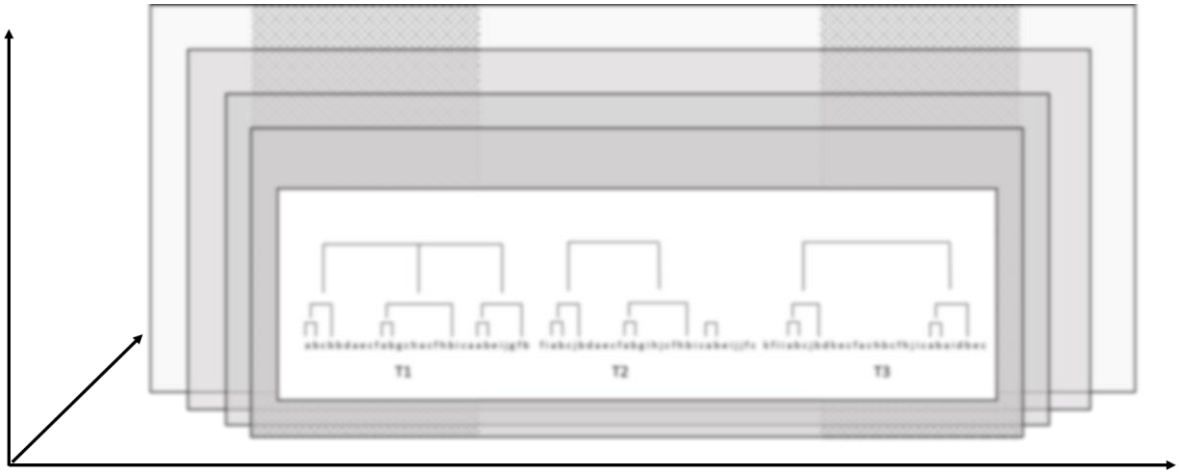
Emergent Social Interaction Phenomena in Organizations:

The Interplay of Stable and Dynamic Elements and the Role of Time



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Emergent Social Interaction Phenomena in Organizations: The Interplay of Stable and Dynamic Elements and the Role of Time

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ABSTRACT

We spend a substantial part of our lives at work. Thus, the study of behavior within organizations is important to psychology. Organizational behavior is the main driver of organizations as dynamic entities. Core to organizational behavior are emergent phenomena. As lower level elements (e.g., team members) interact with each other, a process unfolds that manifests at higher, collective levels (e.g., the team) as emergent phenomena. These phenomena significantly impact organizational functioning. Yet, research insights into the interplay of perceptual and behavioral mechanisms and how these unfold over time is much limited. Accordingly, theoretical approaches that explain how stable (e.g., team member characteristics) and dynamic (e.g., interaction behavior) elements interact as emergent phenomena manifest in organizational contexts and temporal considerations of these processes are lacking. Addressing this gap in the literature, this dissertation project sets out to investigate how gender, as a stable team member characteristic, is involved in the team processes of humor and leadership emergence and how temporal scopes can advance scholarly understanding of these emergent phenomena.

Specifically, Study 1, a comprehensive cross-disciplinary literature review, investigates the impact of gender in meetings, focusing on observational studies. The review identified six key gender-related variables—individual gender, sex role orientation, gender composition, gender salience, contextual factors (such as task type and organizational settings), and the conceptualization of gender as a social construct. By synthesizing scattered research findings, the study provides a valuable resource for researchers exploring the intersection of meetings and gender. Additionally, it outlines current methodological challenges and proposes recommendations for future studies, laying the foundation for subsequent research within this dissertation.

Study 2 implements one of the recommendations from Study 1 utilizing gender as a classic control variable to reevaluate meeting science data. The analysis explores the impact of gender on the relationship between perceived humor—an emergent phenomenon in teams—and meeting satisfaction, aiming to understand how gender influences perceptual aspects of experiencing emergent phenomena unfolding in meetings. Drawing on a sample of US working adults (N = 662), the study reveals that perceived positive and interactive humor positively predicts meeting satisfaction, with a moderating effect of gender. Women benefit more from perceived humor experiences in terms of meeting satisfaction, shedding light on gender differences in relying on humor experiences during meetings.

Study 3 addresses the limitation of relying solely on cross-sectional survey data in Study 2 and investigates a different emergent phenomenon, leadership emergence, through an observational laboratory study. The study involves 34 zero-history three-person teams engaged in a collaborative task, with one team member acting as a confederate (male or female) consistently exhibiting emergent leader behavior. This design ensures comparable levels of leader behavior among male and female emergent leaders. A fine-grained interaction analysis of utterances over the interaction period is conducted to quantify verbal team interaction patterns and explore the dependence of these dynamics on the confederate's gender. The results reveal that leading behavior by one team member influences subsequent following behavior in other team members, predicting their levels of ascribed emergent leadership. While leading behaviors by male and female emergent leaders are equally likely to be followed, female emergent leaders' leading behaviors elicit more challenging behavior than those of male emergent leaders. This study sheds light on the micro-temporal contingencies within the emergent phenomenon of leadership and identifies gender-related differences in behavioral interaction patterns, providing crucial insights into the interplay of stable and dynamic elements in emergent phenomena.

Study 4 reviews conceptual models of leadership and followership explored with behavioral approaches at different temporal scopes, offering an overview of techniques for observing, manipulating, or training actual leader- and/or followership behaviors. We identify types of behaviors studied, methodological approaches, and study contexts, deriving six future research directions. These directions include connecting actual and perceived leader/follower behaviors, nuanced consideration of temporal granularity, exploration of interdependent behavioral patterns, leveraging unconventional research methods, performing multimodal behavior analyses, and advocating for more field research. This comprehensive overview addresses conceptual gaps in behavioral leadership and followership research and provides scholars with a methodological toolbox and guidelines for designing behavioral studies in this field.

Integrating across the four studies, three main theoretical implications are derived pertaining to the role of perception and behavior, team processes unfolding over time at different temporal scopes, and the interplay of stable and dynamic elements. These implications result in the overarching three-dimensional framework of temporal and contextual dynamics of emergent social interaction phenomena. Limitations that extend beyond those discussed in the individual studies as well as concrete for future research and practical implications are discussed.

Keywords: Emergent phenomena, team processes, gender, meetings, leader-follower-interactions, theory-method-alignment, temporal dynamics, organizational behavior

ZUSAMMENFASSUNG

Wir verbringen einen erheblichen Teil unseres Lebens bei der Arbeit. Daher ist ein tieferes Verständnis des menschlichen Verhaltens innerhalb von Organisationen für die Psychologie wichtig. Organisationsverhalten ist der Hauptantrieb für Organisationen als dynamische Einheiten. Zentral für das Organisationsverhalten sind emergente Phänomene. Wenn Elemente auf unterer Ebene (z. B. Teammitglieder) miteinander interagieren, entfaltet sich ein Prozess, der auf höheren, kollektiven Ebenen (z. B. dem Team) als emergentes Phänomen manifest wird. Diese Phänomene beeinflussen maßgeblich die Funktionsweise von Organisationen. Dennoch sind Forschungseinblicke in das Zusammenspiel von Wahrnehmungs- und Verhaltensmechanismen und wie diese sich über die Zeit hin entwickeln, limiert. Dementsprechend fehlen theoretische Ansätze, die erklären, wie stabile (z. B. Merkmale von Teammitglieder) und dynamische (z. B. Interaktionsverhalten) Elemente als emergente Phänomene in organisatorischen Kontexten zusammenspieln, sowie zeitliche Überlegungen zu diesen Prozessen.

Um diese Lücke in der Literatur zu schließen, setzt sich dieses Dissertationsprojekt das Ziel, zu untersuchen, wie Geschlecht, als eine stabiles Merkmal von Teammitgliedern, in den Teamprozessen Humor und emergente Führung involviert ist und wie zeitliche Perspektiven das wissenschaftliche Verständnis dieser emergenten Phänomene voranbringen können.

Konkret untersucht Studie 1, eine umfassende interdisziplinäre Literaturübersicht, die Auswirkungen von Geschlecht in Meetings in Beobachtungsstudien. Die Übersicht identifiziert sechs wesentliche geschlechtsbezogene Variablen: individuelles Geschlecht, Geschlechterrollenorientierung, Geschlechterzusammensetzung, Geschlechtsrelevanz, kontextuelle Faktoren (wie Aufgabentyp und organisatorische Rahmenbedingungen) und die Konzeptualisierung von Geschlecht als soziales Konstrukt. Durch die Synthese verstreuter

Forschungsergebnisse bietet diese Studie eine wertvolle Ressource für Forschende, die die Schnittstelle von Meetings und Geschlecht erkunden. Zusätzlich werden aktuelle methodische Herausforderungen skizziert und Empfehlungen für zukünftige Studien vorgeschlagen, die den Grundstein für nachfolgende Studien in dieser Dissertation legen.

