German group outperformed the Russian-German group in heritage language proficiency. However, no statistically significant differences were observed in the majority language, German comprehension, and the L3 English proficiency scores between the two cohorts.

4.2. Results for Correlation Analyses

The correlation analyses were conducted to understand if there were any relationships between the variables of interest, and if any, the direction (e.g., positive, negative, unrelated) and the strength of these relationships (e.g., weak, moderate, strong). The correlation analyses were conducted pairwise (e.g., HLT1-MLT1, MLT1-TLT1), separately for each measurement time point, and using the cross-sectional data (See Table 6). The analyses were conducted using the normalised data ranging between 0-1.

Correlation analysis results concerning the variables of interest for the overall bilingual sample are presented in Table 6 and Figure 2. This analysis produced a set of correlation coefficients ranging from +1.00 to -1.00 for each pair of variables. A

positive sign indicates that high scores on a variable correspond to high scores on another variable. A negative sign, on the other hand, means that high scores on a variable correspond to low scores on the other variable. Finally, coefficients that are near .00 mean that there is not a relationship between the variables of interest (Fraenkel et al., 2011).

Table 6

The Results of the Correlation Analyses

MTP1		**N**	**Pearson's r**	***p***	**Effect size (Fisher's z)**	**SE Effect size**
HLT1	- MLT1	301	0.238	< .001	0.242	0.058
HLT1	- TLT1	301	0.234	< .001	0.238	0.058
MLT1	- TLT1	301	0.531	< .001	0.592	0.058
MTP2		**N**	**Pearson's r**	***p***	**Effect size (Fisher's z)**	**SE Effect size**
HLT2	- MLT2	301	0.244	< .001	0.249	0.058
HLT2	- TLT2	301	0.207	< .001	0.210	0.058
MLT2	- TLT2	301	0.611	< .001	0.710	0.058
MTP3		**N**	**Pearson's r**	***p***	**Effect size (Fisher's z)**	**SE Effect size**
HLT3	- MLT3	301	0.293	< .001	0.302	0.058
HLT3	- TLT3	301	0.168	0.004	0.169	0.058
MLT3	- TLT3	301	0.577	< .001	0.658	0.058

Usually, correlation coefficients below .35 are accepted to exhibit a relatively weak and slight relationship between variables, while correlations between .40 and .60 may be considered substantial based on the context. A correlation of .65 or higher is usually considered strong, while coefficients over .85 point to a very strong relationship between the variables of interest (Fraenkel et al., 2011).

Accordingly, the results of the correlation analysis suggest that at the MTP1, there was a significant positive correlation between heritage language proficiency (Russian or Turkish) and German language proficiency ($r = .23$, $p < .001$), a significant positive correlation between heritage language proficiency and English language proficiency ($r = .23$, $p < .001$), and particularly a stronger positive correlation between German language proficiency and English language proficiency ($r = .53$, $p < .001$).

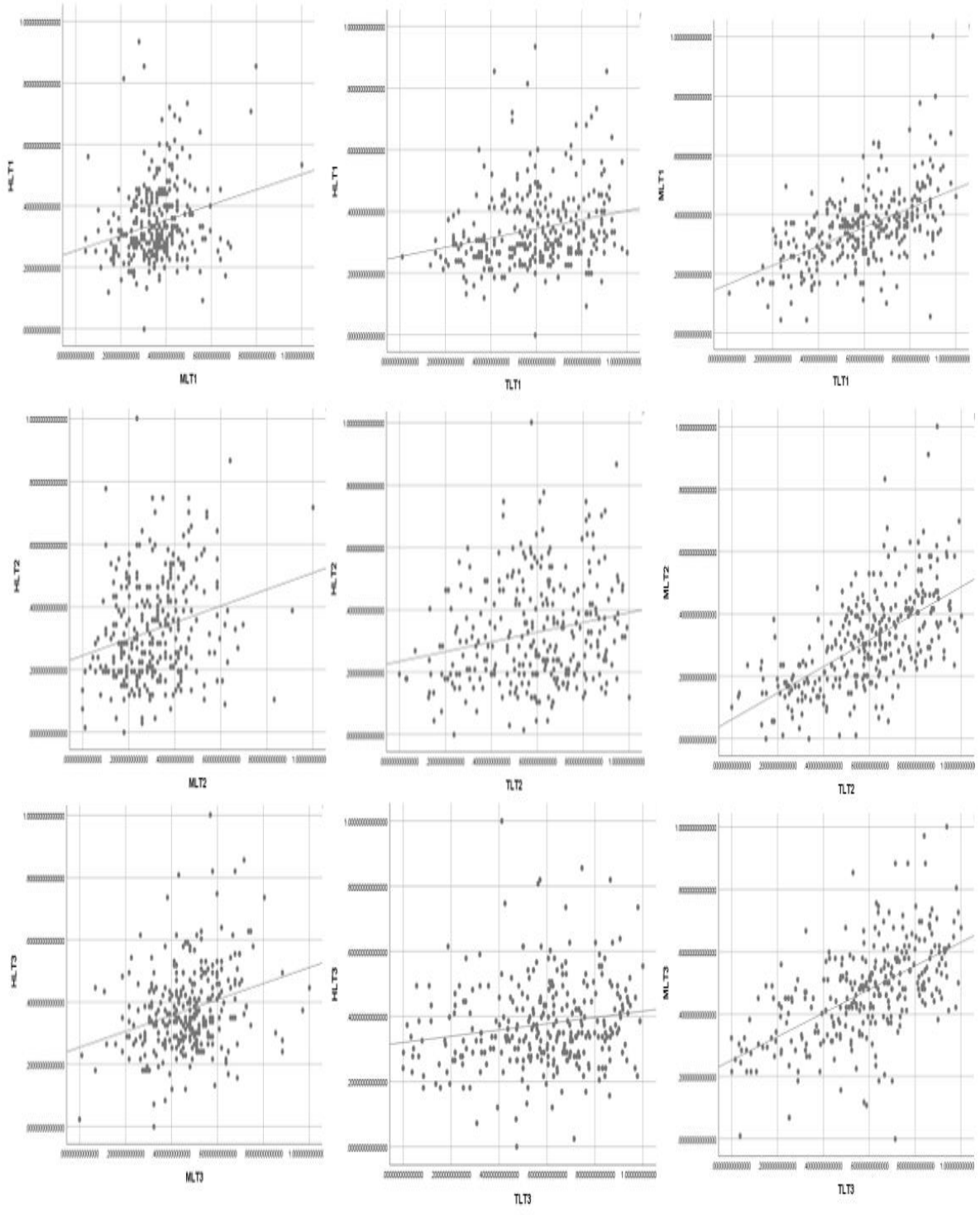
At the MTP2, there was a similar trend in correlation coefficients; there was a statistically significant positive correlation between heritage language proficiency and German language proficiency ($r = .24$, $p < .001$) and a statistically significant positive correlation between heritage language proficiency and English language proficiency ($r = .20$, $p < .001$). These correlations exhibit a relatively weak relationship. At the MTP2, the correlation between German and English language proficiency became even more substantial ($r = .61$, $p < .001$).

At the MTP3, there was a statistically significant positive correlation between heritage language proficiency and German language proficiency ($r = .29$, $p < .001$) and a statistically significant positive correlation between heritage language proficiency and English language proficiency ($r = .16$, $p < .001$), although this relationship was comparably weak. The correlation between German and English language proficiency was significant and more substantial ($r = .57$, $p < .001$). A

visualisation of these correlations in the form of scatterplots is provided in Figure 2.

Figure 2

Correlation Scatterplots



Note: Top row: HLT1–MLT1 (left), HLT1–TLT1 (centre), MLT1–TLT1 (right); Middle row: HLT2–MLT2 (left), HLT2–TLT2 (centre), MLT2–TLT2 (right); Bottom row: HLT3–MLT3 (left), HLT3–TLT3 (centre), MLT3–TLT3 (right)

The results reveal that all pairwise correlations were statistically significant and positive. There was a statistically significant correlation between heritage language Turkish/Russian proficiency, German language proficiency and English language proficiency across all three MTPs, yet the strength of the relationship varied across the variables of interest. Mainly, the correlations between heritage language proficiency-German language proficiency and heritage language proficiency-English language proficiency were found to be weak. On the other hand, the correlations between German language proficiency and English language proficiency were found to be comparably more robust and more substantial. It should be noted that correlations do not readily establish a causal connection and, therefore, need to be considered carefully. However, they provide valuable insights into the relationships among variables of interest (Fraenkel et al., 2011).

4.3. Results Concerning the Latent Growth in L3 English

The primary analyses conducted within the scope of the present study focused on understanding the L3 English growth trajectories of the heritage bilinguals and the growth rate over time, across the three MTPs. This section presents results about the latent growth trajectories of the participants in L3 English, including the variation within the group in initial baseline level of L3 English and the growth rate in L3 English across time. Moreover, the section reports on the relationships between L3 English proficiency growth and the variables of interest—a set of linguistic and extra-linguistic factors (i.e., heritage language proficiency, German language proficiency, socioeconomic status, cognitive ability, school type, and heritage language background).

4.3.1. Model Fit

The longitudinal growth model was fitted to the heritage bilingual students' data. The model fit results demonstrated a good fit between the and the data, as indicated by the indices obtained. Results concerning the model fit have been presented in Table 7. According to the cut-off criteria suggested by Kline (2011) and Hu and Bentler (1999), the model exhibited a good model-to-data fit, therefore the model was accepted. Once the model fit was ensured, the results were considered to be ready to interpret.

Table 7

Model-to-Data Fit Values

	Obtained value	Cut-off criteria
RMSEA	.06	(<.08) (Kline, 2011)
SRMR	.006	(<.08) (Kline, 2011)
Tucker-Lewis Index (TLI)	.97	(>.90) (Hu & Bentler, 1999)
Comparative Fit Index (CFI)	.99	(>.90) (Kline, 2011)

4.3.2. Bilingual Latent Growth Trajectories in L3 English

In this subsection, latent growth curve analysis results are presented in line with the research questions of the present study. The first research question examines the growth trajectory of bilingual participants in third language proficiency, i.e., L3 English proficiency. The results of the latent growth curve modelling and associated

parameters are presented in Table 8.

Table 8

Latent Growth Curve Model Parameters

	Parameter	Estimate	Std. Error	z-value	p
Intercept (*i*)	Mean	0.199	0.039	5.127	< .001*
	Variance	0.018	0.002	9.250	< .001*
Linear slope (*s*)	Mean	-0.061	0.014	-4.245	< .001*
	Variance	0.001	0.001	1.622	0.105
Intercept~~Linear slope		0.001	0.001	0.140	0.888

Note: * Statistically significant result ($p < 0.001$).

According to the results of the linear growth curve modelling estimated in the context of SEM, the intercept (i.e., baseline) was significantly positive, indicating an initial level of the dependent variable, L3 English proficiency, different than zero. The intercept mean of 0.199 was highly significant ($p < 0.001$), suggesting that the predicted average starting point of L3 English proficiency was 0.199 in the sample of heritage bilingual students. In other words, an average heritage bilingual student was expected to have a score of 0.199 in L3 English proficiency at the beginning, on a normalised scale ranging between 0 and 1.

The variance of the intercept factor was estimated to be 0.018, which was statistically highly significant ($p < 0.001$), meaning that there were individual

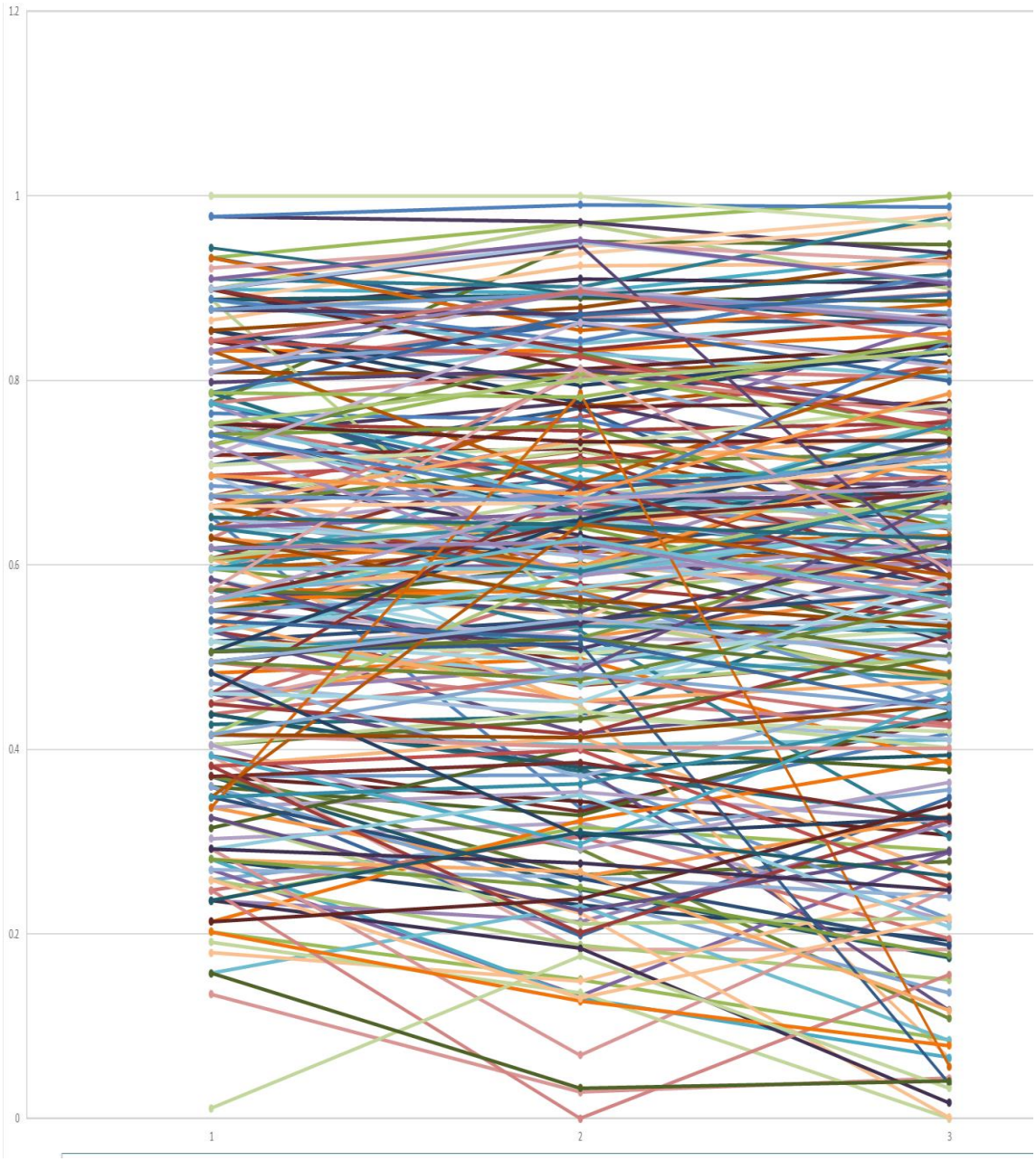
differences in L3 English scores at the baseline, the first measurement point. The variance between the heritage bilingual students at the baseline was slight but statistically significant.

Furthermore, the mean of the linear slope was found to be -0.061. This estimate, albeit small, was found to be negative and highly significant ($p < 0.001$). The mean of the linear slope represents the average linear growth rate in L3 English over time. This slight negative estimate suggested a linear statistically significant decrease by 0.061 points in L3 English scores across the three MTPs. According to this finding, with each MTP, L3 English proficiency scores were expected to decrease by 0.06 points in the overall sample.

Another important estimate was the variance of the linear slope factor. This estimate represents individual differences in L3 English growth rates across time. The variance of the linear slope was estimated to be 0.001 in the sample. However, this estimate was minimal and not found to be statistically significant. It is expected that there would be individual growth trajectories in a given sample. Nevertheless, the statistically insignificant variance estimate means that, on average, individual heritage language students in the sample did not differ considerably in their L3 English growth trajectories across the three measurement points. Over time, their growth trajectories became more similar than different. This is evident in the growth curve plot, which visually depicts students' L3 English proficiency scores across the three MTPs (see Figure 3).

Figure 3

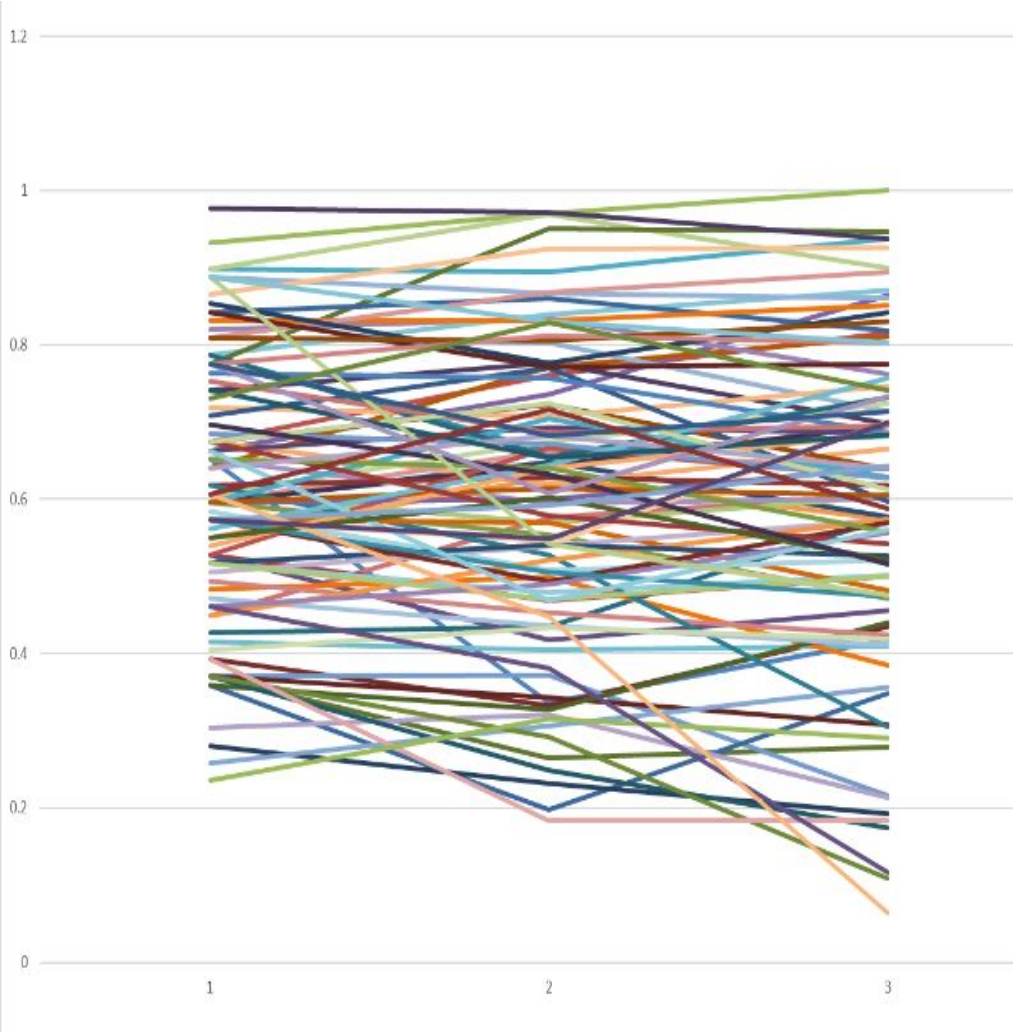
Participants' Individual L3 English Growth Trajectories



Each line in Figure 3 represents an individual student and his/her L3 English scores across three MTPs. In order to better scrutinise and understand the individual growth trajectories represented by these lines and to ensure the clarity and ease of presentation, the general sample was divided into three subgroups and separate growth plots were created for each subgroup (see Figures 4, 5, and 6).