Studie 2 setzt eine der Empfehlungen aus Studie 1 um und nutzt Geschlecht als klassische Kontrollvariable, um Daten aus der Meetingforschung neu zu analysieren. Die Analyse erforscht den Einfluss von Geschlecht auf die Beziehung zwischen wahrgenommenem Humor - einem emergenten Phänomen in Teams - und der Meetingzufriedenheit. Ziel ist es zu verstehen, wie Geschlecht die wahrnehmungsbezogenen Aspekte bei der Entfaltung emergenter Phänomene in Meetings beeinflusst. Basierend auf einer Stichprobe von US-amerikanischen Berufstätigen (N = 662) zeigt die Studie, dass wahrgenommener positiver und interaktiver Humor die Meetingzufriedenheit positiv vorhersagt, wobei ein moderierender Effekt von Geschlecht besteht. Frauen profitieren mehr von wahrgenommenen Humorerlebnissen in Bezug auf die Meetingzufriedenheit, was auf geschlechtsspezifische Unterschiede beim Einsatz von Humorerlebnissen bei der Bewertung von Meetingerfahrung hinweist.

Studie 3 begegnet der Einschränkung, ausschließlich auf querschnittlichen Umfragedaten in Studie 2 zu beruhen, und untersucht ein anderes emergentes Phänomen, das Aufkommen von Führung, in einer beobachtenden Laborstudie. Die Studie umfasst 34 dreiköpfige Teams ohne Vorgeschichte, die an einer gemeinsamen Aufgabe arbeiten. Ein Teammitglied fungiert als Kollaborateur (männlich oder weiblich), das konsequent emergentes Führungsverhalten zeigt. Dieses Design stellt vergleichbare Levels von Führungsverhalten bei männlichen und weiblichen aufkommenden Führungskräften sicher. Eine feingranulare Interaktionsanalyse von Äußerungen über den Interaktionszeitraum hinweg wird durchgeführt, um verbale Teaminteraktionsmuster zu quantifizieren und die

Abhängigkeit dieser Dynamiken vom Geschlecht des Kollaborateurs zu untersuchen. Die Ergebnisse zeigen, dass das Führungsverhalten eines Teammitglieds nachfolgendes Folgeverhalten in anderen Teammitgliedern beeinflusst und deren Levels an zugeschriebener aufkommender Führung vorhersagt. Während Führungsverhalten von aufkommenden Führungskräften, unabhängig vom Geschlecht, gleichermaßen häufig gefolgt wird, provoziert Führungsverhalten von weiblichen aufkommenden Führungskräften mehr herausforderndes Verhalten als das von männlichen aufkommenden Führungskräften. Dieses Kapitel beleuchtet die mikro-temporalen Bedingtheiten innerhalb des emergenten Phänomens der Führung und identifiziert geschlechtsbezogene Unterschiede in den Verhaltensinteraktionsmustern, was wichtige Einblicke in das Zusammenspiel stabiler und dynamischer Elemente in emergenten Phänomenen bietet.

Studie 4 überprüft konzeptuelle Modelle von Führung und Gefolgschaft, die mit Verhaltensansätzen zu unterschiedlichen zeitlichen Perspektiven erforscht wurden, und bietet einen Überblick über Techniken zur Beobachtung, Manipulation oder Schulung von tatsächlichem Führungs- und/oder Gefolgschaftsverhalten. Wir identifizieren untersuchte Verhaltensarten, methodologische Ansätze und Studienkontexte und leiten sechs zukünftige Forschungsrichtungen ab. Diese Richtungen umfassen die Verbindung von tatsächlichem und wahrgenommenem Führungs-/Gefolgschaftsverhalten, die nuancierte Berücksichtigung zeitlicher Granularität, die Erforschung interdependenter Verhaltensmuster, die Nutzung unkonventioneller Forschungsmethoden, die Durchführung multimodaler Verhaltensanalysen und die Befürwortung von mehr Feldforschung. Dieser umfassende Überblick behandelt konzeptionelle Lücken in der Forschung zu Verhaltensführung und -gefolgschaft und bietet Wissenschaftlern eine methodische Toolbox und Leitlinien für die Gestaltung von Verhaltensstudien in diesem Bereich.

Die Integration der vier Studien führt zu drei Haupttheorieableitungen hinsichtlich der Rolle von Wahrnehmung und Verhalten, der sich im Laufe der Zeit entfaltenden Teamprozesse auf verschiedenen zeitlichen Ebenen und des Zusammenspiels stabiler und dynamischer Elemente. Diese Ableitungen münden in das übergreifende dreidimensionale Rahmenkonzept der zeitlichen und kontextuellen Dynamik emergenter sozialer Interaktionsphänomene. Es werden Beschränkungen erörtert, die über die in den einzelnen Kapiteln diskutierten hinausgehen, sowie konkrete Ideen für zukünftige Forschung und praktische Implikationen vorgestellt.

Stichwörter: emergente Phänomene, Teamprozesse, Geschlecht, Meetings, leader-follower Interaktionen, Übereinstimmung von Theorie und Methode, zeitliche Dynamiken, Organisationsverhalten

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*Articles marked with an asterisk are included in the present dissertation. Please, note that the included versions of these articles are not the copy of record and may not precisely replicate the authoritative documents published in the respective journals.

CHAPTER 1. GENERAL INTRODUCTION & THEORETICAL FRAMEWORK

We spend a substantial part of our lives at work. Since work typically happens in organizations, the study of "the impact individuals, groups, and structure have on behavior within organizations" (i.e., organizational behavior; Robbins and Judge, 2018; p. 33) is important to the discipline of psychology. Organizations are open systems, meaning that they influence and are influenced by their surroundings (Scott & Davis, 2000). In contrast to the concrete walls of the organization's building, the organizational life occurring within these walls is inherently dynamic and driven by organizational behavior (Weick, 1974). One core aspect of organizational behavior are emergent social interaction phenomena (hereafter: emergent phenomena). These arise as individuals (e.g., team or organizational members) interact with each other and manifest bottom-up at higher, collective levels (i.e., the team or the organization; Cronin et al., 2011).

There are three core elements that characterize emergent phenomena. First, they involve multiple levels (e.g., the individual and the team level; Cronin et al., 2011). Second, they have a strong process-oriented character (Kozlowski et al., 2013): To understand how exactly the interaction of individuals gives rise to the higher-level, emergent phenomenon, involves identifying and defining the building blocks of the interaction, the order in which these building blocks are assembled, and the context in which they unfold (Hoogeboom & Wilderom, 2020; Kozlowski, 2022). Finally, building on this aspect, conceptualizing emergent phenomena involves a temporal component, since time needs to elapse for the process to unfold (Kozlowski & Chao, 2018).

Prior work, in particular in the area of team research, has revealed important affective, cognitive, attitudinal, and behavioral emergent phenomena that contribute to the success of organizational functioning (Cohen & Bailey, 1997; Kozlowski & Chao, 2018; Ilgen et al., 2005; Kozlowski & Ilgen, 2006; Mathieu et al., 2008; Salas et al., 2004). Despite the value of this work, organizational research still has a long way to go to properly account for the multilevel structure, the process-orientation, and the time-dependence of emergent

phenomena (Kozlowski & Chao, 2018; Leenders et al., 2016). The interindividual interaction processes at the core of emergent phenomena involve *behavior* (Bonito & Sanders, 2011; Kozlowski et al., 2013), defined as "the internally coordinated responses (actions or inactions) of whole living organisms (individuals or groups) to internal and/or external stimuli, excluding responses more easily understood as developmental changes" (Levitis et al., 2009, p. 103). Strong theories of emergent phenomena would provide precise rules that govern the behavioral interaction processes and how these evolve with time (i.e., process mechanisms; Kozlowski, 2022).

Yet, most theories use "static constructs as 'process proxies'" (Kozlowski, 2022, p. 218). Rather than explaining the rules that determine the process (i.e., how the subsystems interact to give rise to a higher-level emergent phenomenon), theories include a static construct mediating the relationship between inputs and outputs (Kozlowski, 2022). These static constructs are typically measured via team members' aggregated self-reports (Kozlowski et al., 2018). Thereby, the complex team interactions constituting the emergent phenomenon are summarized to simple, static aggregates (Leenders et al., 2016). As a consequence, the behavioral interactions and team members' perceptions thereof are confounded (Kozlowski, 2015). To adequately inform how emergent phenomena unfold, an understanding of perceptual and behavioral process mechanisms is important (Kozlowski et al., 2013).

A further limitation of the typical static approach to emergent phenomena concerns the inability to conceptualize the interplay between dynamic elements (i.e., those that change over time, such as behaviors), and stable elements (e.g., contextual features, team member characteristics) in shaping emergent phenomena. Individuals' gender represents one such stable element. As one of the most prominent social categories (Deaux, 1984; Heilman, 2012) gender also represents "an omni-relevant aspect of workplace [interactions]" (Holmes, 2008, p. 479). This renders gender an important stable characteristic whose impact on dynamic

processes may reveal important insights for behavioral and perceptual mechanisms underlying emergent phenomena in organizations. Surprisingly, management research has devoted comparably little attention to gender (Broadbridge & Simpson, 2011; Sperber et al., 2023). To illustrate, a review of 60 years of research published in the *Academy of Management Journal* identified 107 studies (ca. 3% of the journal's publications) that included gender as a focal construct (Joshi et al., 2015). As a comparison, a review article on entrepreneurship – a "newly developing" field at the time – identified 50 articles in the same journal (Ireland et al., 2005). Given that gender impacts most if not all areas of the work domain (Holmes, 2008), there is a pressing need to gain a better understanding of how it affects emergent phenomena.

In short, insights into the time-dependent processes of dynamic and stable elements of emergent phenomena remain largely obscured in present research. This dissertation investigates how gender, as a stable team member characteristic, is involved in emergent team processes - specifically humor and leadership. By studying perceptual, behavioral, and temporal dynamics, I provide nuanced insights into the mechanisms underlying emergent phenomena. Thereby, I contribute in four meaningful ways to the extant literature. First, by studying the role of gender in team interaction contexts, including meetings, I add urgently required insights on gender to the literature of organizational behavior. Second, I provide empirical work on perceptual and behavioral factors that play into emergent phenomena illustrating the importance of precise theory and methodology in this regard. Third, I illuminate the role of time in interaction processes including temporal contingencies of behavioral acts and the role of temporal scopes. Finally, I offer important starting points for theorizing on the interplay of stable and dynamic elements in emergent phenomena in organizations, thereby shedding light on how dynamic organizational behavior unfolds within the concrete walls of organizations.

2. Theoretical Framework

2.1 Processes of Emergence in Teams

Team processes are a prime example of emergent phenomena in organizations. *Teams* are integral to organizations (O'Neill & Salas, 2018). They consist of three or more individuals that interact socially, and interdependently to work towards a common goal (Moreland, 2010; Reimer et al., 2017). Organizations rely on teams to pool expertise, share knowledge, and enable prompt responses (Delice et al., 2019; Mathieu et al., 2008). Thereby, teams are a key factor for the productivity of organizations and enable them to adapt in fast changing environments (Kozlowski et al., 1999). *Team processes* encompass the collaborative and interdependent integration of individual resources, as team members coordinate their knowledge, skills, and effort to accomplish task demands (Kozlowski & Ilgen, 2006; Marks et al., 2001). Accordingly, team processes are at the core of team functioning and critical to organizational success (LePine et al., 2008; Mathieu et al., 2008).

For a long time and to this date, team research has drawn on the input-process-output model (IPO; McGrath, 1964) to explain the influence of team processes on team outcomes (Klonek et al, 2019; LeDoux et al., 2012; Leenders et al., 2016). The model describes how team processes transform *inputs*, that is individual, team, and organizational characteristics and resources, such as employee skills or team composition, into *outputs* (e.g., team creativity, team performance) (Kozlowski & Ilgen, 2006). As a mediating mechanism, *processes* encompass team members' activities as they pool their inputs to accomplish task requirements (or fail to do so; Kozlowski & Ilgen, 2006). Key team processes include team climate, team learning, or team conflict (Kozlowksi & Ilgen, 2006). Team processes as defined by the IPO model imply *interaction* amongst team members and *time* to elapse (Kozlowski & Chao, 2018; Kozlowski & Klein, 2000; Leenders et al., 2016).

The IPO model has been criticized previously (e.g., Ilgen et al., 2005; Mathieu et al., 2019): A number of mechanisms that mediate the effect of inputs on outputs do not exactly apply to the above definition of *processes*. Rather, they manifest as emergent cognitive or affective states (e.g., the degree to which team members overlap in their perceptions of trust levels in the team). Further, the IPO model suggests a singular performance cycle disregarding any feedback loops (e.g., outputs may represent future inputs to the team process). Finally, the model rules out interactions between input and processes. Addressing these limitations, Ilgen and colleagues (2005) developed the Input-Mediator-Output-Input (IMOI) model. Although this model provides a more nuanced perspective on team processes, differentiating the relationships between inputs, mediators, and outputs at early and more mature stages of the team's lifecycle and considering outputs of one cycle as possible inputs of the next cycle, it still assumes linear relationships which do not adequately model the constantly changing, oftentimes chaotic dynamics of team processes (e.g., Cronin et al., 2011). Moreover, clear distinctions between behavioral processes and perceptions therefore remain poorly addressed (Kozlowski, 2015)

Embracing this dynamic nature of team processes, the literature increasingly views teams as complex systems that 1) are comprised of subsystems (e.g., team members) and 2) are integrated in a higher-level complex system – the organization – forming the multilevel structure in which teams are embedded (Arrow et al., 2000; Cronin et al., 2011; Kozlowski, 2022; Leenders et al., 2016). Within this multilevel structure, teams are governed by microdynamics, that is the relationships and behaviors unfolding between team members (Humprey & Aime, 2015). However, this complex dynamic system perspective on team processes does not resonate well with traditional theoretical approaches that are mostly based on linear thinking, including the IPO and IMOI (Humphrey & Aime, 2014). Mathieu and colleagues (2019, p. 19) have thus developed further on these models resulting in the ABCDE model team effectiveness which represents inputs, mediators, and contextual elements "as

overlapping coevolving facets of teams that collectively combine to generate effectiveness [i.e., outputs]". The ABCDE model accounts for a range of important factors, including team member perceptions, feeding into emergent phenomena. However, it is relatively broad and hence, vague and still does not account for temporal dynamics. Thus, in this dissertation, I focus on the microdynamics of team processes to work towards specifying the behavioral, perceptual, and temporal dynamics that unfold between team members at the core of these processes.

Behavioral interactions between team members are the backbone of team processes (Bonito & Sanders, 2011; Marks et al., 2001). Whichever activity teams engage in, will most likely involve team member interaction that then translates into a collective cognitive, emotional, or behavioral change at the team level (Bonito & Sanders, 2011). One important aspect of team interaction is that the behavioral acts comprising the interaction may occur in patterns. Interaction patterns are "sets of observable behaviors that evolve sequentially and occur at certain time intervals" (Hoogeboom & Wilderom, 2020, p. 6). Team interaction research has identified patterns and routines that predict team and organizational outcomes (Keyton, 1999; Hoogeboom & Wilderom, 2020; Lehmann-Willenbrock & Allen, 2014; Lehmann-Willenbrock & Kauffeld, 2012; Lei et al., 2016; Zijlstra et al., 2012). Importantly, fine-grained communicative interaction patterns may be more informative for team performance than the additive sum of individual communicative acts (Kim et al., 2012; Kolbe et al., 2014; Zijlstra et al., 2012). Although still in its infancy, this line of research offers a promising avenue to uncover how exactly inputs feed into behavioral acts and interaction patterns, how they are perceived by team members and thereby affect team outcomes (Kolbe & Boos, 2019).

An important element to understand how team interaction patterns unfold concerns the fine-grained, temporal relationships or the sequential order of behavioral acts (Quera, 2018). Thus, temporal considerations move into focus. First, team processes may change over

time as a function of internal and external dependencies (Klonek et al., 2019). For example, complaints by one team member may trigger more complaints by other team members resulting in a negative feedback loop that may lead to a passive group mood (Lehmann-Willenbrock et al., 2011). Hence, team processes are contingent on internal dynamics. But team processes may also respond to external factors that change over time such as the stability of deadlines (Waller et al., 2002). Time also matters in terms of a team's life cycle (Marks et al., 2001). As teams move through different phases while accomplishing their task (e.g., planning, coordinating, executing, evaluating), the specific task requirements may change (Marks et al., 2001). As a result, the processes that lead to effective collaboration may differ as well (Georganta et al., 2021; Lee & Farh, 2019; Manser et al., 208; Schmutz et al., 2018 2016).

A further vital aspect of time that is hardly specified in current conceptual models of emergent team phenomena is the temporal scope at which the phenomenon of interest unfolds (Klonek et al., 2019). This has implications for understanding the nature of the phenomenon itself. For example, does team conflict only need a few minutes to emerge or does it evolve over a couple of weeks? What can we learn about the nature of the phenomenon if we consider this temporal persepctive? Can we distinguish between different types of conflict patterns depending on the temporal scope that we focus on? Another related aspect is the rate at which the phenomenon changes (Cronin et al., 2011). Leenders and colleagues (2016) have postulated that rates may be a fundamental foundation for processual theory and research designs. The rate of change will inform the temporal scope required to grasp the evolution of the emergent phenomenon. In a similar way, understanding how the context may shape the emergent phenomenon also involves an understanding of the temporal dimensions: How may disruptive events (e.g., change in leadership, change in organizational culture) affect an emergent phenomenon? The disruptive event itself will require a certain amount of time to

manifest. Thus, the emergent phenomenon may have to be long enough for the disruptive event to be meaningful to its evolution.

Gradually, more scholars are adopting these fundamental considerations related to time and temporal change in their theorizing about team processes (e.g., Arrow et al., 2000; Guastello, 2007; Luciano et al., 2018; Ramos-Villagrasa et al., 2018). Yet, a large body of research based on the IPO model approach them in a static way (Kozlowksi & Chao, 2018; Kozlowski & Ilgen, 2006; Leenders et al., 2016). Theoretical models of team processes gain explanatory strength if they lay out the precise process mechanisms that account for the underlying behavioral and temporal dynamics (Kozlowski, 2022). While more work is required to define precise process mechanisms underlying emergent phenomena in organizational teams, advances in team research can be applied to other, related fields including leadership (Kozlowski, 2016; 2022).