Figure 4

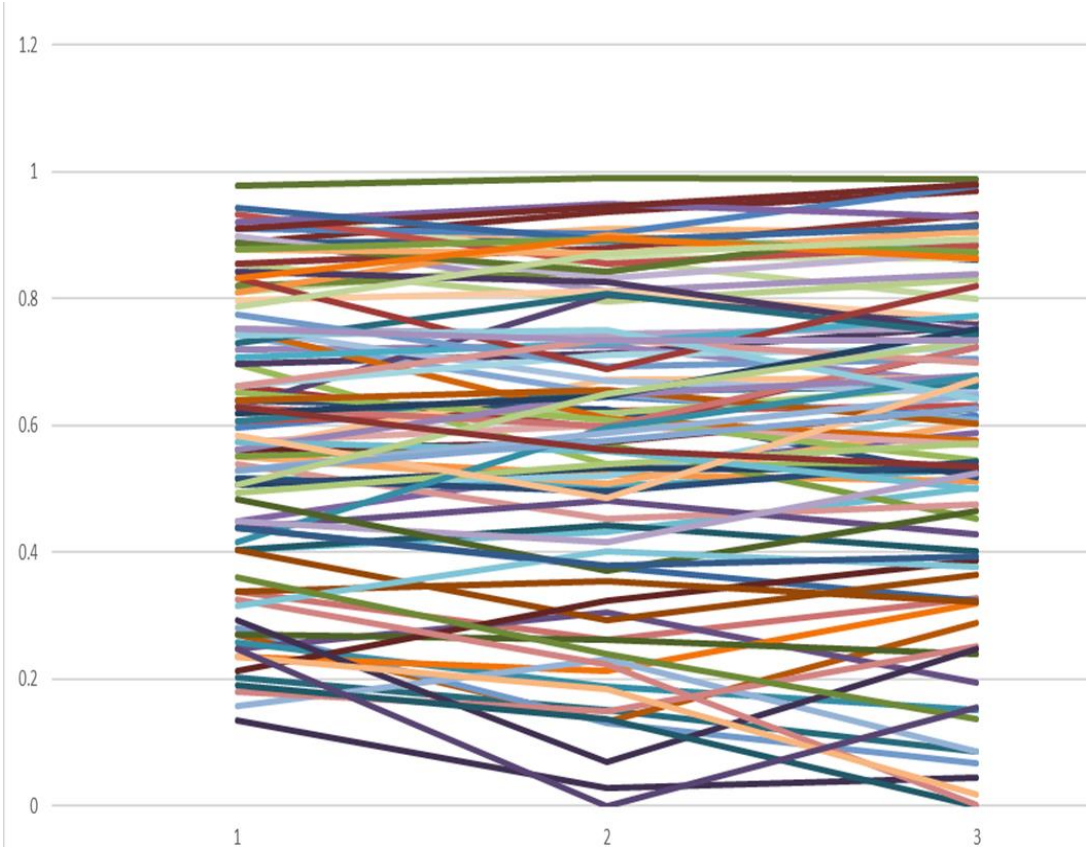
L3 English Growth Plot (Participants 1-100)



Growth plots are particularly useful since they can provide an overview of both individual and general growth trajectories in a given area or skill. In the growth plot in Figure 4, the horizontal x-axis represents the measurement time points (1, 2, and 3), and the vertical y-axis features the L3 English proficiency normalised scores (e.g., 0.8).

Figure 5

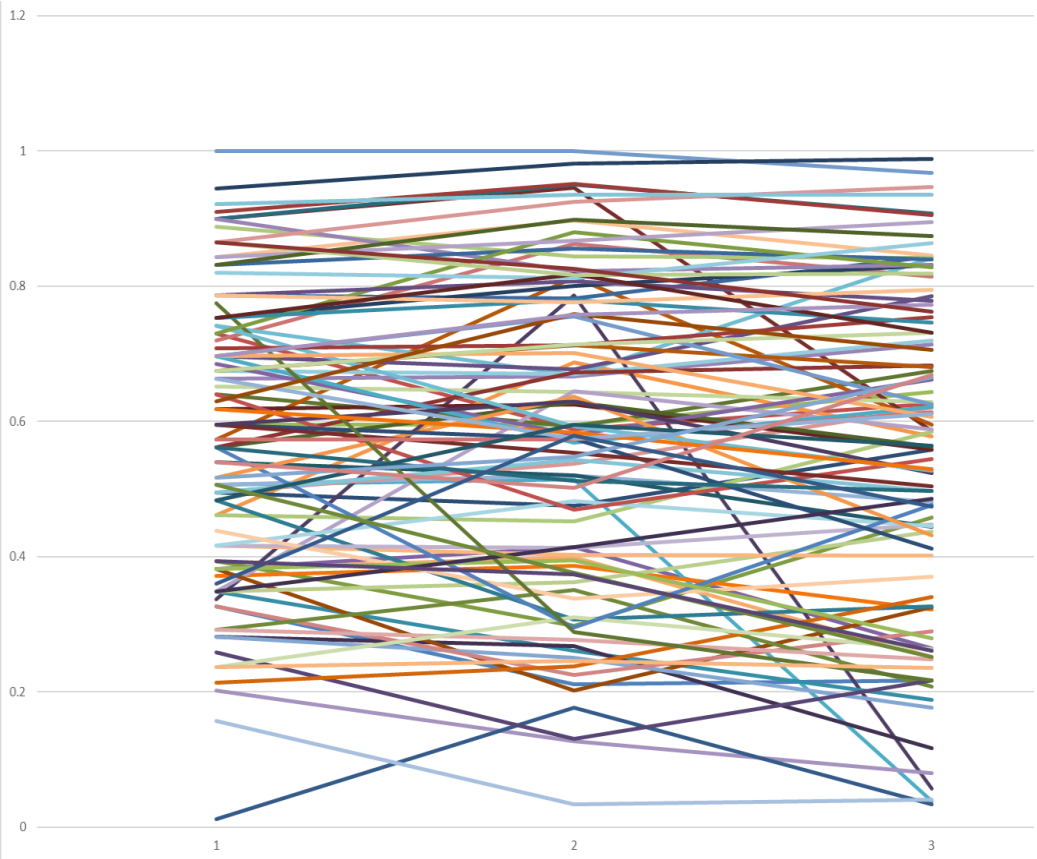
L3 English Growth Plot (Participants 101-200)



The plots clearly show individual differences in L3 English scores at the baseline, the first measurement point, where participants begin with varying scores. Likewise, the results of the growth curve analysis also revealed that there were statistically significant differences at the baseline.

Figure 6

L3 English Growth Plot (Participants 201-301)



A positive development pattern in the plot would indicate growth. Participants were expected to exhibit a positive development pattern over time, reflecting growth. Similarly, some participants showed positive linear growth in L3 English, as evidenced by ascending along the y-axis at each measurement point. However, for some participants, the pattern was reversed; they started with relatively higher scores but show a slight decline in proficiency over time, as indicated by lines descending on the y-axis. On the other hand, most participants seemed to maintain their baseline scores and exhibit similar performances in the subsequent measurement points or exhibit only a slight decrease their performance at the last MTP; therefore, not

suggesting a positive linear growth trajectory over time. The visual observations in the growth plot were previously indicated by the results of the latent growth curve modelling.

Returning to the results on the latent growth curve analysis, the covariance between the intercept and slope factors was found to be statistically insignificant (p=0.888). This estimate suggests that the starting level of the L3 English proficiency, intercept, and the rate of change over time, slope, were not significantly related. Put differently, heritage bilingual students' initial L3 English proficiency scores did not necessarily predict their growth trajectory over time. Had the effect been found to be statistically significant, a positive estimate, for instance, would mean that students with higher L3 English proficiency scores experience higher increases in L3 growth over time. However, such a pattern was not evident in the sample at hand.

4.4. Results on The Variables Influencing L3 English Growth

This section presents detailed results on the second and third research questions of the present study, specifically concerning the linguistic and extra-linguistic variables that may influence the L3 English latent growth trajectories of heritage bilinguals. These two research questions targeted understanding the relationships between linguistic variables (e.g., L3 English proficiency, heritage language proficiency, majority language proficiency, and language background) and extra-linguistic variables (e.g., cognitive ability, socioeconomic status, and school type) with the L3 English proficiency growth trajectories and growth rates.

General descriptive and inferential results shed light on the possible relationships between proficiency in L3 English, German, and respective heritage

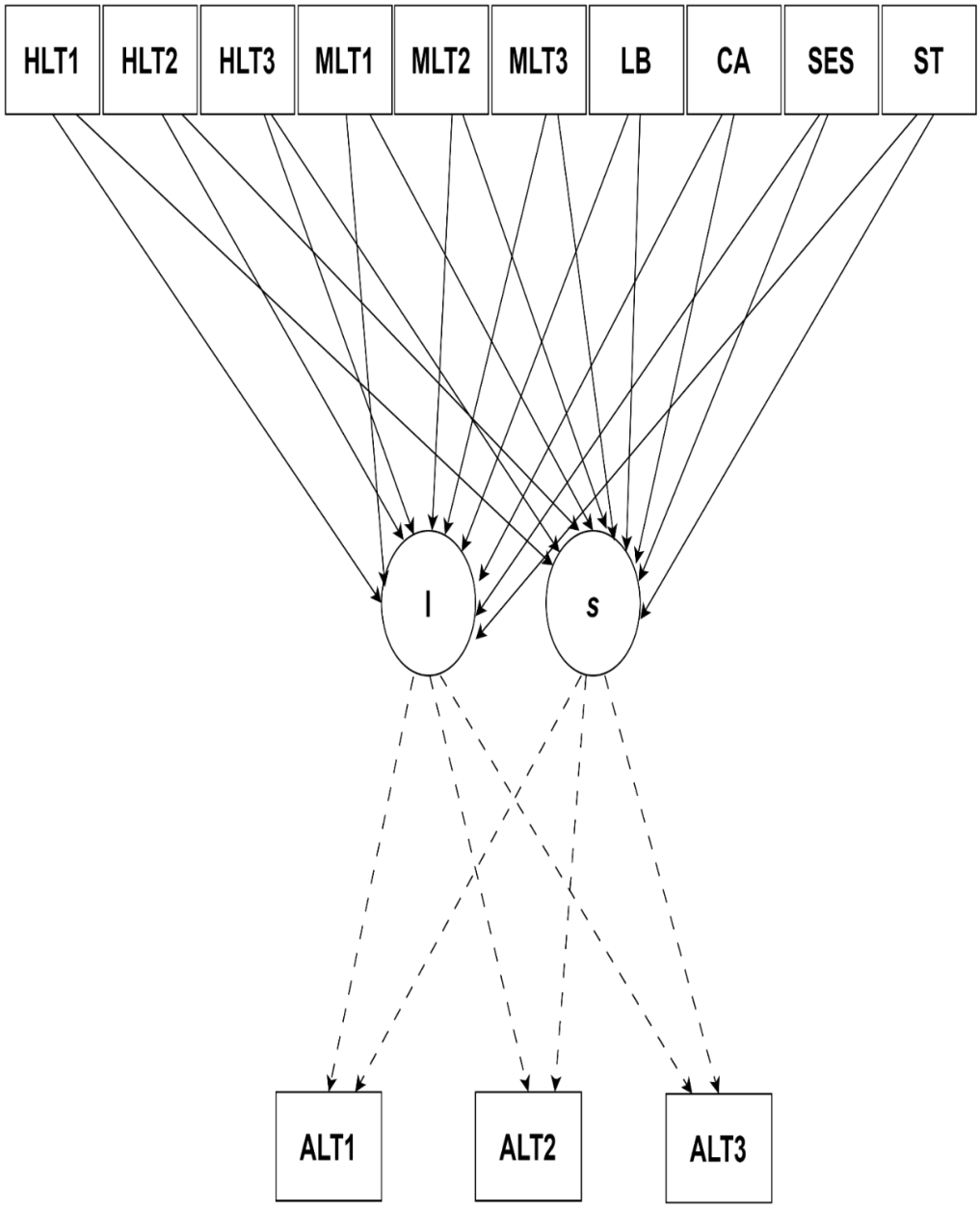
languages cross-sectionally at each MPT. These analyses focused on the relationships between variables themselves at a given time. In contrast, the results presented here offer a longitudinal examination of the contribution of these variables—particularly to L3 English growth rates and growth trajectories. The primary focus of latent growth curve analysis modelling reported here is on L3 English growth. This distinction is crucial and needs to be considered while interpreting the results. The growth model was tested in the context of the SEM (see Figure 7).

4.4.1. The L3 English Growth Model

This subsection presents essential information on the L3 English Growth Model (see Figure 7) and its components.

Figure 7

The L3 English Growth Model



The model demonstrated in Figure 7 concentrated on determining the growth trajectories of participants' in L3 English proficiency over time, in our case, across the three MTPs. In the model, "I" refers to the intercept, the initial baseline level

where no change has occurred. “s” refers to the linear slope and stands for the individual differences in L3 English proficiency in the rate of linear change. “AL” refers to “additional language”, which is the third language, English, for the heritage bilingual students. “ALT1”, for instance, refers to L3 English proficiency measured at the first measurement time point. Other relevant abbreviations are “HL” and “ML” which refer to “heritage language” and “majority language”, respectively. In this case, “MLT2” refers to the measurement of German language proficiency at the second measurement time point. “LB” refers to heritage “language background”, which could be either Russian or Turkish in the context of the present study. “CA” stands for cognitive ability, while “SES” refers to socioeconomic status. Finally, “ST” stands for school type, categorised as the higher academic track, Gymnasium, and other schools, such as Realschule or Hauptschule.

In addition to estimating the latent growth in L3 English, the model featured several intercept and slope factor predictors. These predictors were proficiency in the heritage languages (i.e., HLT1, HLT2, and HLT3), proficiency in the majority language German (MLT1, MLT2, and MLT3) across all three MTPs and language background variable. Moreover, the model featured a set of extra-linguistic factors that have been shown to influence third language acquisition in the relevant literature. These variables were socioeconomic status, cognitive ability, and school type. By including these predictors, it became possible to examine which variables accounted for the differences in participants’ baseline status and their linear growth in L3 English. The model considered the direction (e.g., positive or negative) and magnitude (e.g., small or substantial) of such influence in a longitudinal fashion.

4.4.2. Latent Growth Curve Model Regression Parameters

The latent growth model of L3 English featured a set of predictors for each different MTP. The estimates presented in Table 9 can be interpreted as regression coefficients, modelling the effect of each predictor on the intercept and linear growth in L3 English.

Table 9

Latent Growth Curve Model Regression Parameters

	Predictor	**Estimate**	**Std. Error**	**z-value**	**p**
Intercept	HLT1	0.275	0.101	2.720	0.007*
	HLT2	-0.071	0.084	-0.840	0.401
	HLT3	-0.205	0.093	-2.209	0.027*
	MLT1	0.242	0.102	2.380	0.017*
	MLT2	0.286	0.095	2.992	0.003*
	MLT3	0.189	0.092	2.051	0.040*
	Language Background	-0.008	0.019	-0.424	0.672
	School Type	0.129	0.019	6.776	< .001 *
	HISEI	-0.025	0.034	-0.749	0.454
	Cognitive Ability	0.120	0.040	3.001	0.003*

Table 9

Latent Growth Curve Model Regression Parameters

	Predictor	Estimate	Std. Error	z-value	p
Linear slope	HLT1	-0.005	0.038	-0.124	0.901
	HLT2	-0.010	0.031	-0.320	0.749
	HLT3	0.044	0.035	1.261	0.207
	MLT1	-0.076	0.038	-1.999	0.046*
	MLT2	0.055	0.036	1.540	0.124
	MLT3	0.051	0.034	1.495	0.135
	Language Background	0.016	0.007	2.264	0.024*
	School Type	0.012	0.007	1.705	0.088
	HISEI	0.037	0.013	2.942	0.003*
	Cognitive Ability	0.001	0.015	0.063	0.950

Note: * indicates statistical significance

According to Table 9, the regression coefficients modelling the effect of heritage language proficiency at MTP1 and MTP3 on the intercept parameter were statistically significant. The effect of the heritage language proficiency was significant and positive at MTP1 (0.275). In contrast, although insignificant, the effect turned negative at MTP2 (-0.071). Finally, the effect became statistically significant and negative at MTP3 (-0.205). On the other hand, the regression coefficients modelling the effect of majority language proficiency, German,

remained significant and positive across all MTPs (0.242 at MPT1, 0.286 at MPT2, and 0.189 at MTP3). This finding indicated that higher German proficiency scores were associated with a higher baseline in L3 English proficiency.

Moreover, the regression coefficient for the language background (-0.008) variable, whether a student is a Russian or Turkish heritage language speaker, was slightly negative yet statistically insignificant. The regression coefficient for the school type was found to be statistically significant. School type had a positive effect (0.129) on the baseline level, meaning that attending Gymnasium, the higher academic track, was strongly associated with a higher L3 English proficiency level at the baseline. The regression coefficient for the socio-economic background was found to be negative but statistically not significant (-0.025). Finally, cognitive ability seemed to positively influence the L3 English proficiency baseline, with a coefficient of 0.120, and the effect was statistically significant.