2.2 Leadership in Teams: A Process-Oriented Perspective

Leadership is a central component to organizational success (Yammarino, 2013). In organizational science, it has mostly been approached as a top-down phenomenon (Burke et al., 2011; Lord et al., 2017). For example, scholars have studied how specific leadership styles affect team interaction styles or team learning (Bucic et al., 2010; Hambley et al., 2007). However, leadership is increasingly acknowledged and conceptualized as a process of social influence that unfolds over time as organizational members interact with each other (Cook et al., 2020; DeRue, 2011; DeRue & Ashford, 2010; Sims & Weinberg, 2018; Vullinghs & Dóci, 2020). Such process-oriented approaches to leadership emphasize its collective and emergent character (Acton et al., 2018; Cox et al., 2022; Day et al., 2004; Denis et al., 2012; DeRue, 2011; Zhu et al., 2018). Importantly, these perspectives firmly intertwine leadership with a social interaction context. Thus, teams are an important realm where leadership processes emerge (Burke et al., 2011; Kozlowski et al., 2016).

Another key characteristic of an interactive leadership perspective is that interactions, by definition, involve at least two individuals (Yeomans et al., 2023). Thereby, process-oriented approaches to leadership explicitly integrate the role of followers. Followership had long been overlooked in the leadership field (Oc & Bashshur, 2013). Only more recently have researchers started to focus on followership in their theorizing (e.g., Bastardoz & Van Vugt, 2019; Matshoba-Ramuedzisi et al., 2022; Malakyan, 2014; Uhl-Bien et al., 2014). Adopting an interactive, process-oriented view on leadership incorporates theoretical considerations of both leading and following (e.g., DeRue & Ashford, 2010; Sims & Weinberg, 2018). Therefore, such process-oriented perspectives allow to integrate conceptual and empirical work on leadership and followership into one unified process (e.g., Sims & Weinberg, 2018).

Just as applies to team processes more generally, a better understanding of the conceptual role of behavior and time becomes crucial for acquiring a deeper comprehension of leadership (and followership) processes (Banks et al., in press; Bastardoz & Adriaensen, 2023). While the team literature has made more progress with regard to modeling dynamic processes (e.g., Luciano et al., 2018; Ramos-Villagrasa et al., 2018), leadership and followership research lags behind (e.g., Banks et al., in press; Bastardoz & Adriaensen, 2023). Thus, leadership research may truly benefit from a stronger integration with team research to specify the behavioral and temporal dynamics that unfold between individuals as they construct and enact leader and follower roles.

2.3 Meetings: A Lense Into Emergent Team Phenomena

To study emergent phenomena within teams and organizations, meetings serve as an invaluable vantage point. Defined as “communicative event[s] involving three or more people who agree to assemble for a purpose ostensibly related to the functioning of an organization or a group” (Schwartzman, 1989, p. 7), meetings constitute an integral part of the daily routines of most employees and managers, representing a frequent organizational element

(Lehmann-Willenbrock et al., 2018). Positioned at the heart of organizations, meetings have a direct impact on key organizational outcomes including individual engagement, emotional exhaustion, and job satisfaction, as well as team productivity and organizational success (Allen et al., 2014; Kauffeld & Lehmann-Willenbrock, 2012; Lehmann-Willenbrock et al., 2018; Rogelberg et al., 2010; Myrsiades, 2014).

Importantly, meetings are inherently interactive in nature (Meinecke & Lehmann-Willenbrock, 2015). They are forums for information sharing, problem solving, or socializing (Allen et al., 2014). Interaction and interdependence rather than co-presence is what characterizes the activities of individuals as they attend a meeting (Bonito & Sanders, 2011; Schwartzman, 1989). Given this prime role of communication, meetings become instances during which relationships between employees and with their leaders are formed and maintained shaping the social dynamics of the team (Bonito & Sanders, 2011; Gerpott & Kerschreiter, 2022). Hence, meetings offer excellent peepholes into the interactions from which team processes and other organizational phenomena emerge (Meinecke & Lehmann-Willenbrock, 2015).

Another aspect that adds to the benefit of studying meetings is that they provide rich social context in which behavioral interactions are embedded (Meinecke & Lehmann-Willenbrock, 2015). This offers avenues to examine how stable elements including team member characteristics like gender, intertwine with dynamic elements such as behavioral interactions in emergent phenomena. Regarding the study of gender in organizational research, meetings bear another key opportunity: they represent important occasions for sensemaking during which teams "construct and reconstruct their environments, interpret them and develop collective, coordinated response" (Scott et al., 2015, p. 25). Gender as construct is complex and socially constructed (Azul, 2015; Deaux, 1984; Deaux and Major, 1987). Thus, the social interactions playing out in meetings are particularly relevant for how employees understand – and learn how to deal with gender in their organizational context

(Baines, 2010; Baxter, 2014; Berger et al., 2015; Holmes & Schnurr, 2006). Such work could reveal important insights for better understanding the yet under-researched role of gender in organizations.

2.4 The Neglected Child: Gender in Organizational Science

Despite the pivotal role of gender in organizations, it remains largely neglected in organizational research (Acker, 2012; Broadbridge & Simpson, 2011; Joshi et al., 2015; Sperber et al., 2023). One crucial consequence of this oversight is a lack of conceptual clarity of gender as a construct in this research field (Hyde et al., 2019; Lindqvist et al., 2020). Often gender is either poorly defined or not defined at all, including publications in renowned outlets (e.g., Kray et al., in press; Miron-Spektor et al., 2023; Villamore et al., 2022; Williams & Tiedens, 2016). As a result, precise mechanisms explaining how gender or what aspects of gender affect other organizational constructs are lacking (Acker, 2012; Hyde et al., 2019; Joel et al., 2014; Lindqvist et al., 2020). This is a key limitation that also hampers the integration of gender as a factor that may impact emergent phenomena in organizations – and appropriately inform organizational policies (Hyde, 2014).

Lindqvist and colleagues (2019) define four layers of gender: sex (physiological/bodily aspects of gender, e.g., hormonal levels, physiognomy), gender identity or self-defined gender, legal gender (as designated and recorded in legal documents such as passports), and social gender or social role which includes norm-related behaviors and gender expression. Most research in organizational science draws on the term *gender* as a dichotomous social role that distinguishes between male and female social roles (e.g., Badura et al., 2018; Lanaj & Hollenbeck, 2015; Schlamp et al., 2020; Schock et al., 2019). Note that gender "is not and should not necessarily be assumed to be a binary variable, the existence of multiple genders is increasingly acknowledged and recognized" (Williams & Mean, 2004, p.

458). The multiple limitations of a binary approach will be addressed in depth in the discussion.

Social role theory (Eagly, 1987) postulates that in cultures where the different sexes fulfill different tasks (i.e., division of labor), they take on different social roles. Consequently, men and women are ascribed particular attributes and characteristics based on their social roles (Eagly & Karau, 1991). Most individuals are socialized into a male or female social role, at least to some degree (Eagly, 1987; Lopez Zafra & Garcia-Retamero, 2011). Thus, social gender roles may impact behavioral tendencies such as having specific communication styles that may also play out in team interaction contexts (Holmes & Meyerhoff, 1999). They may also impact the expectations that individuals hold of other people (i.e., women and men; Eagly, 1987). These expectations, in turn, inform how individuals perceive and evaluate others and their behavior (Deaux, 1984). For example, prior work revealed that men and women performing the same behavior were evaluated differently (Biernat, 2012; Biernat & Thompson, 2002; Eagly & Karau, 2002). For instance, Heilman and Chen (2005) found that men showing altruistic behavior were evaluated more favorable than those men wo did not show this behavior. For women there was no effect on favorability. But, not showing altruistic behavior was negative for women's favorability but had no effect for men.

Beyond affecting our evaluations of others, gender roles may also influence which behavioral actions we chose when we interact with others (Deaux, 1984). Williams and Polman (2015), for instance, showed that consultants who worked with mixed-gender client teams interacted with their clients (both male and female) in a more sensitive way compared to consultants working with all-male client teams. Meeting research suggests that the social context is influential for team interactions (Lehmann-Willenbrock & Chiu, 2018; Lehmann-Willenbrock et al., 2017a). For example, team members' interactions can be influenced by the gender composition (i.e., the proportion of women and men) of the group (e.g., Aries, 1976; Karakowsky et al., 2004; Smith-Lovin & Brody, 1989). In addition to the immediate social

context, gender may interweave with other contextual factors. Previous work has shown that the gender orientation of the task or discussion topic (e.g., planning an awareness campaign for breast cancer) may shape behavioral interactions (e.g., Farh et al., 2020; Karakowsky et al., 2004, Pearsall et al., 2008). Moreover, the gender-domination of an organization or the organizational sector (e.g., engineering vs. social work) may impact team processes (Berger et al., 2015; Hysom & Johnson, 2006).

In sum, gender, as a stable team member characteristic, may affect emergent phenomena in teams in a complex fashion. This includes intricate interactions with contextual factors such as team composition, the team task, or the organizational context, but also a complicated interplay of perceptual and behavioral components. To better understand how exactly gender interweaves with emergent phenomena in teams, carefully detangling these effects is one important step. This step requires formulating precise research questions on which aspects of gender are in focus and employing a precise methodology (Lindqvist et al., 2020). Just as applies to emergent phenomena as well, carefully differentiating between perceptual and behavioral facets at both, the conceptual and methodological level is key to advance research on gender in organizational behavior.

2.5 Theory-Method-Alignment

To enhance our understanding of how emergent phenomena unfold in teams, theory and methods need to align to adequately capture the behavioral and temporal dynamics time at the center emergent phenomena (Kolbe & Boos, 2019; Kozlowski, 2022; Van Maanen et al., 2007). Currently dominant theoretical models (e.g., IPO, IMOI) may impede theorizing that captures the complex dynamics discussed here (Kozlowski, 2022; Kozlowski & Chao, 2018; Van Maanen et al., 2007). Theorizing is typically visualized by models comprising "boxes and arrows" where the boxes represent the constructs of interest and the arrows denote the relationship between these constructs (e.g., the direction of the impact of one construct on

another; Kozlowski, 2022). While the benefit of this approach is to break down complex processes and order them in a sequential fashion, it may not adequately capture the complex dynamics unfolding in emergent team processes (Cronin et al., 2011). However, thinking about alternatives is very challenging given that most scholars are socialized into this way of academic thinking as they enroll in their academic training (Ramos-Villagrasa et al., 2018). In a similar way, most statistical approaches applied in team research derive from general linear models in some way or other (Knight et al., 2016). General linear models, however, are not necessarily optimal to capture and analyze the, in many cases, nonlinear dynamics of emergent team processes (Strauss & Grand, 2020).

A further important driver holding back theoretical advancement in team research and gender research alike lies in the applied methodology (Cronin et al., 2011; Delice et al., 2019; Hyde et al., 2019; Joel et al., 2014; Kozlowski & Chao, 2018; Lindqvist et al., 2020). Specific research questions and hypotheses call for specific types of data, designs, and statistical analyses to be tested appropriately (Kozlowski, 2022). Research questions addressing dynamic team processes require some form of behavioral data sampled over a specific period of time at sensible frequencies (Klonek et al., 2016; 2019; Kolbe & Boos, 2019; Leenders et al., 2016). Most research, however, has relied on cross-sectional survey data (Cronin et al, 2011; Delice et al., 2019; Kozlowski & Chao, 2018).

Surveys come with a host of limitations (e.g., coverage error, sampling error, nonresponse error, measurement error, response fatigue, memory effects, interrupting ongoing behavior; Kozlowski & Chao, 2018; Visser et al., 2000). Particularly relevant for the study of emergent phenomena is that surveys provide information on individuals' retrospective perceptions and evaluations, and if cross-sectional, represent singular snapshots in time (Banks et al., in press; Kozlowski & Chao, 2018). Perceptions and evaluations constitute an important facet of emergent phenomena and they need to be integrated into conceptual models as well (LeDoux et al., 2012; Shemla et al., 2016). However, surveys, even when longitudinal,

are limited in the frequencies at which they can be administered which restricts their capacities to uncover process mechanisms (Klonek et al., 2019). This may introduce "testing effects" and bears a high risk of distracting team members that can interfere with the natural process (Bell et al., 2018; Cook & Campbell, 1986; Klonek et al., 2019). Furthermore, memory is usually not precise enough to recall and report the multiple, detailed interaction patterns that occurred over a specific interaction (Kolbe & Boos, 2019; Kozlowski & Chao, 2018). Thus, over-relying on survey-design severely limits our ability to test and advance theorizing on the underlying behavioral and temporal dynamics of emergent phenomena (Klonek et al., 2016; Klonek et al., 2019).

Observational methods represent one crucial alternative to survey-research (Weingart, 1997). First, they have the potential to record longer chunks of uninterrupted team interaction increasing the likelihood to capture temporal dynamics as they unfold in the very moment (Klonek et al., 2016; Waller et al., 2013). As Leenders and colleagues (2016, p. 97) argued, "[*the] holy grain for research on team dynamics is to be able to watch a "movie" of team process as it unfolds, then pause the movie, and be able to answer the question: what will likely happen next and with what implications for outcomes?".* This moves data collection methods with high-sampling frequencies, that is high to near-continuous sampling rates also referred to as *high resolution data* to center stage (Klonek et al., 2019; Kozlowski, 2015). Such methods enable understanding how behavioral acts map onto team processes (i.e., emergent phenomena; Waller et al., 2013).

Second, observational methods allow for collecting behavioral data. Especially considering team processes, behavioral expressions are conceptually more precise to the theoretical constructs (Lehmann-Willenbrock & Allen, 2018). Particularly relevant are methods that allow researchers to study the micro-level communicative interaction patterns of team members are key (Lehmann-Willenbrock & Allen, 2018). These patterns are often a better predictor of team effectiveness than the sum of behavioral acts (Kolbe & Boos, 2019).

These patterns distinguish effective from ineffective teams (Hoogeboom & Wilderom, 2020, 2012; Keyton, 1999; Kim et al., 2012; Kolbe & Boos, 2019; Kolbe et al., 2014; Lehmann-Willenbrock & Allen, 2014; Lehmann-Willenbrock & Kauffeld; Lei et al., 2016; Zijlstra et al., 2012). For example, audiovisual recordings are one way to capture the interaction occurring within a meeting at a high-sampling frequency (only limited by the resolution of the technical equipment; Waller & Kaplan, 2018). The data gathered via this method may be further examined through a number of interaction analytical tools including coding and rating of the data (Keyton, 2018). These tools represent a systematic research technique for reliably unitizing and coding naturally occurring sequential interaction behaviors and making valid interpretations and inferences from those data.

On a further note, in research practice, methods not only have the function of testing theory but can also "generate and shape theory" (Van Maanen et al., 2007, p. 1146). The interplay between theory and method bears important consequences for conceptual advancement (Kozlowski, 2022; Van Maanen et al., 2007). As researchers think about new research questions and design studies, this process will likely be heavily informed by the methods they are familiar with and that are deemed as established (Kozlowski & Chao, 2018). While resorting on validated instruments and analytical procedures follows good scientific practice, it may limit researchers' awareness of other methods (Lehmann-Willenbrock & Allen, 2018). An omni-present set of specific methods may also limit scholars in their theory building (Kozlowski, 2022; van Maanen et al., 2007). Therefore, learning about diverse methods and extending the methodological repertoires comprises more than just a technical component of research on organizational behavior.

2.6 Overview of my Study Program

This cumulative dissertation comprises four chapters each including one study and concludes with a general discussion. Overall, the four chapters aim at illuminating the time-

dependent processes of dynamic and stable elements of emergent phenomena in organizations and in particular, the role gender, an under-researched stable team characteristic. The chapters offer nuanced insights into the mechanisms underlying emergence by examining perceptual, behavioral, and temporal dynamics. An overview of the fours studies is presented in Table 1.1.

Chapter 2 represents a comprehensive literature review across disciplines to explore the impact of gender on meetings. Focusing on observational studies in meeting research, we identified six key gender-related variables — individual gender, sex role orientation, gender composition, gender salience, contextual factors (such as task type and organizational settings), and the conceptualization of gender as a social construct. By synthesizing scattered research findings, this chapter provides a valuable resource for researchers investigating the intersection of meetings and gender. Additionally, we outline current methodological challenges in this field and proposed recommendations for future studies to address these issues, laying the foundation for the subsequent studies within this dissertation.

Chapter 3 implements one of the recommendations proposed in Chapter 2, utilizing gender as a classic control variable to reevaluate meeting science data. We analyze how gender affects the relationship between perceived humor, a emergent phenomenon in teams, and meeting satisfaction to understand how gender may impact perceptual aspects of experiencing and evaluating emergent team phenomena during meetings. For that purpose, we re-analyze a subsample of data from US working adults across various industries (N = 662). The results indicate that perceived positive and interactive humor positively predicts meeting satisfaction and reveal a moderating effect of gender, such that women benefit more from perceived humor experiences in terms of meeting satisfaction. This study sheds light on gender differences in humor experiences during meetings, emphasizing the significance of gender in drawing on perceptual experiences of emergent team phenomena for evaluating meetings (i.e., team interactions).

A major limitation of Chapter 3 is that it relies solely on cross-sectional survey data. In Chapter 4, addressing this shortcoming, we investigate a different emergent phenomenon, leadership emergence, in an observational laboratory study. The study involves the video-recordings of 34 zero-history three-person teams engaging in a collaborative task. One team member, was a confederate (male vs. female) trained to constantly show emergent leader behavior ensuring comparable levels of leader behavior of focal male and female team members. To quantify the verbal team interaction patterns and examine to what extent these team dynamics depended on the confederate's gender, we conduct a fine-grained interaction analysis of utterances over the interaction period. Our results reveal that leading behavior by one team member influenced subsequent following behavior in other team members. The frequency of following-responses to individuals' leading behaviors predict their levels of ascribed emergent leadership. While leading behaviors by male and female confederates are equally likely to be followed, leading behaviors by female confederates elicit more challenging behavior as those of male confederates. This chapter illuminates the micro-temporal contingencies of behavioral acts within this specific emergent phenomenon. Additionally, we identify gender-related differences in the behavioral interaction patterns. Providing a crucial insight into how stable elements may interplay with dynamic elements of emergent phenomena.