When it comes to the slope factor, which indicates the linear growth over the three MTPs, heritage language proficiency and the majority language proficiency did not appear to be important predictors for explaining the linear growth trend in L3 English proficiency over time. The *p* values obtained were statistically not significant for both predictors. The relationship between heritage language proficiency and L3 English growth was negative at MTP1 and MTP2, while the relationship at MPT3 was positive. Nevertheless, it must be noted that the obtained estimates were minimal and not statistically significant. German language proficiency had a significant negative relationship with the slope, indicating that higher German proficiency scores were associated with a slower increase or a decline in the outcome over time, nevertheless, this effect was observed only at MTP1. At MPT2 and MPT3, the impact

of German proficiency on L3 English growth turned positive, yet the obtained p values were not significant.

School type, which was a significant positive predictor of the intercept parameter, was found to be a marginally significant predictor of the slope, with a *p*-value of .08. This associated value might indicate a potential positive relationship with the slope; however, it was not conclusive. Language background was found to be a statistically significant predictor of growth over time, even though it previously did not influence the baseline. To be more specific, an estimate of 0.016 indicated that Russian-German heritage bilingual students, in contrast to Turkish-German heritage bilingual students, showed greater growth in L3 English proficiency over time.

HISEI was not found to be a statistically significant predictor of the baseline. However, HISEI was found to have a statistically significant and positive relationship with L3 English growth (0.037), indicating that socioeconomic status was associated with an increased L3 English proficiency over time (p=0.03). Finally, cognitive ability, which was found to be a significant predictor at the baseline, was not a statistically significant predictor of the L3 English growth over time.

5. Discussions

This dissertation aimed to gain insights into L3 English growth trajectories in Turkish/German and Russian/German heritage bilinguals. To this aim, the present study posed three research questions examining i) how the latent growth trajectories of heritage bilinguals in L3 English were characterised, ii) which linguistic variables and iii) extra-linguistic variables influenced the L3 English latent growth trajectories and growth rate of heritage bilinguals participating in the study. The discussions presented here are based on the three research questions. The findings are discussed in the light of key theories in the field (e.g., Cummins' interdependence and linguistic threshold hypotheses, Falk and Bardel's L2 status factor model, Rothman's typological primacy model, etc.) and the findings of previous research.

5.1. Heritage Bilingual Students' L3 English Growth Trajectories

In the present study, examining the L3 English growth trajectories of heritage bilingual participants was significant, as the findings could help determine whether the "bilingual advantage" proposed in the relevant literature (De Angelis, 2007; Jessner, 2008) existed in the sample at hand. The existence of a bilingual advantage can be scrutinised in the context of four different findings obtained in the study. These findings concerned i) the extent and direction of correlational relationships between language proficiencies—specifically the correlations between L3 English and heritage languages, ii) the extent of participants' L3 English growth trajectories and growth rate across three MTPs, iii) the extent of the contribution of heritage language proficiency to the intercept and linear slope estimates in the L3 English

growth model at three MTPs, and iv) the extent of the contribution of language background variable to the intercept and linear slope parameters in the L3 English growth model.

The results of the initial correlational analyses that were conducted for each separate MTP in a cross-sectional fashion revealed that there were relationships between heritage language proficiency, majority language German proficiency and L3 English proficiency. These relationships were found to be more substantial and robust, particularly between German language proficiency and L3 English proficiency. Although the pairwise relationships between heritage language proficiency-German language proficiency and heritage language proficiency-L3 English proficiency were found to be statistically significant, the estimates were not as substantive as the estimates obtained for the relationship between German language proficiency and L3 English proficiency. Moreover, the correlational relationship between heritage language proficiency and third language proficiency exhibited a decreasing trend over three MTPs. However, these one-directional correlations need to be interpreted carefully since correlational relationships do not mean cause-and-effect relationships. At the cross-sectional level, the findings revealed that the links between German language proficiency and L3 English proficiency were stronger. This finding corroborates the previous research findings, which demonstrated more substantial relationships between majority language proficiency, German, and third language proficiency, English.

For instance, previously, Lorenz et al. (2023) found that there was a positive association between heritage language proficiency and L3 English proficiency; however, this relationship was significantly weaker when compared to the

relationship between German language proficiency and English language proficiency. This positive relationship between German language proficiency and L3 English proficiency was observed in other studies conducted by Lorenz et al. (e.g., Lorenz et al. 2021, 2024). Likewise, the strong link between German language proficiency and English language proficiency was documented in Maluch et al. (2015) and Maluch et al. (2016). In the light of the previous research findings, the close connection between German proficiency and L3 English proficiency detected in the current study, was not surprising. This particular finding may suggest a link between institutionally supported languages, such as the majority language German and English, which receive significant emphasis in educational settings. In contrast, heritage languages are usually confined to home settings and receive relatively little institutional support.

With respect to heritage bilingual participants' L3 English growth trajectories and growth rate across three MTPs, the findings, overall, did not indicate a growth rate or trajectory. Initially, participants' baseline level was significantly positive, with a mean of 0.199. The baseline was statistically significant and different from zero. Moreover, there was a statistically significant though small variation at baseline between the participants, around 0.018 points. The mean of the linear slope, which indicated the linear growth over time, was statistically significant, slightly negative, and small. This slight negative estimate meant that there was a linear decrease of 0.061 points in L3 English scores per MTP. This finding clearly suggests that the bilingual advantage in L3 English growth was not evident in the present sample. In the growth model, had a bilingual advantage existed, this advantage would have been reflected in the rate and direction of the L3 English growth. However, no clear positive growth trend emerged in the analysis. The examination of the participants'

linear growth in the growth plot also revealed varying growth trajectories. Nevertheless, instead of a positive trend, the plot displayed a slight negative trend overall.

Furthermore, the variance of the linear slope was found to be very small and statistically insignificant. This finding suggested that, on average, heritage language students did not differ considerably in terms of L3 English growth rates across the three measurement points. Over time, their growth rates became more similar than different. Considering all these findings on baseline and growth rates in the sample, it could be safe to conclude that baseline variation was slight while the growth rate remained slightly low and negative. This finding would suggest minimal change from the baseline and no considerable variation in growth rate. Also, statistically insignificant covariance detected between the baseline level and the linear slope suggested that these two conditions were not significantly related. In other words, the initial L3 English proficiency scores did not necessarily predict participants' growth trajectory over time. For instance, a participant with a higher baseline score would not necessarily exhibit a greater degree of L3 English growth over time.

The absence of a growth pattern over time, particularly in the light of bilingual advantages echoed in the relevant literature (e.g., Bialystok, 1991; Bialystok & Barac, 2012; Cummins, 1978; Jessner, 1999; Rauch et al., 2012; Ter Kuile et al., 2011), deserves further reflection. Possible reasons for this outcome are discussed in the light of previous literature, particularly considering the impact of each linguistic and extra-linguistic variable included in the L3 English growth model.

An essential factor that might account for the lack of bilingual advantage observed in the analyses could be related to the age and educational level of the

participants. The participants involved in the study were secondary school students who were dominant in the majority language German. Previous research has so far demonstrated that even if a positive link between heritage bilingual background and additional language acquisition is detected, this link may weaken or dissolve at later stages (e.g., Hesse et al. 2008; Hopp et al., 2019; Siemund & Lechner, 2015). To illustrate, Hesse et al. (2008) was one of the earlier studies showing the facilitative impact of heritage bilingualism on subsequent language learning experiences and the results suggested that bilingual advantage exist. However, this advantage was found to be absent when students moved into secondary education.

Similarly, Edele et al. (2018) demonstrated that bilingual advantages in L3 acquisition may be more visible at the beginning of the language learning process, such as during primary school, and the facilitative impact of bilingualism may diminish over time. In the context of secondary education, in addition to advancing age and educational level, Edele et al. (2018) suggested that students may also be relatively more advanced L3 learners. Therefore, the impact of bilingual advantages might be less apparent since students have already attained considerable proficiency in L3. In other words, the accelerated process of L3 acquisition at the beginning may diminish as students continue their secondary education, and for students have become more competent L3 learners, bilingual advantages might also diminish (Edele et al., 2018).

In a similar vein, Hopp et al. (2019) initially found bilingual advantages in the early phases of L3 acquisition. The authors concluded that bilingual experience may facilitate further language acquisition, nevertheless, in the context of secondary school, their findings supported the claim that bilingual advantages diminish as

proficiency in L3 increases over time. In another study, Maluch et al. (2016) also obtained comparable findings. The cross-sectional analysis of the data demonstrated that, initially, bilingual students outperformed their monolingual counterparts in elementary school when contextual variables were controlled for. The authors concluded that this advantage was due to metalinguistic awareness that bilingual students possessed. However, at the secondary level, these advantages were found to be absent. In the light of all these findings reported by previous studies, the lack of bilingual advantage that could promote longitudinal growth might be due to the fact that the current study sampled participants from secondary education, where students advance not only in age but also in L3 English proficiency. Also, the participants in the current study can be characterised as unbalanced bilinguals, dominant in the majority language, German, and weaker in heritage languages, Russian and Turkish. Consequently, their proficiency in the respective heritage languages might be too limited to further influence L3 English acquisition in a positive way. This deduction was previously also made in a line of relevant studies, based on similar findings indicating an absence of a bilingual advantage (e.g., Lorenz et al., 2021, 2024; Siemund et al., 2024a, 2024b).

One important observation in the analyses concerning the L3 English growth was that the participants seemed to grow more homogenous, more similar than different, in terms of their growth trajectories. Previously, Lorenz et al. (2023) showed that, on a continuum from monolingualism to bilingualism, heritage bilingual participants occupied a similar position as monolingual participants, and there were no marked differences between the monolingual and bilingual cohorts. The authors reported that their model depicting relationships between a set of linguistic and extra-linguistic factors functioned similarly across both monolingual

and two bilingual cohorts, with only minor differences concerning effect sizes. The authors concluded that the three language groups were more similar than different. A similar trend for heritage bilingual students was observed in the current study.

Another important reason for the lack of a substantial L3 English growth might have to do with the extent of support that heritage languages have received in the particular context. Previous research has mostly assumed that bilingual experience can have a facilitative impact on additional language acquisition, mainly due to the effect of heightened metalinguistic awareness (Jessner, 2008; Maluch et al., 2016; Lasagabaster, 1997; Rauch et al., 2012; Thomas, 1988).

Against the background of this assumption, a strand of research conducted in heritage bilingual contexts have yielded negative or inconclusive results concerning the bilingual advantage in L3 acquisition (e.g., Hesse et al., 2008; Hopp, 2019; Hopp et al., 2019; Lorenz et al., 2021, 2023, 2024). However, a strong implication arising from this strand of research is that unless heritage languages are supported, bilingual advantage either does not appear at all or, even if it does, it fails to persist over time (Hopp et al., 2019; Lorenz et al., 2024; Maluch et al., 2016; Siemund et al., 2024a). It should be highlighted that previous research which clearly demonstrated bilingual advantages has usually been conducted in immersion environments, where heritage languages are supported (e.g., Bild & Swain, 1989; Cenoz & Valencia, 1994; Gallardo del Puerto, 2007; Muñoz, 2000; Sanz, 2000; Swain, Lapkin, Rowen, & Hart, 1990; Swain et al., 1990; Thomas, 1988).

Nevertheless, it has also been shown that, in many educational contexts including that of Germany, heritage languages may receive less attention (Elsner, 2018; Fuller, 2020) and languages can be treated as separate entities (Hopp &

Jakisch, 2020). Therefore, it might be challenging for students to maximise their bilingual potential and make use of their existing linguistic repertoire (Lorenz et al., 2024).

5.2. The Impact of Linguistic and Extra-linguistic Variables on L3 English Growth

In order to identify the possible contribution of various linguistic and extra-linguistic factors to baseline and growth in L3 English, a set of relationships was featured in a latent growth model of L3 English. The growth model considered the direction (e.g., positive or negative) and magnitude (e.g., small or substantial) of the links between the outcome variable (i.e., L3 English growth) and predictor variables (e.g., heritage language proficiency, majority language proficiency, school type, socio-economic status, cognitive ability, and language background) in a longitudinal fashion. The findings indicated that there was a good model-to-data fit based on various fit indices proposed in the literature (e.g., RMSEA, SRMR, TLI, CFI).

5.2.1. The Impact of Linguistic Variables on L3 English Growth

Cummins' hypothesis of language interdependence (1976, 1979, 2009) has been the underlying theory behind a substantial body of research investigating putative bilingual advantages. According to this hypothesis, proficiency in one language facilitates proficiency in another language. Based on this theory, the L3 English growth model proposed in the present study tested the contribution of both heritage language proficiency and majority language proficiency to gain further insights into putative bilingual advantages. According to the results of the analyses, the impact of heritage language proficiency on L3 English baseline level was initially

significant and positive, then became insignificant but negative, and finally turned significant and negative. For the longitudinal growth, the impact of heritage language proficiency at all three MTPs was found to be insignificant.

Concerning the impact of linguistic variables, Edele et al. (2018), for instance, demonstrated that while proficiency in the heritage languages exerted some positive impact on L3 English proficiency, the impact of majority language German was clearly more substantial. Further analyses on the bilingual samples revealed that only proficiency in the majority language German, instead of heritage language proficiency, accounted for heritage bilingual students' L3 proficiency. Moreover, the interaction terms of L1 and L2 were found to be insignificant in heritage language groups.

Likewise, Lorenz et al. (2021, 2023) demonstrated that the effect of heritage language on L3 English proficiency was not statistically significant. In a study, Lorenz et al. (2023) reported that heritage languages Russian and Turkish contributed little to predicting L3 English proficiency. Similarly, Lorenz et al. (2024) did not also find a measurable impact of heritage language proficiency on L3 English proficiency at any of three MTPs. The authors concluded that the participants' performance in heritage languages, Russian and Turkish, was too weak to exert any meaningful impact on L3 English proficiency. The inconclusive and non-existent contribution of heritage languages that has been widely reported in the relevant literature needs to be considered bearing this issue in mind. Likewise, heritage bilingual participants' weaker performances in their respective heritage languages might account for the lack of a positive growth trend detected in the current study.

Furthermore, according to Cummins (1976, 1979), a substantial level of

proficiency needs to be ensured, and a linguistic threshold needs to be attained in order to see the impact of interdependence. Otherwise, a positive effect would not be observable. Since the participants in the current study were more dominant in majority language German and weaker in their respective heritage languages, as evidenced by their scores in German and heritage language measures, their proficiencies in the respective heritage languages might not be developed enough to activate the positive interdependence between heritage languages and L3 English (Lorenz et al., 2021). Lorenz et al. (2023) also pointed out that due to the dominance of the majority language, German, and the overriding impact of contextual variables, the positive impact of heritage language proficiency on further language experiences might be less observable and even negative in many cases.

Concerning the longitudinal growth, the impact of the majority language, German, was small, slightly negative, and statistically significant for the first MTP, then turned out to be slightly positive but statistically insignificant for the second and the third MTP. Overall, at the baseline, there was a strong relationship, an interdependence, between proficiency in German and English. This facilitative transfer from German to English was established across several pertinent studies, which examined the links between heritage language proficiency, German language proficiency, and L3 English proficiency. For instance, Lorenz et al. (2024) demonstrated that the contribution of German proficiency to L3 English proficiency remained significant over time even though there was not a systematic pattern, yet the impact of German proficiency was more substantial than other predictors. The authors concluded that the relationship between German proficiency and L3 English provided support to Cummins' interdependence hypothesis (1976, 1979). However, an interdependence was not observed for heritage languages. The same situation was

previously captured in Lorenz et al. (2023), where the interdependence between German and English was more substantial than the interdependence between heritage languages and English. Similarly, Lorenz et al. (2021) showed that there was a positive relationship between L3 English proficiency and the majority language German proficiency.

In another study, Edele et al. (2018) found that heritage bilingual students who did not have high proficiency in L2 German had disadvantages in L3 English acquisition, regardless of their proficiency in L1. The authors also found that in the bilingual samples, only L2 German proficiency explained L3 English proficiency, and therefore, they concluded that heritage bilinguals mainly draw on their L2 competence while acquiring their L3. The authors commented that they were not able to find further advantages of bilingualism on L3 acquisition in contrast to their previous hypothesis that having a bilingual background would result in an increased metalinguistic awareness, which would facilitate additional language acquisition.

In a similar vein, Maluch et al. (2015) demonstrated that the majority language, German, had an essential role in the attainment of L3 English. Further analyses revealed that while heritage bilinguals with strong German skills had advantages in L3 English, bilinguals who were weak in German did not perform well in L3 English. Moreover, once German proficiency was considered, almost all bilingual groups had advantages in L3 English achievement, and proficiency in German accounted for a substantial part of the variance in L3 English scores. In a separate study, Maluch et al. (2016) found that heritage bilingual background brought advantages when bilinguals were mostly exposed to German at home, suggesting that higher L3 achievement was due to relatively higher German proficiency. Overall, the findings

of these studies seem to be consistent with those of the current study, which demonstrated the impact of German proficiency, particularly at the baseline.

5.3. The Impact of Language Background

In the current study, language background was featured in the L3 English growth model as a predictor for the L3 baseline and linear growth. Language background variable referred to having either a Russian or Turkish heritage language. Given that previous literature has suggested that all bilingual groups do not act as one homogenous group and may function differently (Lorenz et al., 2021, 2024; Siemund et al., 2024a), such a distinction was added to the L3 growth model.

The findings of the present study indicated that the language background variable was slightly negative yet statistically not significant at the baseline. However, it turned out to be a statistically significant positive predictor of the L3 English growth over time. Particularly, an estimate of 0.016 suggested that Russian/German bilingual students, when compared to their Turkish/German bilingual counterparts, demonstrated increased growth in L3 English proficiency over time. The estimate was small yet indicated a difference between both groups.

Previously, Lorenz et al. (2024) demonstrated that language background was not a significant variable at the first measurement point, while at the second measurement point, Turkish/German bilingual group differed from the monolingual German group and Russian/German bilingual group. Furthermore, their findings revealed that at the third measurement point, the language group was once again a main effect and belonging to Russian/German or German monolingual group influenced L3 English scores more positively when compared to belonging

Turkish/German group. The authors concluded that language background was not a significant variable at the first measurement point, conditionally significant at the second measurement point, and significant at the last measurement point. Likewise, in Lorenz et al. (2024), Turkish/German bilingual group functioned differently than their monolingual German and bilingual Russian/German counterparts and belonging to the Turkish/German group was associated with a negative impact on L3 English proficiency. Hence, the finding of the present study concerning the language background variable appears to lend support to the findings reported in Lorenz et al. (2024).

Several studies have also highlighted the influence of a Turkish/German background on additional language learning experiences and general academic attainment. Lorenz et al. (2024), for instance, hypothesised that this might be due to the variation particularly in cognitive ability scores, an issue which was previously discussed in Siemund et al. (2024a) and Siemund et al. (2024b). In Lorenz et al. (2023), for instance, an interdependence effect between heritage language proficiency and L3 English was found the in Russian/German group. In contrast, this effect was not identified in the Turkish/Russian group. Maluch et al. (2015) also reported that when the Turkish/German bilingual group in their study was compared to other bilingual and monolingual groups in terms of L3 English attainment, after controlling for background factors, this particular group had a slight bilingual advantage, nevertheless, this difference was not found to be significantly different from the monolingual control group.

Differences across Turkish/German and Russian/German heritage bilingual groups were also documented by Edele et al. (2018), who reported that balanced

bilinguals in the Russian/German cohort outperformed their monolingual counterparts while balanced bilinguals in the Turkish/German cohort scored slightly higher than the monolingual German cohort, yet this difference was not found to be significant. According to Edele et al. (2018), an essential factor leading to the differences between Turkish/German and Russian/German bilingual groups and placing the latter in a more advantageous situation might have to do with the linguistic distance between German, Russian, Turkish, and English. To be more specific, Russian, German, and English belong to the Indo-European language family, while Turkish is a Turkic language. Edele et al. (2018) pointed out that the distance between English and German is small, while the distance between English and Russian is intermediate. The distance between Turkish and English is the largest. This situation may also account for the differences obtained in the language background variable, putting the Turkish/German bilingual group in a more disadvantaged position (Edele et al., 2018).

According to Rothman's typological primacy model (2011, 2015), cross-linguistic influence is closely related to language distance, which means that close typological proximity between languages would boost cross-linguistic influence (Rothman, 2013). Taking the linguistic distance between Turkish and English, and Russian and English into consideration, a relatively intermediate distance between Russian and English when compared to a relatively large distance between Turkish and English might also have led to the differences between bilingual groups in this study.

Akoğlu and Yağmur (2020) also discussed the possible reasons concerning a lack of interdependence effect in the Turkish/German cohorts, particularly in the

studies conducted within the Dutch and German context. The authors investigated whether there was a gap between first-language skills of heritage bilingual children raised in the Netherlands and monolingual Turkish children raised in Türkiye, how homogenous was the bilingual group particularly in lexical, syntactic, and textual skills, and whether there were any links between parental language input and education. The findings indicated that there were highly significant differences between the monolingual and bilingual cohorts in terms of attainment in Turkish. However, the findings revealed that the heritage bilingual group was not homogenous. Although the performance of the bilingual cohort was significantly lower than the monolingual cohort, there were also high achievers in the bilingual sample. Moreover, the study demonstrated that there was a significant relationship between mothers' level of education and the students' performance. The authors concluded that the lack of interdependence and underachievement reported in the Turkish origin cohorts might have to do with subtractive bilingual contexts, educational environments favouring a monolingual approach, and extra-linguistic parental factors such as socioeconomic background and educational background.

The possible impact of these factors on the absence of interdependence in the Turkish/German cohort have previously been discussed in Siemund et al. (2024a, 2024b) and Lorenz et al. (2021, 2023, 2024), who obtained comparable results. The impact of extra-linguistic variables has been shown to influence language acquisition to a considerable extent in the relevant literature, in some cases even overriding the impact of linguistic factors (Berthele & Udry, 2022; Lorenz et al., 2023; Siemund et al., 2024a, 2024b). Therefore, in the context of the present study, the difference between the two cohorts in terms of L3 English growth might be due to these differences in extra-linguistic factors as well.

5.4. The Impact of Extra-Linguistic Variables on L3 English Growth

Previous research has demonstrated that additional language acquisition is a highly multifaceted process (Cenoz, 2003, 2013b). Relevant research also suggested that this process could be affected considerably by various factors including cognitive ability, socioeconomic status, quantity of input, quality of input, frequency of use, family size, parental education, parents' language proficiency, family attitudes, birth order, chronological age, and age of onset, particularly in the context of heritage bilingualism (Armon-Lotem et al., 2021; Hayakawa et al., 2022; Montrul, 2018; Paradis, 2023; Polinsky & Scontras, 2020; Rinke et al., 2019).

To illustrate, Lorenz et al. (2023) demonstrated that the impact of linguistic factors on L3 English proficiency, specifically the impact of heritage languages, was dwarfed by extra-linguistic factors. The authors tested models featuring various extra-linguistic factors such as cognitive ability, school type, socio-economic status, and gender. The authors found that extra-linguistic factors, except for gender, predicted L2 German and L3 English proficiency to a great extent. Their findings highlighted the significance of extra-linguistic factors on the attainment in L3 English.

In the context of the present study, the potential impact of contextual factors, such as cognitive ability, school type, language background, and socioeconomic status was also tested. The findings concerning language background have been discussed previously since this variable mainly has a linguistic focus.

5.4.1. Cognitive Ability

The impact of cognitive ability on additional language acquisition has been examined in a great many studies since the inception of standardised IQ tests in the 1920s (Hakuta & Diaz, 1985; Siemund, 2023). While earlier research carried out before Peal and Lambert (1962) documented the cognitive disadvantages associated with a bilingual background, studies conducted in the later years primarily focused on the relationships between language acquisition and cognitive ability. These studies took notions such as, common underlying proficiency (Cummins, 1976), metalinguistic awareness (Jessner, 2008), and general cognitive ability (Genesee, Geva, Dressler, & Kamil, 2006) into account.

More recently, the effect of a multilingual boost or a general cognitive ability on additional language acquisition has been investigated in several studies (e.g., Berthele & Udry, 2022; Daller & Ongun, 2018; Siemund et al., 2024a, 2024b). Additionally, there is a line of research which treated cognitive ability as a confounding factor in their designs and controlled for the variable (e.g., Edele et al., 2018; Hopp et al., 2019; Maluch et al., 2015). In the present study, the possible impact of cognitive ability on L3 English baseline level and L3 English growth rate was tested. The findings demonstrated that at the baseline level, cognitive ability was a statistically significant factor contributing positively to L3 English attainment (0.120). The impact of cognitive ability was comparable to the impact of school type, another critical predictor at the baseline. However, for the slope parameter, the variable did not significantly contribute to growth in L3 English. In other words, cognitive ability was associated with differences in the initial level of L3 English proficiency and contributed positively to the baseline but did not significantly

influence the rate of change in L3 English proficiency over time.

The relationship between cognitive ability and L3 English attainment was previously investigated by Lorenz et al. (2024) in the context of heritage bilingualism. The authors demonstrated that in the bilingual sample, cognitive ability influenced L3 English proficiency at the MTP1 and MTP3, while standardised estimates remained lower than 0.2. The finding that cognitive ability contributed positively to the L3 English baseline is in line with the findings reported by Lorenz et al. (2024). Since managing multiple languages is assumed to be a cognitively demanding task (Cummins, 1979), it seems reasonable that bilinguals with higher cognitive ability are better able to deal with the task of acquiring languages when compared to their bilingual counterparts with lower cognitive ability (Siemund, 2024b). This very idea has been echoed in Cummins' notion of cognitive academic language proficiency as well (Cummins, 2000).

5.4.2. School Type

The present study demonstrated that school type was a statistically significant variable exerting a positive impact on L3 English proficiency at the baseline. This finding meant that attending Gymnasium, the higher academic track, was strongly associated with a higher L3 English proficiency level when compared to attending relatively lower academic tracks, such as Realschule or Hauptschule. Moreover, school type was found to be a marginally significant predictor for the L3 English growth. Previous research also suggested that school type, whether students attend a higher academic track or a lower academic track, exerts an impact on their academic achievements to a great extent (e.g., Lorenz et al., 2023; Edele et al., 2018). To

illustrate, Lorenz et al. (2024) found that school type was a significant predictor in all models they tested, either as a main effect or in interaction. A similar observation was made in an earlier study conducted by Lorenz et al. (2023). Their findings demonstrated that school type was an important contextual factor that influenced additional language acquisition. The results of both current study and those of previous studies seem to be in line. Attending higher academic track schools appears to enhance both academic achievement and further language learning experiences (Ardasheva, Tretter, & Kinny, 2012; Lechner & Siemund, 2014).

5.4.3. Socioeconomic Status

Another contextual variable whose impact was tested in the L3 English growth model was socioeconomic status. Initially, socioeconomic status was not found to be a statistically significant predictor at the baseline, nevertheless, it had a statistically significant and positive relationship with the growth, meaning that socioeconomic status was associated with an increase in L3 English proficiency over time.

In the relevant literature, socioeconomic status has been considered a significant factor that affects language acquisition in general and L2/L3 acquisition in particular (Berthele & Udry, 2022; Hesse et al., 2008; Lechner & Siemund, 2014; Maluch et al., 2015; Maluch & Kempert, 2019). It has been argued that heritage bilingual students usually have heterogeneous linguistic profiles based on their socioeconomic background (Edele et al., 2018; Maluch & Kempert, 2019). Therefore, that is the reason the socioeconomic variable remains a significant variable whose impact is tested or controlled for in numerous studies investigating bilingual advantages (e.g., Cenoz & Valencia, 1994; Edele et al., 2018; Hesse et al., 2008; Hopp et al., 2019;

Siemund et al., 2024b).

However, findings concerning the impact of socioeconomic status remain relatively inconclusive in the relevant literature (Lorenz, Feindt, Rahbari, & Siemund, 2022). To illustrate, Siemund et al. (2024b) showed that the impact of socioeconomic status on L3 English and L2 German proficiency was not consistent. The effect of socioeconomic status was not statistically significant in the low cognitive ability group for both L2 German and L3 English proficiency and for L3 English proficiency in the high cognitive ability group. The impact of socioeconomic status was significant and positive in the mid-cognitive ability groups and in the high-cognitive ability group for L2 German proficiency.

Similarly, in Lorenz et al. (2023), the impact of socioeconomic status on both L2 German and L3 English proficiencies was inconclusive, varying across models that were tested. The authors concluded that including socioeconomic status as a predictor to explain additional language acquisition was an essential step, yet maintained that more research was needed to fully grasp its contribution and relevance. The finding reported in the present study concerning socioeconomic status appears to be in line with previous research, which have mainly reported the varying influence of the variable on L2 and L3 acquisition.

6. Conclusions

The present study aimed to examine the longitudinal growth in L3 English and the potential variables that might influence the L3 English growth in heritage bilingual students in the context of German secondary education. The study utilised a national sample of Russian/German and Turkish/German heritage bilingual students who participated in the MEZ project, which lasted around one and a half years (Mehrsprachigkeitsentwicklung im Zeitverlauf [MEZ], 2014–2019; Gogolin et al., 2017).

The present study identified the L3 English growth trajectories and longitudinal growth rate of heritage bilingual students in the context of heritage bilingualism and third language acquisition. This intersection of multilingualism research is particularly worth exploring further since it has received comparatively less scholarly attention and produced relatively inconclusive findings (Maluch et al., 2015). Furthermore, rather than embracing the traditional monolingual vs. multilingual comparison perspective, the present study focused on a national bilingual sample that comprised Russian/German and Turkish/German heritage bilingual students.

Additionally, from a methodological perspective, the present study utilised a longitudinal approach to examine the L3 English development of the bilingual cohorts by investigating the impact of a set of linguistic (heritage language proficiency, majority language proficiency, and L1 background) and extra-linguistic (cognitive ability, socio-economic status, and school type) factors which may influence the longitudinal L3 English development. As such, this longitudinal study aimed to contribute to a growing body of research which examined the links between

heritage bilingualism and third language acquisition (e.g., Hopp et al., 2019, Hopp, 2019; Lorenz et al., 2021, 2023, 2024; Schnoor & Usanova, 2023; Siemund et al., 2024a, 2024b).

Since it is often necessary to go beyond the traditional statistical methods like regression and ANOVA to fully understand the complex longitudinal data (Boscardin, Sebok-Syer, & Pusic, 2022), the present study specifically used the LGCM methodology in the context of SEM approach. This methodological choice could be viewed as a significant contribution to the field, considering the paucity of studies focused on longitudinal development in multilingualism research (Hopp et al., 2019; Lorenz et al., 2024; Maluch et al., 2016). The latent growth curve modelling methodology made it possible to i) examine the growth trajectories in L3 English over time, ii) gain deeper insights into potential relationships between linguistic, extra-linguistic variables and the dependent variable (L3 English growth), and iii) explain the growth with time.

Before moving on to the primary analyses, the longitudinal data were analysed by using a set of descriptive and inferential statistics. Particularly, a set of *t*-tests were computed to determine whether the differences observed in the descriptive analyses were statistically meaningful. Moreover, a set of correlational analyses were carried out to understand the relationship between linguistic variables, notably heritage language proficiency, majority language proficiency, and third language proficiency. These initial descriptive analyses revealed that the mean scores for heritage language proficiency were comparably low, while the mean scores for German language proficiency were comparably higher. Also, there was an increasing trend in German proficiency. Additionally, the results indicated that heritage bilingual students were mainly dominant in the majority language, German.

Furthermore, the independent samples t-test results demonstrated the availability of statistically significant differences between the Turkish/German and Russian/German groups for cognitive ability, socio-economic status, and heritage language proficiency. While the Turkish/German group scored lower than the Russian/German group for cognitive ability and socio-economic status, the group outperformed the Russian/German group in heritage language proficiency. Nevertheless, no statistically significant differences were observed between the two cohorts in terms of majority language, German proficiency, and L3 English proficiency.

The correlations computed at each measurement time point for linguistic variables revealed statistically significant positive correlations between heritage language proficiency, German language proficiency and L3 English proficiency across all three MTPs. Nevertheless, the strength of these relationships varied. On the one hand, the correlations between heritage language proficiency and German language proficiency were found to be weak. Likewise, correlations between heritage language proficiency and English language proficiency were also found to be weak. On the other hand, correlations between German language proficiency and English language proficiency were comparably more substantial, lending support to the L2 status factor model (Bardel & Falk, 2007, 2012).

The primary analyses, the latent growth curve modelling analyses, aimed to examine the growth trajectories of the heritage bilinguals and the growth rate in L3 English across the three MTPs. Furthermore, potential relationships between the growth rate in L3 English and the variables of interest (i.e., a set of linguistic and extra-linguistic factors including heritage language proficiency, German language proficiency, socio-economic status, cognitive ability, school type, and heritage

language background) were examined. The latent growth curve modelling results showed that the baseline, the initial level of L3 English, was significantly positive. At the same time, there was a slight yet statistically significant variation at the baseline in L3 English scores. Interestingly, the mean of the linear slope, which stands for the linear rate of growth, was found to be slightly negative. This small yet statistically significant estimate indicated that the growth line was slightly moving down, with scores decreasing by 0.061, on average, across the three MTPs. This finding suggested that a bilingual advantage was not present in the sample at hand. Moreover, the variance of the slope was found to be very small and statistically not significant, meaning that individual heritage bilingual students in the sample did not vary considerably in terms of their L3 growth trajectories over time. The covariance between the intercept and the slope factor was also not statistically significant, meaning that heritage bilingual students' initial L3 English proficiency scores did not necessarily predict their L3 English growth trajectory across three measurement time points.

Since the latent growth curve modelling in the context of SEM makes it possible to examine the potential relationships between variables of interest, a latent growth model featuring all relevant linguistic and extra-linguistic variables was fitted to the longitudinal data. The model-to-data fit was found to be good, as indicated by the indices obtained. A set of regression coefficients, which established the relationship between the variables of interest, the intercept parameter and the slope parameter were estimated as a part of the growth model. The analyses revealed that the effect of heritage language proficiency on the intercept was positive first at the MTP1, negative and not significant at MTP2, and negative and significant at MTP3. The effect of the majority language proficiency, German, was significant and positive

across all three MTPs, which meant having higher German proficiency scores was associated with a higher baseline in L3 English proficiency. When it comes to extra-linguistic variables, the effect of the school type was statistically significant, meaning that attending Gymnasium, the higher academic track, was strongly associated with a higher L3 English proficiency level. The effect of socio-economic background was negative but statistically not significant. The influence of cognitive ability was positive and statistically significant.

The results concerning the slope parameter, which indicates the linear growth over the three MTPs, revealed that both heritage language proficiency and the majority language proficiency did not seem to predict the linear L3 English growth over time. The *p* values that were obtained were statistically not significant for both predictors. German language proficiency had a slightly negative relationship with the slope, yet this applied to the German scores only at the MTP1. At MPT2 and MPT3, the impact of German proficiency on growth turned positive, while the estimates were not statistically significant. School type remained a marginally significant predictor for growth.

Moreover, the findings revealed that language background was a statistically significant predictor of L3 English growth, indicating an advantage for the Russian/German group when compared to the Turkish/German group. HISEI also had a statistically significant and positive relationship with the L3 English growth. Finally, cognitive ability, which had a positive influence at the baseline, was found not to contribute to L3 growth over time.

Since the present study focused on a bilingual sample to understand the L3 growth in the context of heritage bilingualism, examining the potential links between heritage bilingualism and L3 English growth and questioning whether a bilingual

advantage existed was essential. The presence of a bilingual advantage could be inferred in the extent and direction of correlational relationships between the heritage language proficiency and L3 English proficiency, the extent of heritage bilingual participants' L3 English growth trajectories and growth rate over time, the contribution of HL proficiency to L3 English baseline and growth, and the contribution of language background variable to L3 English baseline and growth.

The results of the correlation analyses revealed that there was a positive relationship between heritage language proficiency and L3 English proficiency. However, these relationships were not found to be substantial and exhibited a decreasing pattern over time. Moreover, it should be noted that the correlational relationships were one-directional and cross-sectional, estimated for each MPT. In a longitudinal design, these effects would turn out to be different, and the relationship may differ, as indicated in the results of the latent growth curve analysis.

The findings concerning the L3 English growth trajectories and growth rate also suggested that there was not a positive trend in L3 English growth. Previously, relevant research has suggested that a bilingual background could enhance additional language learning experiences, such as third language acquisition, mainly as a result of increased metalinguistic awareness in bilingual individuals (De Angelis, 2007; Jessner, 2008). In the context of the present study, if a bilingual advantage persisted, one would expect a positive pattern. However, such a pattern was absent in the sample at hand. The examination of the growth plot also indicated differences across growth trajectories, yet overall, there was a slight decreasing pattern in the general sample. The finding concerning the statistically insignificant covariance between the baseline level and the linear slope was also worth further consideration. This particular finding hinted that the initial L3 English scores did not necessarily predict

the growth trajectory over time.

Several factors may account for the emergence of these results. A key factor leading to a lack of bilingual advantage might be that the participants in this study were unbalanced bilinguals, dominant in the majority language, German, and comparably weaker in their respective heritage languages, Turkish and Russian. This observation was also previously made in a line of research conducted by Lorenz et al. (2021, 2023, 2024) and Siemund et al. (2024a, 2024b), demonstrating that the participants' proficiency in the heritage languages might be too low to exert any facilitative effect on L3 English proficiency.