Chapter 4 demonstrates how the leadership literature can benefit from established conceptual and methodological approaches in team research. To encourage scholars exploring new research avenues, in Chapter 5, we review the conceptual models that have been investigated with behavioral approaches at different temporal scope. This includes a summary of the available methods to capture leader and follower behavior. Specifically, we offer an overview of techniques for observing, manipulating, or training actual leader- and/or followership behaviors. Furthermore, we show which types of behaviors have been studied in which study context (laboratory or field). Based on this analysis, we derive six future research

directions: conducting studies that connect actual and perceived leader/follower behaviors, considering temporal granularity in a nuanced manner, exploring interdependent behavioral patterns, leveraging unconventional research methods, performing multimodal behavior analyses, and conducting more studies "in the wild" (i.e., field research). Thereby, we offer scholars an overview of conceptual research gaps in behavioral leadership and followership research that may advance insights on emergent team phenomena.

Concluding my dissertation, in Chapter 6, I discuss and integrate the research findings of the four studies. I derive theoretical implication for the study of emergent phenomena in organizations addressing the role of perception and behavior, the temporal dynamics of emergent team phenomena, and the interplay of dynamic and stable elements in emergent team phenomena. The theoretical implications lead to a unifying theoretical framework that integrates the findings of the four studies. Chapter 6 also includes the limitations of this dissertation, namely (1) the conceptualization and measurement of gender, (2) a focus on positive constructs, (3) no consideration of the broader organizational context, and (4) no consideration of longitudinal insights at higher temporal scopes. Based on these critical considerations and additional points that are relevant to the study of emergent phenomena, I discuss future directions. Finally, I include recommendations for practitioners that can be derived from the above work.

Table 1.1.

Overview of Studies

	Study 1 (Chapter 2)	Study 2 (Chapter 3)	Study 3 (Chapter 4)	Study 4 (Chapter 5)
Research Aim	Provide an overview of scattered research on gender in meetings	Examine the role of humor perceptions on meeting experiences across gender	Investigate behavioral interaction patterns that give rise to leadership emergence and how gender is involved in this process	Review available methods to study leader and follower behavior at different temporal scopes
Study design	Systematic literature review of 43 empirical studies	Re-analysis of a meeting science data base using cross-sectional survey data collected from *N = 662*	Observational laboratory study with 34 three-person zero-history teams and 36,900 coded utterances	Systematic and integrative literature review of 266 empirical studies
Contribution to the dissertation	• Identify central aspects of gender involved in social interactions of meetings • Identify methodological challenges to the study of gender in meetings • Develop recommendations for future research to advance this field	• Provides evidence for gender differences in the experiences involved in emergent team phenomena • Shows that women rely more on humor experiences when evaluating their meeting satisfaction compared to men	• Highlight the fundamental role of micro-temporal contingencies of behavioral acts to understand emergent team phenomena • Identify specific interaction patterns involved in the emergence of leadership • Showcase how gender, as a stable team member characteristic, may affect interaction patterns and thereby emergent team phenomena	• Identify major conceptual research gaps in the field • Provide a methodological tool box to investigate leader-follower interactions • Derive concrete directions for future research
Authors	Clara S. Hemshorn de Sanchez, Annika Meinecke	Clara S. Hemshorn de Sanchez, Joseph A. Allen, & Nale Lehmann-Willenbrock	Clara S. Hemshorn de Sanchez, Jana Mangels, Juliane Degner, & Nale Lehmann-Willenbrock	Clara S. Hemshorn de Sanchez, Fabiola Gerpott, & Nale Lehmann-Willenbrock

CHAPTER 2. SOCIAL INFLUENCE IN MEETINGS – A GENDER PERSPECTIVE (STUDY 1)[1]

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ABSTRACT

Across different research fields it is increasingly acknowledged that gender is not a binary variable and goes beyond the male-female dichotomy. At the same time gender is a prominent social cue that affects evaluations and interactions among individuals. Thus, gender can impact social processes on many levels in complex ways. Meetings provide arenas where key social processes unfold that are relevant to the organization. Understanding which role gender takes in this context is therefore central to organizations as well as meeting research. This chapter provides a critical review of research to date on social influence in meetings, specifically zooming in on the role of gender. We conducted a multi-step systematic literature review and identified 43 studies across a wide area of disciplines (e.g., psychology, communication, management). We put special emphasis on the methodologies employed across this work since a comprehensive understanding of the applied methods is core for a synthesis of research results. Through our analysis we pinpoint six variables—individual gender, sex role orientation, gender composition, gender salience, contextual factors such as task type and organizational settings, and the construction of gender as a social concept—that are directly related to gender and which represent factors that are critical for the role of gender in the meeting context. Thereby, this chapter aims to provide a roadmap for researchers and practitioners interested in the role of gender during workplace meetings. We conclude by highlighting methodological and managerial recommendations and suggest avenues for future research.

Keywords: workplace meetings, gender, gender composition, social influence, team processes

> *The other day I had a meeting with my project group. We are a team of four students, two males and two females (including myself). As part of our project we had to discuss about the qualities of candidates for a fictional job position and agree on a ranked order. All of us had quite different opinions concerning their preferred candidate. Over the course of the conversation after we had already established the top three candidates, I noticed that our second choice actually was a much better compromise for the criteria highlighted by the different team members of our group compared to the choice we had ranked number one. I voiced this observation and suggested an alternative order of candidates. One of the two males on our team stated that he liked my suggestion and repeated it in his own words. Subsequently, the other male team member said that the idea suggested by the first male participant (which had actually been my idea) was great and that he would indeed vote for this alternative as well. I thought to myself "What?! That was my idea and not his!" I was also wondering whether the second male did that on purpose or whether he had simply not listened to what I had said before. I repeated my argument again, emphasizing that I had originally suggested it. Unfortunately, I have experienced situations like this in all sorts of different contexts before. It feels unfair that someone else (often a man) is rewarded for my ideas and it feels unfair that I need to make an extra effort to be heard and recognized.*
>
> *Anna H., January 2019*

Similar accounts have been described in previous research (e.g., Cunningham, Crandall, & Dare, 2017; Ford, 2008; McClean, Martin, Emich, & Woodroof, 2018) and especially in the popular press (e.g., Chira, 2017; Green Carmichael, 2018). The New York Times, for instance, issued a call on Facebook for people to share their experiences on gender at the workplace. Amongst the replies, one respondent wrote, “My female boss told me she needed to allow each man to interrupt her four times before protesting in a meeting. If she

protested more often, there were problems" (Chira, 2017). Another woman shared that she used to work for a large company where suggestions by one of the female colleagues would often be interrupted by the owner of the company whenever he attended meetings. These ideas would then resurface some time later as his own (Chira, 2017). Similarly, observing that "those couple work place scenarios, being ignored in a meeting, not getting credit for ideas, seem just as on topic now as they did back in the '90s" was the motivation to launch a podcast on "Women at work" for Sarah Green Carmichael, executive editor of the Harvard Business Review (2018).

While men may also experience similar situations, the number of reports highlight that, apart from constituting undesirable situations for individuals, this phenomenon represents a clear pattern of gender differences. From an ethical perspective, the observed inequality is reason enough to investigate how this problem could be resolved. From a more practical perspective, the consequences of these gendered patterns in workplace meetings can be severe. If an employee experiences repeatedly that during meetings her ideas are not valued or even ignored how motivated will she feel to make original contributions? What will it cost her to override these feelings to be able to continue making original contributions? How will this affect the dynamics between colleagues? In some cases this can be the reason for skilled female employees leaving the company (Chira, 2017; Mallette, 2017).

While the press has embraced this phenomenon spotlighting its emotional power, research within a diverse range of disciplines including psychology (e.g., Durham, 1980; Fuegen & Biernat, 2002), sociology (e.g., Giesen & McClaren, 1976; Lucas & Lovaglia, 1998), linguistics (e.g., Baxter, 2014; Holmes & Schnurr, 2006), women studies (e.g., Baines, 2010; Barett, 2004), and management (e.g., Dobbins, Long, Dedrick, & Clemons, 1990; Karakowski & McBey, 2001) has embarked upon the issue as well. The scattered literature and the breadth of theoretical and methodological approaches, however, pose a challenge to develop a clear understanding on the role that gender plays in meetings.

In this chapter, we provide a systematic overview of the existing literature on gender and meetings across various disciplines. Our specific focus on meetings distinguishes this review from previous publications which have examined gender in other work-related research fields such as virtual teams (Savicki, Kelley, & Lingenfelter, 1996), leadership (Badura, Grijalva, Newman, Yan, & Jeon, 2018; Paustian, Walker, Slattery, & Woehr, 2014), language (Leaper & Ayers, 2007), and diversity in teams more broadly (Bell, Villado, Lukasik, Belau, & Briggs, 2011; Bowers, Pharmer, & Salas, 2000). For the purpose of this review, we define meetings as "a communicative event involving three or more people who agree to assemble for a purpose ostensibly related to the functioning of an organization or a group" (Schwartzman, 1989, p. 7). Similar definitions have been applied in current research on meetings (e.g., Allen, Lehmann-Willenbrock, & Rogelberg, 2015; Allen, Lehmann-Willenbrock, & Sands, 2016; Mroz, Yoerger, & Allen, 2018). With regard to meeting types (Kello, & Allen, Chapter 2 of this volume), we mainly focus on generic staff meetings although our review also includes some studies on project team meetings and committee meetings.