The lack of a growth pattern in L3 English acquisition might also have to do with the influence of extra-linguistic, i.e., contextual, factors. Relevant literature has demonstrated that L3 acquisition can be considerably affected by extra-linguistic variables, including socioeconomic status, cognitive ability, and educational background (Berthele & Udry, 2022; Cenoz, 1991, 2003; Edele et al., 2018; Hesse et al., 2008; Lasagabaster, 1997; Maluch & Kempert, 2019; Muñoz, 2000; Sanz, 2000; Siemund et al., 2024a, 2024b). Cognitive ability, particularly, has been found to exert an impact on L3 attainment (Berthele & Udry, 2022; Lorenz et al., 2024; Siemund et al., 2024b, 2024b).

Even though findings concerning the impact of socio-economic status have been mainly inconclusive (Lorenz, Feindt, Rahbari, & Siemund, 2022; Siemund et al., 2024b), school type, particularly attending higher-academic track schools, such as Gymnasium, has been shown to be an influential factor, contributing positively to multilingual development (Lorenz et al., 2024). The findings of the present study indicated that cognitive ability and school type had a positive influence on the baseline. School type and HISEI variables had a positive impact on the L3 English

growth.

Another crucial factor leading to the lack of a growth pattern in L3 English in the current sample could be the age and educational level of the participants. The participants were secondary school students; therefore, at this stage, the positive impact of heritage language proficiency might have weakened. Providing support for this possibility, a growing body of literature has suggested that the facilitative impact of bilingualism dissolves at the later stages. For instance, Hesse et al. (2008), Edele et al. (2018), Maluch et al. (2016), and Hopp et al. (2019) produced similar findings which demonstrated that bilingual advantages were not observed at secondary school level and/or previously existing advantages diminished over time.

Notably, the significance of the language background variable, which indicated an advantage for the Russian/German heritage bilingual group when compared to the Turkish/German bilingual group, is worthy of further consideration. This finding was documented previously in several studies, which usually attributed the difference to variations in cognitive ability scores or socioeconomic background (Maluch et al., 2015; Lorenz et al., 2024; Siemund et al., 2024b). Likewise, the t-test results in the present study indicated significant differences between the Turkish/German and Russian/German cohorts in the cognitive ability and socioeconomic status variables. However, another crucial factor which might lead to the difference between the two bilingual cohorts might be the linguistic distance between the languages of interest (Edele et al., 2018). According to the typological primacy model (Rothman, 2011), cross-linguistic influence is closely related to language distance. Consequently, close typological proximity between languages could facilitate cross-linguistic influence. As such, the relatively intermediate distance between Russian and English, when compared to the considerable distance between Turkish and English, might also have

influenced the outcome in our sample.

Overall, the lack of a bilingual advantage demonstrated in the present study might have to do with the present landscape of the German secondary education system, which has been described as predominantly adhering to a monolingual ideology, viewing foreign languages in isolation and excluding languages other than English (Gogolin, 2021; Hopp & Jakisch, 2020; Lorenz et al., 2024). In this context, it is safe to posit that students are unlikely to make use of their multilingual repertoire, especially their heritage languages (Lorenz et al., 2021, 2023, 2024). Taking all these factors into account, the pedagogical implications of the current findings for educational, societal, and home settings have been presented in the next section. These implications are presented in line with relevant frameworks and theories proposed in the relevant literature.

6.1. Pedagogical Implications

It has long been considered that having a bilingual background exerts a facilitating impact on additional language acquisition, mainly as a result of the heightened metalinguistic awareness that bilingual individuals are assumed to have (Berthele & Udry, 2022; Jessner, 2008; Maluch et al., 2016; Lasagabaster, 1997; Rauch et al., 2012; Thomas, 1988). However, research examining the impact of having a bilingual background on further language acquisition seems to produce inconclusive results concerning bilingual advantages.

Particularly, research conducted in immersion settings such as Canada and Spain usually revealed bilingual advantages in additional language acquisition (e.g., Bild & Swain, 1989; Cenoz & Valencia, 1994; Gallardo del Puerto, 2007; Muñoz, 2000; Sanz, 2000; Swain, Lapkin, Rowen, & Hart, 1990; Thomas, 1988), whereas

research conducted in monolingual European contexts has yielded relatively inconclusive results (Edele et al., 2018; Hopp et al., 2019).

Regardless of whether results are positive or negative, one significant implication arising from both previous research and the current study has been that multilingual development or a multilingual boost is not unconditional, and heritage languages need to be supported to help students fully access their multilingual repertoire (Berthele & Udry, 2022; Lorenz et al., 2021, 2023, 2024). Moreover, both previous research and the current study have clearly demonstrated that in contexts where heritage languages are not supported, a bilingual advantage does not appear at all, or even if it appears, it does not persist over time (Hopp et al., 2019; Lorenz et al., 2024; Maluch et al., 2016; Siemund et al., 2024a, 2024b).

In the German educational context where the study was conducted, students generally start learning a foreign language, usually English, when they are in the third or fourth grade of primary school. Moreover, heritage bilingual students can receive formal instruction in their heritage languages, depending on the provisions in different states. In some states, curricular requirements for languages mention that heritage languages should also be considered to boost metalinguistic awareness in students (Hopp et al., 2020).

In practice, however, particularly at the secondary level of education, the system has been described as mainly opting for a monolingual approach (Gogolin, 2021). Moreover, in English language classes, German and other foreign languages, along with heritage languages, do not receive much attention (Elsner, 2018; Fuller, 2020; Lorenz et al., 2024). Languages are usually considered in isolation, while heritage languages can be discouraged not only in classrooms but also at a societal level (Lorenz et al., 2024). Hence, it might be challenging for students with heritage

bilingual backgrounds to exploit their bilingual advantage and make use of their linguistic repertoire fully. According to the Dynamic Model of Multilingualism of Herdina and Jessner (2002), for instance, multilingual competence emerges due to interactions between the psycholinguistic systems of languages that exist in a person's linguistic repertoire. However, it seems that "normative monolingualism" (Fuller, 2020, p. 171), which appears to be widely practised in our current context, makes it difficult to activate the so-called M (multilingualism) factor (Herdina & Jessner, 2002).

Moreover, the emergence and development of the M-factor would depend on the amount of linguistic input available to individuals and the degree of explicitness in language instruction (Berthele & Udry, 2022). Consequently, an educational environment which provides a few hours of lessons weekly may not deliver the optimum conditions for ensuring a multilingual boost (Berthele & Udry, 2022). Thus, more practical efforts are needed to ensure that multilingual development is fostered in language classes.

Hence, in the context of the multilingual shift in educational settings (May 2014), where multilingual teaching is now being considered an effective way to make the most of students' linguistic repertoire (Krumm & Reich, 2016), adopting a multilingual and plurilingual approach would be highly meaningful. Such an approach would support the multilingual development of heritage bilingual individuals by highlighting the cross-linguistic differences and similarities across languages (Hopp & Thoma, 2021). Similarly, Lorenz et al. (2024) proposed that a holistic approach that makes use of students' linguistic repertoire and focuses on translanguaging rather than a "normative monolingualism" (Fuller, 2020, p. 171) would contribute considerably to the multilingual development in both monolingual

and bilingual students.

Taking the popularity of English in the German context into account, multilingualism can be incorporated into English language classes to help students fully exploit their linguistic repertoire. Hopp et al. (2020), for instance, proposed that creating contexts for multilingual EFL lessons, generating methods, materials, and activities for multilingual EFL teaching, abandoning monolingualism in FL classrooms, and reconsidering the role of the teacher would support multilingualism in language classes. Hopp et al. (2020) also drew attention to the role of teachers in multilingual classrooms and maintained that teachers' mindset and willingness to incorporate multilingualism in their classrooms are vital to multilingual teaching.

Hopp et al. (2020) further proposed a framework of "Multilingual language (learning) awareness", which relies on the distinction between language analysis and language control (p. 151). While the language analysis dimension features the knowledge of languages and the ability to represent abstract linguistic structures, the language control dimension features the ability to deal with linguistic elements and control attention when using cognitive and executive skills. Thus, multilingual competence can be promoted by addressing language analysis and language control dimensions of multilingual language learning awareness.

Furthermore, multilingual competence could be considered as being related to students' multilingual identity development and the contribution of teachers, school authorities, and materials developers. In line with this notion, Martinez (2015), to illustrate, proposed a set of practices which would facilitate multilingual approaches in language classes. These practices include methods for linking previously acquired languages, methods for cross-linguistic learning, across- and within-language transfer and intercomprehension, multilingual mediation, integrating heritage

languages, promoting language reflection and awareness, promoting metacognitive knowledge, supporting learner motivation, and supporting flexibility, openness and curiosity towards languages and cultures.

Concisely, to support multilingual competence and multilingual development, the following actions could be taken in educational, societal, and home settings. In educational settings, language curricula may be arranged so as to include translanguaging approaches, which motivate students to use all their linguistic resources and aim to support development in multiple languages (Cenoz & Gorter, 2021). Language educators can re-examine the traditional ways of teaching languages in isolation and consider alternative approaches to language learning, such as "Focus on Multilingualism" (Cenoz, 2013b). According to the "Focus on Multilingualism" approach, multilinguals differ from monolinguals and are not expected to attain equal proficiency in all languages in their multilingual repertoire (Cenoz & Gorter, 2021). Thus, language classes should soften the boundaries between languages and facilitate cross-linguistic comparisons to foster metalinguistic awareness (Hopp & Thoma, 2021). Likewise, there is a need to revisit existing language learning materials and develop new ones which address the needs and resources of multilingual students since language curricula and materials have often been generated for monolingual students (Hopp et al., 2019).

Societal attitudes towards the status and benefits of particular languages have been shown to influence linguistic outcomes considerably (Quay & Chevalier, 2019). Therefore, in societal settings, individuals should recognise the value of multilingualism and consider it a powerful tool for protecting the diversity and richness of languages and cultures (Bartelheimer et al., 2019). Embracing multilingualism would not only promote inclusivity and tolerance but also support

the acquisition and maintenance of heritage languages, which can be relatively underrepresented in society.

Concerning fostering multilingualism in a home environment, the impact of quantity and quality of input (e.g., caregiver discourse styles) on multilingual outcomes is considerable, particularly in the context of heritage language acquisition (Quay & Chevalier, 2019). When children with bilingual backgrounds start attending school, they usually become more dominant in the majority language, which is also the language of instruction and society. Hence, heritage languages need to be fostered in home environments with input of sufficient quality and quantity. For instance, caregivers may increase the quality of input by exposing children to speech, books, and storytelling in heritage languages (Quay & Chevalier, 2019). Additionally, in an increasingly digitised world, the use of digital family language practices such as instant messaging, video calls, and emails can also foster multilingualism, if these digital family language practices incorporate translanguaging to some degree (Lanza & Lexander, 2019).

6.2. Limitations and Future Research

The present study has several limitations which are worth mentioning. This section elaborates on these limitations and how future research can address them.

Previous research has suggested that bilingual advantages in L3 acquisition might be more prominent at the beginning of additional language acquisition, the positive impact of bilingualism may diminish over time, and the secondary school education context may yield more homogenous groups (Edele et al., 2018). The fact that the present study featured participants from the secondary school context who were relatively proficient in L3 English, thus, could be considered a limitation. More

research efforts that particularly target bilingual children at primary education and kindergarten levels, where a bilingual advantage could be more marked, would be beneficial.

Moreover, even though the participants in the present study had taken a so-called locator test to ensure they had sufficient proficiency in their respective heritage languages, the participants seemed to be more dominant in the majority language, German and weaker in heritage languages. This case was evident in the scores obtained by the participants on measures concerning heritage language proficiency. Since previous research has also suggested that a bilingual advantage could manifest itself in the case of balanced bilingualism, future research could focus more on balanced heritage bilingual groups to investigate whether the bilingual advantage is available.

The L3 English growth model proposed in the study featured a set of linguistic and extra-linguistic variables. Of these variables, cognitive ability was measured only at the MTP1. Based on previous research, it was assumed that the cognitive ability variable is relatively stable and would not change considerably across the three MTPs over one and a half years. Furthermore, socioeconomic status was operationalised based on the parental occupation. However, expanding the scope of the socioeconomic status variable by adding dimensions such as cultural capital and monthly income would definitely be more helpful.

Moreover, the way the proficiency in heritage languages and L3 English were assessed was different. To be more specific, while reading comprehension scores served as a proxy for the heritage language and majority language proficiency, C-test scores were used as a proxy for proficiency in L3 English. Furthermore, the present study did not employ any instruments for the assessment of metalinguistic

awareness or language aptitude in bilingual participants. Since bilinguals are considered to have enhanced metalinguistic awareness and cognitive advantages in executive functions, future research may benefit from adding various instruments that measure these crucial qualities to their design.

Despite these limitations, the present study has several strengths. First, the present study aimed to contribute to a growing body of research on English as an additional language acquisition by mainly focusing on L3 English longitudinal growth in contrast to studies that mostly focused on one-shot assessment of additional language proficiency. Second, rather than adopting the common approach of comparing bilinguals with monolinguals, the present study focused on a heritage bilingual sample consisting of two different heritage language cohorts. Third, from a methodological perspective, the present study used a longitudinal design instead of a cross-sectional one. It relied on a longitudinal quantitative method, namely the latent growth curve modelling, for the analysis of the longitudinal data. Thus, it is hoped that the present study contributes to a growing body of multilingualism research, which investigates the links between bi/multilingualism and (English) additional language acquisition in the context of heritage bilingualism.

References

Abu-Rabia, S. (2001). Testing the interdependence hypothesis among native adult bilingual Russian-English students. *Journal of Psycholinguistic Research, 30*, 437–455.

Adesope, O., Lavin, T., Thompson, T., & Ungerleider, C. (2010). A systematic review and meta-analysis of the cognitive correlates of bilingualism. *Review of Educational Research*, *2*(80), 207–245.

Akoğlu, G., & Yağmur, K. (2020). First-language skills of bilingual Turkish immigrant children growing up in a Dutch submersion context. In M. Schwartz, Å. Palviainen (Eds.), *21st century pre-school bilingual education* (pp. 104–119). Routledge.

Albert, M. L., & Obler, L. K. (1978). *The bilingual brain: Neuropsychological and neurolinguistic aspects of bilingualism.* Academic Press.

Alonso, J. G., Rothman, J., Berndt, D., Castro, T., & Westergaard, M. (2017). Broad scope and narrow focus: On the contemporary linguistic and psycholinguistic study of third language acquisition. *International Journal of Bilingualism*, *21*(6), 639–650.

Ansó Ros, J., Maijala, M., & Maijala, N. (2024). The role of the teacher in heritage language maintenance courses in Finland. *Journal of Multilingual and Multicultural Development*, *45*(2), 522–535.

Ardasheva, Y., Tretter, T. R., & Kinny, M. (2012). English language learners and academic achievement: Revisiting the threshold hypothesis. *Language Learning, 62*(3), 769–812.

Armon-Lotem, S., Rose, K., & Altman, C. (2021). The development of English as a heritage language: The role of chronological age and age of onset of bilingualism. *First Language*, *41*(1), 67–89.

Arnaus Gil, L., & Jiménez-Gaspar, A. (2022). The role of internal and external factors for code-switching: A study of early multilingualism in Germany with special reference to Catalan as a heritage language. *Languages*, *7*(4), 258.

Aronin, L., & Singleton, D. (2008). Multilingualism as a new linguistic dispensation. *International Journal of Multilingualism*, *5*(1), 1–16.

Baker, C. (2001). *Foundations of bilingual education and bilingualism*. Clevedon: Multilingual Matters.

Baltes, P. B., & Nesselroade, J. R. (1979). History and rationale of longitudinal research. In J. R. Nesselroade, & P. B. Baltes (Eds.), *Longitudinal research in the study of behavior and development* (pp. 1–39). Academic Press.

Barac, R., & Bialystok, E. (2012). Bilingual effects on cognitive and linguistic development: Role of language, cultural background, and education. *Child Development*, *83*(2), 413–422.

Barac, R., Bialystok, E., Castro, D. C., & Sanchez, M. (2014). The cognitive development of young dual language learners: A critical review. *Early Childhood Research Quarterly*, *29*(4), 699–714.

Bardel, C., & Falk, Y. (2007). The role of the second language in third language acquisition: The case of Germanic syntax. *Second Language Research*, (23), 459–484.

Bardel, C., & Falk, Y. (2012). Behind the L2 Status Factor: A neurolinguistic framework for L3 research. In J. Cabrelli Amaro, J. Rothman, & S. Flynn (Eds.)*, Third language acquisition in adulthood* (pp. 61–78). John Benjamins.

Bartelheimer, L., Hufeisen, B., & Montanari, S. (2019). Multilingualism in Europe. In S. Montanari & S. Quay (Eds.), *Multidisciplinary perspectives on multilingualism: The fundamentals* (pp. 51–76). De Gruyter Mouton.

Benmamoun, E., Montrul, S., & Polinsky, M. (2013). Heritage languages and their speakers: Opportunities and challenges for linguistics. *Theoretical Linguistics*, *39*(3–4), 129–181.

Ben-Zeev, S. (1977). The influence of bilingualism on cognitive strategy and cognitive development. *Child Development, 48*(3), 1009–1018.

Berthele, R. (2021). The extraordinary ordinary: Re-engineering multilingualism as a natural category. *Language Learning, 71(S1)*, 80–120.

Berthele, R., & Udry, I. (2022). Multilingual boost vs. cognitive abilities: Testing two theories of multilingual language learning in a primary school context. *International Journal of Multilingualism*, *19*(1), 142–161.

Berthele, R., & Vanhove, J. (2020). What would disprove interdependence? Lessons learned from a study on biliteracy in Portuguese heritage language speakers in Switzerland. *International Journal of Bilingual Education and Bilingualism*, *23*(5), 550–566.

Bérubé, D., & Marinova-Todd, S. H. (2012). The development of language and reading skills in the second and third languages of multilingual children in French Immersion. *International Journal of Multilingualism*, *9*(3), 272–293.

Bialystok, E. (1986). Factors in the growth of linguistic awareness. *Child Development*, *57*(2), 498–510.

Bialystok, E. (1991). Metalinguistic dimensions of bilingual language proficiency. In E. Bialystok (Ed.)*, Language processing in bilingual children* (pp. 113–140). Cambridge: Cambridge University Press.

Bialystok, E. (2001). *Bilingualism in development: Language, literacy, and cognition*. Cambridge: Cambridge University Press.

Bialystok, E. (2006). Effect of bilingualism and computer video game experience on the Simon task. *Canadian Journal of Experimental Psychology*, *60*(1), 68–79.

Bialystok, E. (2017). The bilingual adaptation: How minds accommodate experience. *Psychological Bulletin, 143*(3), 233–262.

Bialystok, E., & Barac, R. (2012). Emerging bilingualism: Dissociating advantages for metalinguistic awareness and executive control. *Cognition, 122*(1), 67–73.

Bialystok, E., & Miller, B. (1999). The problem of age in second language acquisition: Influences from language, structure, and task. *Bilingualism: Language and Cognition*, *2*(2), 127–145.

Bialystok, E., & Ryan, E. (1985). Towards a definition of metalinguistic skill. *Merrill-Palmer Quarterly*, 31, 13–32.

Bialystok, E., Craik, F. I. M., Green, D. W., & Gollan, T. H. (2009). Bilingual minds. *Psychological Science in the Public Interest*, *10*(3), 89–129.

Bialystok, E., Craik, F. I. M., & Luk, G. (2008). Lexical access in bilinguals: Effects of vocabulary size and executive control. *Journal of Neurolinguistics, 21*(6), 522–538.

Bialystok, E., Luk, G., Peets, K. F., & Yang, S. (2010). Receptive vocabulary differences in monolingual and bilingual children. *Bilingualism: Language and Cognition*, *13*(4), 525–531.

Bialystok, E., Majumber, S., & Martin, M. M. (2003). Developing phonological awareness: Is there a bilingual advantage. *Applied Psycholinguistics*, *24*(1), 27–44.

Bialystok, E., Peets, K. F., & Moreno, S. (2014). Producing bilinguals through immersion education: Development of metalinguistic awareness. *Applied Psycholinguistics*, *35*(1), 177–191.

Bild, E. R., & Swain, M. (1989). Minority language students in a French immersion programme: Their French proficiency. *Journal of Multilingual and Multicultural Development*, *10*(3), 255–274.

Birdsong, D. (2018). Plasticity, variability and age in second language acquisition and bilingualism. *Frontiers in Psychology, 9,* 81.

Bonnet, A. & Siemund, P. (2018). Multilingualism and foreign language education: A synthesis of linguistic and educational findings. In A. Bonnet & P. Siemund (Eds.), *Foreign Language Education in Multilingual Classrooms* (pp. 1–29). John Benjamins Publishing Company.

Boscardin, C. K., Sebok-Syer, S. S., & Pusic, M. V. (2022). Statistical points and pitfalls: growth modeling. *Perspectives on Medical Education, 11*(2), 104–107.

Bournot-Trites, M., & Reeder, K. (2001). Interdependence revisited: Mathematics achievement in an intensified French immersion program. *Canadian Modern Language Review, 58*(1), 27–43.

Brandt, H., Lagemann, M., & Rahbari, S. (2017). Multilingual development: A longitudinal perspective – Mehrsprachigkeitsentwicklung im Zeitverlauf (MEZ). *European Journal of Applied Linguistics*, *5*, 347–357.

Brohy, C. (2021). Generic and/or specific advantages of bilingualism in a dynamic plurilingual situation: The case of French as official L3 in the school of Samedan (Switzerland). *International Journal of Bilingual Education and Bilingualism*, *4*(1), 38–49.

Bruck, M., & Genesee, F. (1995). Phonological awareness in young second language learners. *Journal of Child Language*, *22*(2), 307–324.

Bylund, E., Hyltenstam, K., & Abrahamsson, N. (2021). Age of acquisition – not bilingualism – is the primary determinant of less than nativelike L2 ultimate attainment. *Bilingualism: Language and Cognition, 24*(1), 18–30.

Carlisle, R. S. (1986). *The writing of Anglo and Hispanic fourth and sixth graders in regular, submersion, and bilingual programs*. [Doctoral dissertation, University of Illinois at Urbana-Champaign].

Cenoz, J. (1991). *Enseñanza-aprendizaje del inglés como L2 o L3*. [Doctoral dissertation, Universidad del País Vasco].

Cenoz, J. (2001). The effect of linguistic distance, L2 status and age on cross-linguistic influence in third language acquisition. In *In J. Cenoz, B. Hufeisen, & U. Jessner (Eds.), Crosslinguistic influence in third language acquisition: Psycholinguistic perspectives* (pp. 8–20). Multilingual Matters.

Cenoz, J. (2003). The additive effect of bilingualism on third language acquisition: A review. *The International Journal of Bilingualism*, *7*, 71–87.

Cenoz, J. (2013a). Defining multilingualism. *Annual Review of Applied Linguistics*, (33), 3–18.

Cenoz, J. (2013b). The influence of bilingualism on third language acquisition: Focus on multilingualism. Language Teaching, 46(1), 71–86.

Cenoz, J., & Genesee, F. (1998). Psycholinguistic perspectives on multilingualism and multilingual education. In *In J. Cenoz & F. Genesee (Eds.), Beyond bilingualism: Multilingualism and multilingual education* (pp. 16–32). Multilingual Matters.

Cenoz, J., & Gorter, D. (2011). Focus on multilingualism: A study of trilingual writing. T*he Modern Language Journal, 95*(3), 356–369.

Cenoz, J., & Gorter, D. (2021). *Pedagogical translanguaging*. Cambridge University Press.

Cenoz, J., & Valencia, J. (1994). Additive trilingualism: Evidence from the Basque Country. *Applied Psycholinguistics*, *15*(2), 195–207.

Cenoz, J., Hufeisen, B., & Jessner, U. (Eds.). (2001). *Cross-linguistic influence in third language acquisition: Psycholinguistic perspectives*. Multilingual Matters.

Chang, C. B. (2016). Bilingual perceptual benefits of experience with a heritage language. *Bilingualism: Language and Cognition*, *19*(4), 791–809.

Chertkow, H., Whitehead, V., Phillips, N., Wolfson, C., Atherton, J., & Bergman, H. (2010). Multilingualism (but not always bilingualism) delays the onset of Alzheimer disease: Evidence from a bilingual community. *Alzheimer Disease & Associated Disorders, 24*(2), 118–125.

Chung-Fat-Yim, A., Sorge, G. B., & Bialystok, E. (2017). The Relationship between bilingualism and selective attention in young adults: Evidence from an ambiguous figures task. *Quarterly Journal of Experimental Psychology, 70*(3), 366–372.

Comishen, K. J., Bialystok, E., & Adler, S. A. (2019). The impact of bilingual environments on selective attention in infancy. *Developmental Science, 22*(4), e12797.

Cook, V., & Bassetti, B. (2011). *Language and bilingual cognition*. Psychology Press.

Cox, J. G., Lynch, J. M., Mendes, N., & Zhai, C. (2019). On bilingual aptitude for learning new languages: The roles of linguistic and nonlinguistic individual differences. *Language Learning*, *69*(2), 478–514.

Craik, F. I. M., Bialystok, E., & Freedman, M. (2010). Delaying the onset of Alzheimer disease: Bilingualism as a form of cognitive reserve. *Neurology*, *75*(19), 1726–1729.

Cromdal, J. (1999). Childhood bilingualism and metalinguistic skills: Analysis and control in young Swedish-English bilinguals. *Applied Psycholinguistics*, *20*, 1–20.

Cummins, J. (1976). The influence of bilingualism on cognitive growth: A synthesis of research findings and explanatory hypotheses. *Working Papers in Bilingualism, 9,* 1–43.

Cummins, J. (1978). Bilingualism and the development of metalinguistic awareness. *Journal of Cross-Cultural Psychology, 9*(2), 131–149.

Cummins, J. (1979). Cognitive/academic language proficiency, linguistic interdependence, the optimum age question and some other matters. *Working Papers on Bilingualism 19*, 121–129.

Cummins, J. (1980a). The construct of language proficiency in bilingual education. In J. Alatis (Ed.), *Current issues in bilingual education*, (pp. 81–103). Georgetown University Press.

Cummins, J. (1980b). The cross-lingual dimensions of language proficiency: Implications for bilingual education and the optimal age issue. *TESOL Quarterly, 14*(2), 175–187.

Cummins, J. (1991). Interdependence of first- and second-language proficiency in bilingual children. In E. Bialystok (Ed.), *Language processing in bilingual children* (pp. 70–89). Cambridge University Press.

Cummins J. (2000). Putting language proficiency in its place: Responding to critiques of conversational/academic language distinction. In J. Cenoz & U. Jessner (Eds.), *English in Europe: The acquisition of a third language* (pp.54–83). Multilingual Matters.

Cummins, J. (2009). Pedagogies of choice: Challenging coercive relations of power in classrooms and communities. *International Journal of Bilingual Education and Bilingualism, 12*(3), 261–271.

Curran, P. J., & Hussong, A. M. (2002). Structural equation modeling of repeated measures data. In D. Moskowitz & S. Hershberger (Eds.), *Modeling intra-individual variability with repeated measures data: Methods and applications* (pp. 59–86). Erlbaum Associates.

Daller, M., & Ongun, Z. (2018). The Threshold Hypothesis revisited: Bilingual lexical knowledge and non-verbal IQ development. *International Journal of Bilingualism*, *22*(6), 675–694.

Darcy, N. T. (1946). The effect of bilingualism upon the measurement of the intelligence of children of preschool age. *Journal of Educational Psychology, 37*(1), 21–44.

De Angelis, G. (2007). *Third or additional language acquisition*. Multilingual Matters.

De Angelis, G. (2015). English L3 learning in a multilingual context: The role of parental education and L2 exposure within the living community. *International Journal of Multilingualism, 12*(4), 435–452.

De Angelis, G., & Selinker, L. (2001). Interlanguage transfer and competing linguistic systems in the multilingual mind. In J. Cenoz, B. Hufeisen, & U. Jessner (Eds.), *Cross-linguistic influence in third language acquisition: Psycholinguistic perspectives* (pp. 42–58). Multilingual Matters.

De Groot, A. M. B. (2011). *Language and cognition in bilinguals and multilinguals: An introduction*. Psychology Press.

De La Fuente, A. A., & Lacroix, H. (2015). Multilingual learners and foreign language acquisition: Insights into the effects of prior linguistic knowledge. *Language Learning in Higher Education*, *5*(1), 45–57.

Degirmenci, M. G., Grossmann, J. A., Meyer, P., & Teichmann, B. (2022). The role of bilingualism in executive functions in healthy older adults: A systematic review. I*nternational Journal of Bilingualism, 26*(4), 426–449.

Del Pilar Agustín-Llach, M. (2019). The impact of bilingualism on the acquisition of an additional language: Evidence from lexical knowledge, lexical fluency, and (lexical) crosslinguistic influence. *International Journal of Bilingualism*, *23*(5), 888–900.

Dewaele, J. (2001). Activation or inhibition? The interaction of L1, L2 and L3 on the language mode continuum. In J. Cenoz, B. Hufeisen, & U. Jessner (Eds.)*, Cross-linguistic influence in third language acquisition: Psycholinguistic perspectives* (pp. 69–89). Multilingual Matters.

Dockrell, J. E., Papadopoulos, T. C., Mifsud, C. L., Bourke, L., Vilageliu, O., Bešić, E., & Gerdzhikova, N. (2021). Teaching and learning in a multilingual Europe: Findings from a cross-European study. *European Journal of Psychology of Education*, 37, 293–320.

Edele, A., Kempert, S., & Schotte, K. (2018). Does competent bilingualism entail advantages for the third language learning of immigrant students? *Learning and Instruction, 58*, 232–244.

Eisenstein, M. (1980). Childhood bilingualism and adult language learning aptitude. *International Review of Applied Psychology, 29*(1-2), 159–172.

Ellis, A. B., Ozgur, Z., Kulow, T., Dogan, M. F., & Amidon, J. (2016). An exponential growth learning trajectory: Students' emerging understanding of exponential growth through covariation. *Mathematical Thinking and Learning, 18*(3), 151–181.

Elsner, D. (2018). Institutional foreign language learning – teaching English at different levels. In C. Surkamp & B. Viebrock (Eds.), *Teaching English as a foreign language. An introduction* (pp. 17–37). J. B. Metzler Verlag.

Extra, G., & Yağmur, K. (2011). Urban multilingualism in Europe: Mapping linguistic diversity in multicultural cities. *Journal of Pragmatics*, *43*(5), 1173–1184.

Falk, Y., & Bardel, C. (2010). The study of the role of the background languages in third language acquisition: The state of the art. *International Review of Applied Linguistics in Language Teaching, 48*, 185–219.

Falk, Y., & Bardel, C. (2011). Object pronouns in German L3 syntax: Evidence for the L2 status factor. *Second Language Research*, *27*(1), 59–82.

Fessi, I. (2015). La adquisición de terceras lenguas: Multilingüismo aditivo y substractivo. *Dirāsāt Hispānicas Revista Tunecina De Estudios Hispánicos, 2,* 109–119.

Fleckenstein, J., Möller, J. & Baumert, J. (2018). Mehrsprachigkeit als Ressource: Kompetenzen dual-immersiv unterrichteter Schülerinnen und Schüler in der Drittsprache Englisch. *Zeitschrift für Erziehungswissenschaft, 21*, 97–120.

Flynn, S., Foley, C., & Vinnitskaya, I. (2004). The cumulative-enhancement model for language acquisition: Comparing adults' and children's patterns of development in first, second and third language acquisition of relative clauses. *International Journal of Multilingualism*, *1*(1), 3–16.

Fraenkel, J. R. ,Wallen, N. E., & Hyun, H. H. (2011). *How to design and evaluate research in education* (8th Edition). McGraw-Hill.

Friederici, A. D. (2011). The brain basis of language processing: From structure to function. *Physiological Reviews, 91*(4), 1357–1392.

Fuller, J. M. (2020). English in the German-speaking world: Immigration and integration. In R. Hickey (Ed.), *English in the German-speaking world* (pp. 165–184). Cambridge: Cambridge University Press.

Gallardo del Puerto, F. (2007). Is L3 phonological competence affected by the learner's level of bilingualism? *International Journal of Multilingualism*, *1*(4), 1–16.

Ganzeboom, H. B. G., De Graaf, P. M., & Treiman, D. J. (1992). A standard international socio-economic index of occupational status. *Social Science Research, 21*(1), 1–56.

Genesee, F. (1979). Acquisition of reading skills in immersion programs. *Foreign Language Annals*, *12*(1), 71–77.

Genesee, F. (1998). A case study of multilingual education in Canada. In J. Cenoz & F. Genesee (Eds.)*, Beyond bilingualism: Multilingualism and multilingual education* (pp. 243–258). Multilingual Matters.

Genesee, F., Geva, E., Dressler, C., & Kamil, M. L. (2006). Synthesis: Cross-Linguistic Relationships. In D. August & T. Shanahan (Eds.), *Developing literacy in second-*

language learners: Report of the National Literacy Panel on Language-Minority Children and Youth (pp. 153–174). Lawrence Erlbaum Associates Publishers.

Genesee, F., Tucker, R., & Lambert, W. E. (1975). Communication skills in bilingual children. *Child Development*, *46 (4)*, 1010–1014.

Gironzetti, E., & Belpoliti, F. (2021). The other side of heritage language education: Understanding Spanish heritage language teachers in the United States. *Foreign Language Annals, 54*(4), 1189–1213.

Gogolin, I. (2008). *Der monolinguale Habitus der multilingualen Schule*. Waxmann Verlag.

Gogolin, I. (2021). Multilingualism: A threat to public education or a resource in public education?–European histories and realities. *European Educational Research Journal*, *20*(3), 297–310.

Gogolin, I., Gabriel, C., Brandt, H., & Dünkel, N. (2021). Foreign language learning in multilingual Germany. *Multilingua*, *40*(6), 735–743.

Gogolin, I., Klinger, T., Lagemann, M., Schnoor, B., in collaboration with Gabriel, C., Knigge, M., Krause, M., & Siemund, P. (2017). *Indikation, Konzeption und Untersuchungsdesign des Projekts Mehrsprachigkeitsentwicklung im Zeitverlauf (MEZ)*. Hamburg (Universität Hamburg). www.mez.uni-hamburg.de https://www.pedocs.de/volltexte/2017/14825/pdf/Gogolin_et_al_2017_Indikation_Konzeption_Untersuchungsdesign.pdf

González, L. A. (1986). *The effects of first language education on the second language and academic achievement of Mexican immigrant elementary school children in the United States*. [Doctoral dissertation, University of Illinois at Urbana-Champaign]. University Microfilms International.

Göbel, K., Rauch, D., & Vieluf, S. (2011). Lernergebnisse und elterliche Unterstützung in Deutsch und Englisch von Lernenden unterschiedlicher sprachlicher Herkunft. *Zeitschrift Für Interkulturellen Fremdsprachenunterricht*, *2*(16), 50–65.

Granados, A., Lorenzo-Espejo, A., & Lorenzo, F. (2021). Evidence for the interdependence hypothesis: a longitudinal study of biliteracy development in a CLIL/bilingual setting. *International Journal of Bilingual Education and Bilingualism, 25*(8), 3005–3021.

Grimm, K. J., Davoudzadeh, P., & Ram, N. (2017), IV. Developments in the analysis of longitudinal data. *Monographs of The Society for Research in Child Development, 82*, 46–66.

Haenni Hoti, A. U., Heinzmann, S., Müller, M., Oliveira, M., Wicki, W., & Werlen, E. (2011). Introducing a second foreign language in Swiss primary schools: The effect of L2 listening and reading skills on L3 acquisition. *International Journal of Multilingualism*, *8*(2), 98–116.

Häggman, J. (2010). Multilingualism and the European Union. *Europäisches Journal Für Minderheitenfragen*, *2*, 191–195.

Hakuta, K., & Diaz, R. M. (1985). The relationship between degree of bilingualism and cognitive ability: A critical discussion and some new longitudinal data. In K. E. Nelson (Ed.), *Children's language*, Vol. 5, (pp. 319–344). Lawrence Erlbaum Associates Inc.

Hammarberg, B. (Ed.) (2009). *Processes in third language acquisition*. Edinburgh University Press.

Hardy, I., & Jurecka, A. (2018). Die Rolle der Erstsprache für schulisches Lernen bei Kindern und Jugendlichen mit Migrationshintergrund. In N. McElvany, W. Bos, H. G. Holtappels, J. Hasselhorn, & A. Ohle-Peters (Eds.)*, Dortmunder Symposium der*

empirischen Bildungsforschung: Band 3. Bedingungen erfolgreicher Bildungsverläufe in gesellschaftlicher Heterogenität: Interdisziplinäre Forschungsbefunde und Perspektiven für Theorie und Praxis (pp. 131–146). Münster: Waxmann.

Harris, C. (1948). An exploration of language skill patterns. *Journal of Educational Psychology*, *39*(6), 321–336.