From a theoretical perspective, a comprehensive review is an opportunity to compare and integrate the scattered findings on gender and meetings across various disciplines. From a methodological perspective, it is valuable to identify methodological aspects that are critical for successful gender research in meeting science and to uncover shortcomings in this research field. With this chapter we aim to build new knowledge that extends previous work on the role of gender in meetings and point out practical implications based on theory and empirical findings for those who frequently manage meetings.

2.1 Gender and Gender Composition

Before we introduce our review, we would like to give a brief overview on gender to understand its complexity in the context of meeting research. In terms of defining gender, we apply a binary approach because the studies that we review work with a male/female

dichotomy and most research participants identify themselves and are identified within organizational record and wider society as either man or woman. This approach is in line with previous reviews and meta-analyses on gender in the workplace (e.g., Paustian-Underdahl et al., 2014). Yet, we would like to note that gender is a socially constructed concept (Azul, 2015), "[which] is not and should not necessarily be assumed to be a dichotomous variable, [especially as] the existence of multiple genders is increasingly acknowledged and recognized" (Williams & Mean, 2004, p. 458). We elaborate on this notion in our discussion.

Gender as a variable is a challenging to investigate. On the one hand, through socialization processes it can affect individual behavioral tendencies. On the other hand, gender provides a social cue which may influence how individuals evaluate each other and react towards each other. Since meetings represent complex social processes (Meinecke & Lehmann-Willenbrock, 2015) they constitute social contexts where gender (potentially) plays a role on all these levels.

2.2 Gender and Individual Behavior

Being assigned a gender at birth usually goes along with being socialized according to that gender (Maccoby, 2002). Broadly speaking, little boys are raised differently than little girls. Likewise, what we expect women and men to act, think and feel like in certain situations can be quite different from each other. The way we were raised and the expectations we perceive from society shape us (Eagly, 1987). For example, how we communicate can be determined by the gender we were socialized in (Holmes & Meyerhoff, 1999). Of course, this is not the only factor influencing us and we do see a diversity of behaviors and attitudes in both men and women. Still, these are tendencies which can become relevant in specific situations such as workplace meetings.

Social role theory (Eagly, 1987) provides a framework that explains behavioral differences and differences in expectations based on gender. The theory postulates that in cultures where a division of labor exists between men and women, men and women fulfilled

different tasks leading to different ascriptions of attributes and characteristics according to gender. These in turn would influence behavior as well as the expectations that people would hold of women and men respectively. The characteristics ascribed to men were typically agentic—strong, dominant, assertive. The characteristics ascribed to women were typically communal—warm, nurturing, caring. Across cultures, the content of these ascriptions can vary but what remains similar is that gender roles are often ascribed to particular social roles (Eagly, Wood, & Diekman, 2000).

Brought to a meeting, this specific behavior can influence the dynamics the meeting will take. For instance, following prescriptive gender stereotypes (Diekman & Eagly, 2000; Heilman, 2001) women might be more likely to show higher amounts of socio-emotional behavior (e.g., giving feedback, expressing emotions, and encouraging participation of quieter team members) whereas men might be more inclined to show task-oriented behaviors (e.g., formulating solutions, analyzing problems, and delegating tasks). Behavior, however, does not occur in a social vacuum but is at least to some extent related to the context in which it is performed (Uhl-Bien, 2006).

2.3 Gender and the Social Context

The gender of other people serves as a social cue to each individual which may also influence his/her behavior. Previous research repeatedly showed that the way people behave at work and during meetings is strongly influenced by the social context they find themselves in (e.g., Aries, 1976; Lehmann-Willenbrock & Chiu, 2018; Lehmann-Willenbrock, Chiu, Lei, & Kauffeld, 2017). Does an individual act the same way if she/he belongs to the majority gender compared to a meeting where she/he is in the minority or maybe even the only individual of that gender? Williams and Polman (2015) showed that consultants working in mix-gender client teams interacted with their clients (both male and female) in a more sensitive way compared to consultants working in all-male client teams.

In a similar way, gender as a social category provides information which is used to

make evaluations and chose actions (Deaux, 1984). Thereby, gender influences how individuals (i.e., meeting attendees) interpret or evaluate someone's behavior or opinions. For instance, in a meeting one colleague may tell another colleague what to prepare for tomorrow's meeting. How would the addressed colleague interpret this action? As bossy or as taking the initiative to distribute team tasks? Would it make a difference whether the addressed colleagues was male or female? Would it make a differences whether the demanding colleague was male or female?

Social role congruity theory (Eagly & Karau, 2002), an extension of social role theory (Eagly, 1987), explains how gender-roles can affect other social roles such as being a leader. The characteristics ascribed to men share a greater overlap with the characteristics traditionally ascribed to leaders which places men in a more favorable position for leadership. Women are confronted with a role conflict and may be perceived as incompetent leaders or as cold and socially incompetent women. In any case, it is believed that leader behavior performed by women is evaluated less positively as if performed by men (Eagly & Karau, 2002). Both, this theory and the above mentioned social role theory, have been supported by empirical research (e.g., Hentschel et al., 2018) and are still frequently used as a theoretical framework in gender-related research (e.g., Badura et al., 2018; Paustian-Underdahl et al., 2014). However, empirical research has also shown that the picture is not as simple and that in some cases women benefit from showing positive male behavior (Lanaj, & Hollenbeck, 2015). Schaumberg and Flynn (2018), for instance, showed that in terms of leadership evaluations women benefited from showing positive, agentic (typically male) traits such as self-reliance but not from displaying negative, agentic traits such as dominance.

The implications for meeting contexts are that the gender of an individual alone is not the only gender-related factor which can impact the dynamics of the meeting. How meeting attendees interact with each other can partly be influenced by the gender-based evaluations each attendee makes of the others at the meeting. Hence, the ratio of men and women (i.e., the

gender composition) present at a meeting may shape the behavioral patterns performed during that meeting. This moves the gender composition into the focus of attention.

2.4 Methodological Considerations

Research involving gender composition poses three particular challenges which hamper the synthesis of results across studies.

First, the question whether actual behavior differs between men and women (Mullany, 2006; Robinson & Smith-Lovin, 2001) or whether it is the perception and evaluation of behavior which is influenced by gender (Caleo, 2016; Heilman & Chen, 2005; Hentschel, Braun, Peus, & Frey, 2018) is oftentimes not clearly distinguished and addressed by research designs. To illustrate why this distinction is critical let us look at social influence, and particularly emergent leadership. Emergent leadership is the level of social influence that team members ascribe to one another (Acton, Foti, Lord, & Gladfelter, 2019). The underlying processes of leader emergence are not yet clear (Acton et al., 2019; Gerpott et al., in press). To better understand this process and why some individuals emerge as influential, it is useful to know whether it is because the actual behavior they perform conveys their influence or whether other attributes, such as gender, aid to be perceived as influential by others.

Second, the measurement of gender composition across different studies is often inconsistent. Williams and Meân (2006) conducted a comprehensive literature review on different methodologies to measure gender composition. Their review provides a through account of the methods available and their weaknesses and strengths with regard to different research questions. When measured categorically, different categories are established or similar labels are employed but their operationalization is rather distinct at times. Williams and Meân (2004) highlight the importance of considering all seven possible constellations of gender composition in the design. These include groups that are all-female, majority-female, 50-50%, minority-female, all-male, or that either have a token-female or token-male. The critical difference between being a token person and being in the minority is often overlooked

which represents a serious limitation to a number of studies (Williams & Meân, 2004). To circumvent collecting large sample sizes across these seven categories the authors recommend a continuous measure for gender composition.

Third, the measurement of gender composition is often conceptually inappropriate (Williams & Meân, 2004). Gender composition can be investigated at different levels of analysis (individual and group level) and its measurement should therefore be consistent with the research question at hand (Williams & Meân, 2004). For example, when studying meeting satisfaction of meeting attendees with a token status (i.e., the only man on the team), the gender composition should be conceptualized on an individual level (e.g., the number or proportion of meeting attendees who have a different gender). However, investigating the productivity of teams with a token-male would require a group-level measurement for gender composition (e.g., the percentage of men in the group).

2.5 Meetings and the Role of Gender

So, what are possible mechanisms through which gender and gender composition could affect social interaction in a meeting? Based on a trait approach we would assume that men and women behave differently and thus the behavioral dynamics change with different ratios of female and male attendees. As outlined above, however, the story is not as simple. The way how individuals evaluate behaviors (e.g., the contribution of a colleague) influences own actions (Uhl-Bien, 2006). Particular behaviors, however, may be evaluated differently whether performed by a man or a woman (Eagly & Karau, 2002). As a consequence, the behavior that follows (e.g., a reaction to a colleague's contribution) will be based on this evaluation and the response can vary depending on the first individual's gender. Thus, exclusively relying either on individuals' perceptions or on individuals' behavior will not reveal the complex patterns by which gender influences the dynamics of meetings.