Harwell, M. R. (2011). Research design: Qualitative, quantitative, and mixed methods. In C. F. Conrad, & R. C. Serlin (Eds.), *The Sage handbook for research in education: Pursuing ideas as the keystone of exemplary inquiry* (2nd ed.) (pp. 147–164). Sage Publications, Inc.

Hayakawa, S., Chung-Fat-Yim, A., & Marian, V. (2022). Predictors of language proficiency and cultural identification in heritage bilinguals. *Frontiers in Communication*, *7*, 994709.

Hellrung, M., Hugk, N., Mora, O.,Waschk, A., Penon, K., & Hillen, P. (2017). *Methodenbericht. MEZ – Mehrsprachigkeitsentwicklung im Zeitverlauf. Erhebung in den Jahrgangsstufen 7 und 9. 1. Messzeitpunkt – Januar bis März 2016*. Hamburg: IEA Hamburg.

Heller, K., & Perleth, C. (2000). *Kognitiver Fähigkeitstest für 4. bis 12. Klassen, Revision: KFT 4–12*. Göttingen: Beltz Test.

Herdina, P., & Jessner, U. (2002). *A dynamic model of multilingualism*. Clevedon: Multilingual Matters.

Hermas, A. (2010). Language acquisition as computational resetting: Verb movement in L3 initial state. *International Journal of Multilingualism, 7*(4), 343–362.

Hesse, H. G., Gobel, K., & Hartig, J. (2008). Sprachliche Kompetenzen von mehrsprachigen Jugendlichen und Jugendlichen nicht–deutscher Erstsprache. In E. Klieme (Ed.)*, Beltz Padagogik. Unterricht und Kompetenzerwerb in Deutsch und Englisch. Ergebnisse der DESI–Studie* (pp. 208–230). Beltz.

Higby, E., Gámez, E., & Mendoza, C. H. (2023). Challenging deficit frameworks in research on heritage language bilingualism. *Applied Psycholinguistics*, *44*(4), 417–430.

Højen, A., & Bleses, D. (2023). Relative heritage language and majority language use before school start explains variance in 2nd grade majority language but not reading skills. *Frontiers in Psychology*, (14), 1134830.

Hopp, H. (2019). Cross-linguistic influence in the child third language acquisition of grammar: Sentence comprehension and production among Turkish-German and German learners of English. *International Journal of Bilingualism, 23*(2), 567–583.

Hopp, H., Jakisch, J., Sturm, S., Becker, C., & Thoma, D. (2020). Integrating multilingualism into the early foreign language classroom: Empirical and teaching perspectives. *International Multilingual Research Journal, 14*(2), 146–162.

Hopp, H., & Jakisch, J. (2020). Mehrsprachigkeit im Fremdsprachenunterricht. In I. Gogolin, A. Hansen, S. McMonagle & D. Rauch (Eds.), *Handbuch Mehrsprachigkeit und Bildung* (pp. 195–199). Springer.

Hopp, H., & Thoma, D. (2021). Effects of plurilingual teaching on grammatical development in early foreign-language learning. *The Modern Language Journal, 105*(2), 464–483.

Hopp, H., Vogelbacher, M., Kieseier, T., & Thoma, D. (2019). Bilingual advantages in early foreign language learning: Effects of the minority and the majority language. *Learning and Instruction*, *61*, 99–110.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55.

Huang, T., Loerts, H., & Steinkrauss, R. (2022). The impact of second-and third-language learning on language aptitude and working memory. *International Journal of Bilingual Education and Bilingualism, 25*(2), 522–538.

Huguet, Á. (2014). Latin American students and language learning in Catalonia: What does the linguistic interdependence hypothesis show us? *The Spanish Journal of Psychology, 17*, e11, 1–13.

International Labour Office. (2012). *International standard classification of occupations. ISCO-08. Volume 1: Structure, group definitions and correspondence tables*. ILO.

Jacobsen, M., & Imhoof, M. (1974). Predicting success in learning a second language. *The Modern Language Journal*, *58*(7), 329–336.

Jaspaert, K., & Lemmens, G. (1990). Linguistic evaluation of Dutch as a third language. In M. Byram & J. Leman (Eds.)*, Bicultural and trilingual education: The Foyer model in Brussels* (pp. 30–56). Clevedon, U.K.: Multilingual Matters.

Jessner, U. (1999). Metalinguistic awareness in multilinguals. Cognitive aspects of third language learning. *Language Awareness*, *8*(3-4), 201–209.

Jessner, U. (2006). *Linguistic awareness in multilinguals: English as a third language*. Edinburgh University Press.

Jessner, U. (2008). Teaching third languages: Findings, trends and challenges. *Language Teaching*, *41*(1), 15–56.

Jones, W. R., & Stewart, W. A. C. (1951). Bilingualism and verbal intelligence. *British Journal of Statistical Psychology, 4*(1), 3–8.

Kemp, C. (2007). Strategic processing in grammar learning: Do multilinguals use more strategies? *International Journal of Multilingualism*, *4*(4), 241–261.

Kemp, C. (2009). Defining multilingualism. In L. Aronin & B. Hufeisen (Eds.)*, The exploration of multilingualism: Development of research on L3, multilingualism, and multiple language acquisition* (pp. 11–26). John Benjamins.

Kim, Y.-S., Petscher, Y., Schatschneider, C., & Foorman, B. (2010). Does growth rate in oral reading fluency matter in predicting reading comprehension achievement? *Journal of Educational Psychology, 102*(3), 652–667.

Klieme, F., Eichler, W., Helmke, A., Lehmann, R., Nold, R., Rolff, H. R., … Willenberg, H. (2006). *Unterricht und Kompetenzerwerb in Deutsch und Englisch: Zentrale Befunde der Studie Deutsch-Englisch-Schülerleistungen-International (DESI)*. Beltz Verlag.

Kline, R.B. (2011). *Principles and practice of structural equation modeling*. The Guilford Press.

Klinger, T., Brandt, H., Dittmers, T. (2022). The making of MEZ – Multilingual development: A longitudinal perspective. Study design and methods. In H. Brandt, M. Krause, & I. Usanova (Eds.), *Language development in diverse settings* (pp. 1–33). Springer VS.

Kolb, N., Mitrofanova, N., & Westergaard, M. (2022). Crosslinguistic influence in child L3 English: An empirical study on Russian-German heritage bilinguals. *International Journal of Bilingualism, 26*(4), 476–501.

Kousaie, S., & Phillips, N. A. (2012). Conflict monitoring and resolution: Are two languages better than one? Evidence from reaction time and event-related brain potentials. *Brain Research*, 1446, 71–90.

Krumm, H.J., & Reich, H. (2016). Ansätze zum Mehrsprachigkeitsunterricht. In E. Burwitz-Melzer, G. Mehlhorn, C. Riemer, K.R. Bausch & H.J. Krumm (Eds.), *Handbuch Fremdsprachenunterricht* (pp. 230–234). A. Francke Verlag.

Kupisch, T, Kolb, N., Rodina, Y., & Urek, O. (2021). Foreign accent in pre- and primary school heritage bilinguals. *Languages, 6*(2), 96.

Lambert, W.E. (1974). Culture and language as factors in learning and education. In F. E. Aboud & R. D. Meade (Eds.), *Cultural factors in learning and education* (pp. 91–122). Western Washington State College Press.

Lanza, E., & Lexander, K. V. (2019). Family language practices in multilingual transcultural families. In S. Montanari & S. Quay (Eds.), *Multidisciplinary perspectives on multilingualism: The fundamentals* (pp. 229–251). De Gruyter Mouton.

Lasagabaster, D. (1997). *Creatividad y conciencia metalingüística: Incidencia en el apprendizaje del inglés como L3.* [Doctoral dissertation, University of the Basque Country, Vitoria-Gasteiz].

Lechner, S., & Siemund, P. (2014). Double threshold in bi-and multilingual contexts: Preconditions for higher academic attainment in English as an additional language. *Frontiers in Psychology, 5*, 546.

Lehmann, R., & Lenkeit, J. (2008). *ELEMENT: Abschlussbericht über die Untersuchungen 2003, 2004 und 2005 an Berliner Grundschulen und grundständigen Gymnasien*. Berlin: Humboldt Universität zu Berlin.

Leikin, M. (2013). The effect of bilingualism on creativity: Developmental and educational perspectives. *International Journal of Bilingualism, 17*(4), 431–447.

Lerea, L., & Kohut, S. (1961). A comparative study of monolinguals and bilinguals in a verbal task performance. *Journal of Clinical Psychology*, *17*, 49–52.

LiMA, Linguistic Diversity Management in Urban Areas: *LiMA Panel Study (LiPS),* (2009–2013). Projektkoordination LiPS: Prof. Dr. Ingrid Gogolin. LiMA-LiPS 2013.

Linde, S. G., & Löfgren, H. (1988). The relationship between medium of instruction and school achievement for Finnish-speaking students in Sweden. *Language, Culture and Curriculum*, *1*(2), 131–145.

Lindqvist, C., & Bartel, C. (2010). Approaches to third language acquisition: Introduction. *International Review of Applied Linguistics in Language Teaching*, *48*(2-3), 87–90.

Lloyd-Smith, A. (2023). Perceived foreign accent in L3 English: The effects of heritage language use. *International Journal of Multilingualism, 20*(3), 753–767.

Lorenz, E., Feindt, K., Rahbari, S., & Siemund, P. (2022). The influence of extralinguistic variables on cross-linguistic influence in contexts of bilingual heritage speakers: A summary of topical research findings. In H. Brandt, M. Krause, & I. Usanova (Eds.), *Language development in diverse settings: Interdisziplinäre Ergebnisse aus dem Projekt Mehrsprachigkeitsentwicklung im Zeitverlauf (MEZ)* (pp. 305–330). Springer.

Lorenz, E., Rahbari, S., Schackow, U., & Siemund, P. (2020). Does bilingualism correlate with or predict higher proficiency in L3 English? A contrastive study of monolingual and bilingual learners. *Journal of Multilingual Theories and Practices*, *1*(2), 185–217.

Lorenz, E., & Siemund, P. (2020). The acquisition of English as an additional language by multilingual heritage speakers. In M. Meyer, & U. Hoikens (Eds.)*, Der Einfluss der Migration auf Sprach- und Kulturräume* (pp. 111–134). Bern: Peter Lang.

Lorenz, E., Toprak, T. E., & Siemund, P. (2021). English L3 acquisition in heritage contexts: Modelling a path through the bilingualism controversy. *Poznan Studies in Contemporary Linguistics*, *57*(2), 273–298.

Lorenz, E., Toprak-Yildiz, E. T., & Siemund, P. (2023). Why are they so similar? The interplay of linguistic and extra-linguistic variables in monolingual and bilingual learners of English. *Pedagogical Linguistics*, *4*(2), 159–194.

Lorenz, E., Toprak-Yildiz, T. E., & Siemund, P. (2024). L3 English in the German secondary school context: Longitudinal development of bilingual heritage speakers' multilingual repertoire. *International Journal of Multilingualism*, *22*(1), 76–97.

Malakoff, M. E. (1988). The effect of language of instruction on reasoning in bilingual children. *Applied Psycholinguistics*, *9*(1), 17–38.

Maluch, J. T., Kempert, S., Neumann, M., & Stanat, P. (2015). The effect of speaking a minority language at home on foreign language learning. *Learning and Instruction*, *36*, 76–85.

Maluch, J. T., & Kempert, S. (2019). Bilingual profiles and third language learning: The effects of the manner of learning, sequence of bilingual acquisition, and language use practices. *International Journal of Bilingual Education and Bilingualism*, *22*(7), 870–882.

Maluch, J. T., Neumann, M., & Kempert, S. (2016). Bilingualism as a resource for foreign language learning of language minority students? Empirical evidence from a longitudinal study during primary and secondary school in Germany. *Learning and Individual Differences*, *51*, 111–118.

Manuel, H. T. (1935). A comparison of Spanish-speaking and English-speaking children in reading and arithmetic. *Journal of Applied Psychology*, *19*(2), 189–202.

Martinez, H. (2015). Mehrsprachigkeitsdidaktik: Aufgaben, Potenziale und Herausforderungen. *FLuL–Fremdsprachen Lehren und Lernen,* 44, 7–19

May, S. (Ed). (2014). T*he multilingual turn. Implications for SLA, TESOL and bilingual education*. New York: Routledge.

Mayo, M. del P. G. (2012). Cognitive approaches to L3 acquisition. *International Journal of English Studies*, *12*(1), 129–146.

Mehrsprachigkeitsentwicklung im Zeitverlauf (MEZ). (2020a). *Testhandbuch 1*. Hamburg (Universität Hamburg, MEZ-Projekt), Mimeo.

Mehrsprachigkeitsentwicklung im Zeitverlauf (MEZ). (2020b). *Testhandbuch 2*. Hamburg (Universität Hamburg, MEZ-Projekt), Mimeo.

Mehrsprachigkeitsentwicklung im Zeitverlauf (MEZ). (2020c). *Testhandbuch 3*. Hamburg (Universität Hamburg, MEZ-Projekt), Mimeo.

MEZ – Mehrsprachigkeitsentwicklung im Zeitverlauf. (2014–2019). Projektkoordination: Prof. Dr. Dr. h.c. Ingrid Gogolin, Universität Hamburg. © MEZ 2017.

Min S., & He L. (2014). Applying unidimensional and multidimensional item response theory models in testlet-based reading assessment. *Language Testing, 31*(4), 453–477.

Mitchell, A. J. (1937). The effect of bilingualism in the measurement of intelligence. *The Elementary School Journal, 38(1)*, 29–37.

Montrul, S. (2018). Heritage language development. Connecting the dots. *International Journal of Bilingualism*, *22*(5), 530–546.

Montrul, S., & Ionin, T. (2010). Transfer effects in the interpretation of definite articles by Spanish heritage speakers. *Bilingualism: Language and Cognition, 13*(4), 449–473.

Muñoz, C. (2000). Bilingualism and trilingualism in school students in Catalonia. In J. Cenoz & U. Jessner (Eds.)*, English in Europe: The acquisition of a third language* (pp. 157–178). Multilingual Matters.

Murphy, S. (2003). Second language transfer during third language acquisition. *Studies in Applied Linguistics and TESOL*, *3*(2), 1–21.

Nation, R., & McLaughlin, B. (1986). Experts and novices: An information processing approach to the 'good language learner' problem. *Applied Psycholinguistics, 7*(1), 41–55.

Nayak, N., Hansen, N., Krueger, N., & Mclaughlin, B. (1990). Language-learning strategies in monolingual and multilingual adults. *Language Learning, 40*(2), 221–244.

Odlin, T. (1989). *Language transfer*. Cambridge University Press.

Paap, K. R., & Greenberg, Z. I. (2013). There is no coherent evidence for a bilingual advantage in executive processing. *Cognitive Psychology*, *66*(2), 232–258.

Paap, K. R., Johnson, H. A., & Sawi, O. (2015). Bilingual advantages in executive functioning either do not exist or are restricted to very specific and undetermined circumstances. *Cortex, 69*, 265–278.

Paradis, J. (2023). Sources of individual differences in the dual language development of heritage bilinguals. *Journal of Child Language*, *50*(4), 793–817.

Peal, E., & Lambert, W. (1962). The relation of bilingualism to intelligence. *Psychological Monographs: General and Applied*, *76*(27), 1–23.

Peck, J., & Coyle, M. (2002). *A brief history of English literature*. Palgrave.

Polinsky, M., & Scontras, G. (2020). Understanding heritage languages. *Bilingualism: Language and Cognition*, *23*(1), 4–20.

Pratt, C., & Grieve, R. (1984). The development of metalinguistic awareness: An introduction. In W. Tunmer, C. Pratt, & M. Herriman (Eds.)*, Metalinguistic awareness in children: Theory, research, and implications* (pp. 2–11). Springer.

Prevoo, M. J. L., Malda, M., Emmen, R. A. G., Yeniad, N., & Mesman, J. (2015). A context-dependent view on the linguistic interdependence hypothesis: Language use and SES as potential moderators. *Language Learning, 65*(2), 449–469.

Psaltou-Joycey, A., & Kantaridou, Z. (2009). Plurilingualism, language learning strategy use and learning style preferences. *International Journal of Multilingualism, 6*(4), 460–474.

Pugés, H. R., & Pérez Vidal, C. (2008). La lectura bilingüe: Factor esencial para la adquisición de la competencia escrita en una tercera lengua. Retrieved from http://www.um.es/lacell/aesla/contenido/pdf/1/roquet.pdf

Puig-Mayenco, E., González Alonso, J., & Rothman, J. (2020). A systematic review of transfer studies in third language acquisition. *Second Language Research*, *36*(1), 31–64.

Quay, S. & Chevalier, S. (2019). Fostering multilingualism in childhood. In S. Montanari & S. Quay (Eds.), *Multidisciplinary perspectives on multilingualism: The fundamentals* (pp. 205–227). De Gruyter Mouton.

R Core Team (2024). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/>.

Ramirez, C. M. (1985). *Bilingual education and language interdependence: Cummins and beyond*. [Doctoral dissertation, Yeshiva University]. ProQuest Dissertations & Theses Global.

Ransdell, S., Barbier, M. L., & Niit, T. (2006). Metacognitions about language skill and working memory among monolingual and bilingual college students: When does multilingualism matter? *International Journal of Bilingual Education and Bilingualism*, *9*(6), 728–741.

Rauch, D. P., Naumann, J., & Jude, N. (2012). Metalinguistic awareness mediates effects of full biliteracy on third-language reading proficiency in Turkish–German bilinguals. *International Journal of Bilingualism*, *16*(4), 402–418.

Reder, F., Marec-Breton, N., Gombert, J. E., & Demont, E. (2013). Second-language learners' advantage in metalinguistic awareness: A question of languages' characteristics. *British Journal of Educational Psychology*, *83*(4), 686–702.

Ricento, T. (2006). Language policy: Theory and practice – An Introduction. In Thomas Ricento (Ed.) *An introduction to language policy: Theory and method* (pp. 10–23). Blackwell Publishing.

Ringbom, H. (1986). Crosslinguistic influence and the foreign language learning process. In M. Sharwood Smith & E. Kellerman (Eds.)*, Crosslinguistic influence in second language acquisition* (pp. 150–162). Pergamon Press.

Ringbom, H. (1987). *The role of the first language in foreign language learning*. Multilingual Matters.

Ringbom, H. (2007). *Cross-linguistic similarity in foreign language learning*. Multilingual Matters.

Ringbom, H. (2001). Lexical transfer in L3 production. In J. Cenoz, B. Hufeisen, & U. Jessner (Eds.), *Cross-linguistic influence in third language acquisition* (pp. 59–68). Multilingual Matters.

Rinke, E., Flores, C., & Santos, A. L. (2019). Heritage languages at school: Implications of linguistic research on bilingualism for heritage language teaching. In C. Gabriel, J. Grünke, & S. Thiele (Eds.)*, Romanische Sprachen in ihrer Vielfalt: Brückenschläge zwischen linguistischer Theoriebildung und Fremdsprachenunterricht* (pp. 211–232). Ibidem.

Rodina, Y. (2017). Narrative abilities of preschool bilingual Norwegian-Russian children. *International Journal of Bilingualism, 21*(5), 617–635.

Rothman, J. (2009). Understanding the nature and outcomes of early bilingualism: Romance languages as heritage languages. *International Journal of Bilingualism*, *13*(2), 155–163.

Rothman, J. (2011). L3 syntactic transfer selectivity and typological determinacy: The typological primacy model. *Second Language Research, 27*(1), 107–127.

Rothman, J. (2013). Cognitive economy, non-redundancy and typological primacy in L3 acquisition: Evidence from initial stages of L3 Romance. In S. Baauw, F. Dirjkoningen, M. Pinto (Eds.), *Romance languages and linguistic theory 2011* (pp. 217–247). John Benjamins Publishing.

Rothman, J. (2015). Linguistic and cognitive motivations for the Typological Primacy Model (TPM) of third language (L3) transfer: Timing of acquisition and proficiency considered. *Bilingualism: Language and Cognition*, *18*(2), 179–190.

Rothman, J., Bayram, F., DeLuca, V., Di Pisa, G., Duñabeitia, J. A., Gharibi, K., … Wulff, S. (2023). Monolingual comparative normativity in bilingualism research is out of "control": Arguments and alternatives. *Applied Psycholinguistics*, *44*(3), 316–329.

Rothman, J., Gonzáles Alonso, J., & Puig-Mayenco, E. (2019). *Third language acquisition and linguistic transfer*. Cambridge University Press.

Rosseel, Y. (2024). The lavaan tutorial. Available at: https://lavaan.ugent.be/tutorial/

Saer, D. J. (1923). The effect of bilingualism on intelligence. *British Journal of Psychology*, *General Section, 14*(1), 25–38.

Sagasta, M. P. (2003). Acquiring writing skills in a third language: The positive effects of bilingualism. *International Journal of Bilingualism*, *7*(1), 27–42.

Sahingöz, Y. (2014). *Schulische Mehrsprachigkeit bei türkisch-deutsch bilingualen Schülern: Eine Analyse von transferinduzierten Wortstellungsmustern*. [Doctoral dissertation, University of Hamburg]. https://ediss.sub.uni-hamburg.de/handle/ediss/5998

Saif, P. S., & Sheldon, M. E. (1969). *An investigation of the experimental French programme at Bedford Park and Allenby public schools.* Toronto: Toronto Board of Education. https://eric.ed.gov/?id=ED065005

Sanders, M., & Meijers, G. (1995). English as L3 in the elementary school. *International Journal of Applied Linguistics, 107*(1), 59–78.

Sanz, C. (2000). Bilingual education enhances third language acquisition: Evidence from Catalonia. *Applied Psycholinguistics*, *21*(1), 23–44.

Sekerina, I. A., Spradlin, L. & Valian, V. (2019). *Bilingualism, executive function, and beyond: Questions and insights*. John Benjamins Publishing Company.

Schoonen, R., van Gelderen, A., De Glopper, K., Hulstijn, J., Snellings, P., Simis, A., & Stevenson, M. (2002). Linguistic knowledge, metacognitive knowledge and retrieval speed in L1, L2 and EFL writing. In S. Ransdell & M. -L. Barbier (Eds.)*, New directions for research in L2 writing* (pp. 101–122). Kluwer Academic Publishers.

Schneider, W., Schlagmüller, M., & Ennemoser, M. (2016). *Lesegeschwindigkeits- und verständnistest für die klassenstufen 5–12*. Hogrefe.

Schnoor, B., & Usanova, I. (2023). Multilingual writing development: Relationships between writing proficiencies in German, heritage language and English. *Reading and Writing, 36*, 599–623.

Schnoor, B., Hartig, J., Klinger, T., Naumann, A., & Usanova, I. (2023). Measuring the development of general language skills in English as a foreign language—Longitudinal invariance of the C-test. *Language Testing, 40*(3), 796–819.

Schwartz, M., Geva, E., Share, D., & Leikin, M. (2007). Learning to read in English as a third language: The cross-linguistic transfer of phonological processing skills. *Written Language and Literacy*, *10*(1), 25–52.

Siemund, P. (2023). *Multilingual development: English in a global context*. Cambridge University Press.

Siemund, P. & Lechner, S. (2015). Transfer effects in the acquisition of English as an additional language by bilingual children in Germany. In H. Peukert (Ed.), *Transfer effects in multilingual language development* (pp. 147–160). John Benjamins.

Siemund, P., Lorenz, E., & Toprak-Yildiz, T. E. (2024a). English as an additional language: Heritage language proficiency and cognition. In S. Karpava, N. Pavlou, & K.

Grohmann (Eds.), *New approaches to multilingualism, language learning, and teaching* (pp. 80–106). Cambridge Scholars Publishing.

Siemund, P., Lorenz, E., & Toprak-Yildiz, T. E. (2024b). The impact of heritage language proficiency on English as an additional language: Disentangling language and cognition. *International Journal of Multilingualism, 21*(4), 2131-2149.

Skutnabb-Kangas, T., & Toukomaa, P. (1976). *Teaching migrant children's mother tongue and learning the language of the host country in the context of the socio-cultural situation of the migrant family*. The Finnish National Commission for UNESCO.

Slabakova, R. (2017). The scalpel model of third language acquisition. *International Journal of Bilingualism*, *21*(6), 651–665.

Stanat, P., & Christensen, G. (2006). *Where immigrant students succeed. A comparative review of performance and engagement in PISA 2003*. Paris, France: OECD.

Stanat, P., Rauch, D., & Segeritz, M. (2010). Schülerinnen und Schüler mit Migrationshintergrund [Students with migration background]. In E. Klieme, C. Artelt, J. Hartig, N. Jude, O. Koller, M. Prenzel, et al. (Eds.)*, PISA 2009. Bilanz nach einem Jahrzehnt* (pp. 200–230). Münster: Waxmann.

Stoehr, A., Benders, T., Van Hell, J. G., & Fikkert, P. (2018). Heritage language exposure impacts voice onset time of Dutch–German simultaneous bilingual preschoolers. *Bilingualism: Language and Cognition*, *21*(3), 598–617.

Swain, M., Lapkin, S., Rowen, N., & Hart, D. (1990). The role of mother tongue literacy in third language learning. *Culture and Curriculum, 3*(1), 65–81.

Talebi, S., Fallahi, J. & Amjadi, A. (2024). Strategic reading comprehension in L2 and L3: Assuming relative interdependence within Cummins' linguistic interdependence

hypothesis. *International Review of Applied Linguistics in Language Teaching, 62*(4), 1903–1933.

Tavakol M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education, 27*(2), 53–55.

Ter Kuile, H., Veldhuis, M., Van Veen, S. C., & Wicherts, J. M. (2011). Bilingual education, metalinguistic awareness, and the understanding of an unknown language. *Bilingualism: Language and Cognition, 14*(2), 233–242.

Thomas, J. (1988). The role played by metalinguistic awareness in second and third language learning. *Journal of Multilingual and Multicultural Development*, *9*(3), 235–246.

Thomas, J. (1992). Metalinguistic awareness in second-and third-language learning. *Advances in Psychology, 83*, 531–545.

Van Gelderen, A., Schoonen, R., De Glopper, K., Hulstijn, J., Snellings, P., & Simis, A. (2003). Roles of linguistic knowledge, metacognitive knowledge and processing speed in L3, L2 and L1 reading comprehension: A structural equation modelling approach. *International Journal of Bilingualism*, *7*(1), 7–25.

Verhoeven, L. T. (1994). Transfer in bilingual development: The linguistic interdependence hypothesis revisited. *Language Learning, 44*(3), 381–415.

Vildomec, V. (1963). *Multilingualism*. Netherlands: A.W. Sythoff-Leyden.

Von Bastian, C. C., Souza, A. S., & Gade, M. (2016). No evidence for bilingual cognitive advantages: A test of four hypotheses. *Journal of Experimental Psychology: General*, *145*(2), 220–246.

Vorobyeva, T., Bel, A., & Voeikova, M. (2024). Grammatical gender agreement in production: The case of heritage Russian. *International Journal of Bilingualism, 28*(2), 234–254.

Westergaard, M., Mitrofanova, N., Mykhaylyk, R., & Rodina, Y. (2017). Crosslinguistic influence in the acquisition of a third language: The linguistic proximity model. *International Journal of Bilingualism*, *21*(6), 666–682.

Wiener, S., & Tokowicz, N. (2021). Language proficiency is only part of the story: Lexical access in heritage and non-heritage bilinguals. *Second Language Research*, *37*(4), 681–695.

Wrembel, M., Gut, U., & Mehlhorn, G. (2010). Phonetics/phonology in third language acquisition: Introduction. *International Journal of Multilingualism*, *7*, 1–3.

Wright, S. C., Taylor, D. M., & Macarthur, J. (2000). Subtractive bilingualism and the survival of the Inuit language: Heritage- versus second-language education. *Journal of Educational Psychology, 92*(1), 63–84.

Zhang, Z. & Wang, L. (2017-2022). *Advanced statistics using R*. Granger, IN: ISDSA Press. https://doi.org/10.35566/advstats.

7. Appendix

7.1. Abstract (English)

This dissertation investigated the links between heritage bilingualism and the longitudinal development of L3 English in the German secondary education context by employing a longitudinal design. In addition to examining L3 English longitudinal growth trajectories and growth rate in heritage bilingual students, the dissertation research examined which linguistic (i.e., heritage language proficiency, majority language proficiency, and L1 background) and extra-linguistic (i.e., cognitive ability, socioeconomic status, and school type) factors exerted an impact on L3 English development. The participants were 301 heritage bilingual students (Russian-German=123, Turkish-German=178) sampled from 72 schools across eight federal states in Germany. The students participated in the first three waves of the MEZ project (MEZ—2014–2019), which examined the multilingual development of secondary school students in the German educational context. The longitudinal data initially were examined by using a set of descriptive and inferential statistics (e.g., analysis of difference and correlational analysis). The main analyses were conducted by using the Latent Growth Curve Modelling methodology in the context of Structural Equation Modelling. The latent growth curve modelling results showed that the baseline, the initial level of L3 English, was significantly positive. Additionally, a slight yet statistically significant variation was detected at the baseline in L3 English scores. The mean of the linear slope, the rate of growth, was found to be slightly negative, with scores decreasing by 0.061, on average, across three measurement time points.

Moreover, the results demonstrated that heritage bilingual students did not vary considerably in terms of their L3 English growth trajectories over time. Furthermore, it was found that heritage bilingual students' initial L3 English scores did not necessarily predict their L3 English growth across three measurement time points. Concerning the links between linguistic and extra-linguistic variables and L3 English growth, the analyses revealed that, notably the effect of the majority language proficiency, German, was significant and positive across all three MTPs for the baseline. The effect of heritage language proficiency was significant and positive at MTP1, negative and not significant at MTP2, and negative and significant at MTP3. The impact of school type was statistically significant, meaning that attending the Gymnasium was strongly associated with a higher L3 English proficiency initial level. The effect of socioeconomic background was negative but statistically not significant while the effect of cognitive ability was positive and statistically significant. When it comes to L3 English growth, the results indicated that both heritage language proficiency and the majority language proficiency did not seem to predict linear growth over time. The impact of German proficiency on growth was positive at MPT2 and MPT3, while the impact of heritage language proficiency was negative across all MPTs, yet the associated p values did not reach statistical significance. School type remained a marginally significant predictor for L3 English growth. Socioeconomic background contributed positively to L3 English longitudinal growth whereas cognitive ability was not found to impact the growth. Language background was a statistically significant predictor for L3 English growth, particularly indicating an advantage for the Russian-German group compared to the Turkish-German group. Overall, the results did not indicate a clear bilingual advantage due to a lack of a positive pattern in L3 growth trajectories and growth rate. The lack of linear growth may stem from the influence of extra-linguistic, i.e., contextual factors, participants' age, educational level, and bilingual profiles, and the status of heritage languages in educational, societal, and home settings.

7.2. Abstract (German)

Diese Dissertation untersuchte die Zusammenhänge zwischen herkunftsbezogener Zweisprachigkeit und der longitudinalen Entwicklung von L3-Englisch im deutschen Sekundarschulkontext anhand eines Längsschnittdesigns. Neben der Untersuchung der longitudinalen Wachstumsverläufe und der Wachstumsrate von L3-Englisch bei herkunftsbezogenen zweisprachigen Schülern untersuchte die Dissertation, welche sprachlichen (d. h. Kenntnisse der Herkunftssprache, Kenntnisse der Mehrheitssprache und L1-Hintergrund) und außersprachlichen (d. h. kognitive Fähigkeiten, sozioökonomischer Status und Schultyp) Faktoren die Entwicklung von L3-Englisch beeinflussten. Die Teilnehmer waren 301 herkunftsbezogene zweisprachige Schüler (Russisch-Deutsch=123, Türkisch-Deutsch=178) aus 72 Schulen in acht Bundesländern. Die Schüler nahmen an den ersten drei Wellen des MEZ-Projekts (MEZ – 2014–2019) teil, das die mehrsprachige Entwicklung von Sekundarschülern im deutschen Bildungskontext untersuchte. Die Längsschnittdaten wurden zunächst mithilfe einer Reihe deskriptiver und inferentieller Statistiken (z. B. Differenzanalyse und Korrelationsanalyse) untersucht. Die Hauptanalysen wurden mithilfe der Methodik der latenten Wachstumskurvenmodellierung im Kontext der Strukturgleichungsmodellierung durchgeführt. Die Ergebnisse der latenten Wachstumskurvenmodellierung zeigten, dass der Ausgangswert, das Ausgangsniveau in L3 Englisch, signifikant positiv war. Darüber hinaus wurde bei den L3-Englisch-Ausgangsergebnissen eine leichte, jedoch statistisch signifikante Abweichung festgestellt. Der Mittelwert der linearen Steigung, die Wachstumsrate, war leicht negativ, wobei die Ergebnisse über drei Messzeitpunkte hinweg durchschnittlich um 0,061

sanken. Darüber hinaus zeigten die Ergebnisse, dass sich die Wachstumsverläufe in L3-Englisch bei den herkunftszweisprachigen Schülern im Laufe der Zeit nicht erheblich unterschieden. Darüber hinaus wurde festgestellt, dass die Ausgangsergebnisse in L3-Englisch bei den herkunftszweisprachigen Schülern nicht unbedingt deren Wachstum in L3-Englisch über drei Messzeitpunkte hinweg vorhersagten. Bezüglich der Zusammenhänge zwischen sprachlichen und außersprachlichen Variablen und dem Wachstum der L3-Englischkenntnisse zeigten die Analysen, dass insbesondere der Einfluss der Mehrheitssprachenkompetenz Deutsch in allen drei MTPs für die Baseline signifikant und positiv war. Der Einfluss der Herkunftssprachenkompetenz war in MTP1 signifikant und positiv, in MTP2 negativ und nicht signifikant sowie in MTP3 negativ und signifikant. Der Einfluss des Schultyps war statistisch signifikant, d. h. der Besuch des Gymnasiums war stark mit einem höheren Ausgangsniveau der L3-Englischkenntnisse verbunden. Der Einfluss des sozioökonomischen Hintergrunds war negativ, aber statistisch nicht signifikant, während der Einfluss der kognitiven Fähigkeiten positiv und statistisch signifikant war. Bezüglich des Wachstums der L3-Englischkenntnisse zeigten die Ergebnisse, dass weder die Herkunftssprachenkompetenz noch die Mehrheitssprachenkompetenz ein lineares Wachstum im Zeitverlauf vorherzusagen scheinen. Der Einfluss der Deutschkenntnisse auf das Wachstum war in MPT2 und MPT3 positiv, während der Einfluss der Herkunftssprachenkompetenz in allen MPTs negativ war, die zugehörigen p-Werte erreichten jedoch keine statistische Signifikanz. Der Schultyp blieb ein marginal signifikanter Prädiktor für das Wachstum von L3-Englisch. Der sozioökonomische Hintergrund trug positiv zum longitudinalen Wachstum von L3-Englisch bei, während die kognitiven Fähigkeiten keinen Einfluss auf das Wachstum hatten. Der sprachliche Hintergrund war ein statistisch signifikanter Prädiktor für das Wachstum von L3-Englisch und deutete insbesondere auf einen Vorteil der russisch-deutschen Gruppe gegenüber der türkisch-deutschen Gruppe hin. Insgesamt deuteten die Ergebnisse nicht auf einen klaren

zweisprachigen Vorteil hin, da ein positives Muster in den L3-Wachstumsverläufen und der Wachstumsrate fehlte. Das fehlende lineare Wachstum könnte auf den Einfluss außersprachlicher, d. h. kontextueller Faktoren, des Alters, des Bildungsniveaus und der zweisprachigen Profile der Teilnehmer sowie des Status der Herkunftssprachen im Bildungs-, Gesellschafts- und Familienumfeld zurückzuführen sein.

7.3. Eidesstattliche Versicherung

Ich versichere an Eides statt durch meine eigene Unterschrift, dass ich die vorliegende Dissertation selbstständig und ohne fremde Hilfe angefertigt und alle Inhalte (Text, Bild, Ton, Video und Daten anderer Art), die identisch oder annähernd identisch aus bestehenden Quellen übernommen wurden, als solche kenntlich gemacht und dass ich mich auch keiner anderen als der angegebenen Quellen und Hilfsmittel bedient habe.

Sofern im Zuge der Erstellung der vorliegenden Dissertationsschrift generative Künstliche Intelligenz (gKI) basierte elektronische Hilfsmittel verwendet wurden, versichere ich, dass meine eigene Leistung im Vordergrund stand und dass eine vollständige Dokumentation aller verwendeten Hilfsmittel gemäß der Guten wissenschaftlichen Praxis vorliegt. Ich trage die Verantwortung für eventuell durch die gKI generierte fehlerhafte oder verzerrte Inhalte, fehlerhafte Referenzen, Ver-stöße gegen das Datenschutz- und Urheberrecht oder Plagiate.

Ich versichere, diese Arbeit nicht bereits in einem anderen Promotionsverfahren eingereicht zu haben. Ich versichere die inhaltliche und formale Gleichheit der eingereichten Print- und Digitalexemplare.

Hamburg, 17.12.2025 Tugba Elif TOPRAK YILDIZ