Research on social influence, and particularly emergent leadership, illuminates this problem. Emergent leadership is the level of social influence that team members ascribe to

one another (Acton, Foti, Lord, & Gladfelter, 2019). A large body of research shows that men emerge as leaders more often than women (Badura et al., 2018; Eagly & Karau, 1991). As explained above, a common theoretical explanation is that leadership roles are traditionally associated with masculinity which provides men with an advantage (social role congruity theory; Eagly & Karau, 2002). Nevertheless, emergent leadership or social influence is also recognized as a dynamic social process (Acton et al., 2019; Gerpott, Lehmann-Willenbrock, Voelpel, & Van Vugt, in press). Uhl-Bien's (2006) relational leadership theory, for instance, describes leadership as a process of mutual influence that can occur in any direction, created by social dynamics and that shapes social coordination and change (e.g., in values, attitudes, and approaches). This entails that static features, such as gender, alone do not explain how an individual acquires social influence in a meeting. Rather, the behavioral process which is fed with contextual information—individual characteristics, actions, as well as evaluations of these static characteristics and dynamic actions—will lead some to emerge as more influential than others (Uhl-Bien, 2006).

Thus, to be able to understand how these processes unfold we need to understand the behavioral trajectories of which a meeting is comprised. McGrath's (1960) input-process-outcome (I-P-O) model offers an approach to better understand the role of gender in this context. *Inputs* refer to factors that exist before the meeting started, including individual characteristics, relationships with other colleagues, or a particular agenda that an individual has for the meeting. *Processes* comprise the dynamics that turn the input into *outcomes* such as meeting satisfaction, meeting effectiveness, and performance more broadly. The key and also challenging point to understand in the context of meetings is that *processes* include feedback loops. Every preceding step of the process influences subsequent steps. Thus, it becomes a form of input in itself. This form of input, however, is dynamic and thus qualitatively different from the original meaning of *input* in the I-P-O model. Since gender is a fixed characteristic existing prior to the interaction of a meeting it can act as an input factor.

However, since gender can also influence how the process unfolds it can as a moderator of other relationships. Given the complexity of the gender variable it is worth critically analyzing how gender is currently examined in meeting research.

2.6 AN INTEGRATIVE, INTERDISCIPLINARY REVIEW

An interdisciplinary approach brings along the benefit of multiple perspectives. At the same time, it brings along multiple methodological approaches. To be able to synthesize the content of research findings the first stage is to ensure that the employed methodologies allow for this step (Williams, & Meân, 2004). For this purpose, we will structure this overview with a strong methodological focus. The following questions guided our analysis. Which research fields have embraced gender research in meeting contexts and what settings were investigated? How was gender operationalized and where in the I-P-O model was gender included? How was gender composition assessed? Was the interaction during the meeting accounted for and if so, how? Which outcome variables were examined? By exploring these questions our review takes a critical form and will not provide concrete conclusions about how exactly gender and gender composition affect meeting outcomes. Instead, we aim to highlight which aspects are worth paying more attention to in future research and in current managerial practice.

2.6.1 METHODOLOGY

Following the recommendation by the Journal of European Psychology Students (Strukelj, 2018), we conducted a multi-step systematic literature review of studies and book chapters that focus on both gender and team meetings. For all steps we applied the following inclusion criteria: a) published in English, b) participants were adults (at least 18 years old), c) qualitative and quantitative studies, d) study settings in the lab, field as well as with student groups, and e) settled within the disciplines of psychology, communication, management, economics, anthropology, sociology, computer sciences, and behavioral studies.

We excluded articles that were a) meta-analyses, reviews, or dissertations, b) studies that included less than three persons per group, and c) specific contexts (i.e., negotiations, clinical therapy groups, political contexts such as parliamentary debates, and general diversity studies). The literature on negotiations and gender is rich and certainly offers overlap with meeting research and starting points from which to explore meetings from a gender perspective. Negotiations, however, have a qualitative different character than the type of social interaction that we are focusing here under the term of "meetings". Similarly, therapy groups do not fall under our definition of meetings. In those cases, where therapy groups touch upon work-related topics the focus most probably is not on work but on the effects that a particular situation had on the individual. Although political contexts such as parliamentary debates offer tribunes for gendered communication patterns (Chira, 2017), we exclude these here because we would not consider them as group contexts in which individuals work together towards a common goal. Finally, there is extensive work on the effects of gender (or more general diversity) on team outcomes such as performance or satisfaction often also in combination with leadership. Large parts of this work do not explicitly address team interaction or meetings. Outside of meetings gender can affect individuals and their satisfaction or performance in many ways (Eagly & Carli, 2007). Hence, we did not include these studies in our review.

In the first step, we searched the Web of Science database from 1945 up to 2019 with filters for multidisciplinary sciences, behavioral sciences, communication, linguistics, language linguistics, psychology multidisciplinary, psychology, social psychology, experimental psychology, applied psychology, women's studies, sociology, social sciences interdisciplinary, anthropology, social issues, political sciences, management, economics, business, computer information systems, computer science cybernetics, computer science interdisciplinary applications, and telecommunications. We used the following keywords: sex/sex composition/gender/gender composition/male/men/ female/women AND

meetings/group discussion/group interaction/team discussion/team interaction. This search yielded 5,674 articles. Scanning through the titles we discarded those that clearly met our exclusion criteria (e.g., focusing on animal research, genetic research, medical research such as mental health, cancer or HIV, adolescents or children, marital issues, pregnancy, or violence). Thus, we identified 355 articles. For this selection, we employed a thorough analysis of abstracts and in cases of doubts also analyzed method sections to examine whether the research settings investigated matched our definition of meetings (see above). This approach resulted in a sample of 30 articles.

In the second stage, we performed a manual search on Google Scholar using the same keywords. This search resulted in 10 further articles not yet identified. In the third stage, we inspected reference lists of selected papers. This search provided three studies. In the fifth step, we contacted meeting researchers who have published on gender issues to ensure that we did not miss key literature in the field. This step revealed no further papers. Thus, our final sample consisted of 43 articles.

We classified the studies according to their research field, their method (quantitative, qualitative or mixed methods), their study setting (lab studies with either students or working adults as participants; student groups conducted within a class context; and field studies where real employees were investigated in their "natural" environment), whether the meeting process was considered (covering audio- or video-recordings, meeting minutes, observational field notes and in a few cases a survey that specifically asked about the experienced interaction), whether a formal leader or moderator was present, and whether a multi-level approach was taken in the analysis.

2.6.2 RESULTS

A summary of the reviewed articles is presented in Table 2.1.

Table 2.1

Systematic summary of the literature on gender and meetings

Authors	Research field and study context	Participants nested in teams	Gender	GC measure	Was the interaction itself accounted for (if yes, how)?	Outcome
Baines, 2010	G & Org; Development project	1 project team	G, Org, G const.: G & Org = input; G const. = outcome	-	Yes; Field notes recorded in short hand	Team conflict
Barett, 2004	W & Mgmt; Communication dilemma	157 evaluating the same interaction	G: Input	-	No; -	Perception of workplace communication strategies
Barett, 2009	G & Mgmt; Communication dilemmas	255 evaluating the same interaction	G: Input	-	No; -	Perception of workplace communication strategies
Baxter, 2014	Linguistics; Managerial meetings	3 teams	G: Input	no info	Yes; Meeting transcripts (microlinguistic anaylsis)	Double-voicing & leadership
Benkraiem et al., 2018	Economics; board meetings	801 observations	GC: Input	Continuous (number of women)	No; -	Levels of debt, total leverage ratio
Berdahl & Anderson, 2005	Group Research; Task group	Study 1: 109 in 29 teams; Study 2: 169 in 41 teams	G, GC, & Org: G = input; GC = manipulation	Categorical (single-gender, majority male/token female; majority female/token male; & mixed; 50-50%)	Yes; Survey; social influenc ratings	Leadership centralization & preference for equality norms
Berger et al., 2015	G & Org; Meetings	ca. 90 in six teams	G, GC, Org, G const.: , GC, &	Descriptive (5 projects with males in majority)	Yes; Observational data & interviews with attendees	Doing gender in networking (marginalizing gender,

			Org = Input; G const. = outcome			referring to women's gender, men connecting with men)
Bommer et al., 2011	Psychology; Assesment center group	528 in teams	G, GC: Input & moderator	-	Yes; Video recordings; coded transcripts	Individual performance & emotion recognition
Calnan et al., 2017	W & Mgmt; Business meetings	72 in 10 teams	G & GC: Input	Categorical (single-gender & mixed: not specified)	Yes; Audio recordings (verbal interaction)	Tag questions
Dobbins et al., 1990, Study 1	Management; Task group	Study 1: 120 in 40 teams	G & GC: G = input; GC = control	Categorical (50-50%)	No; -	Leader emergence
Geimer et al., 2015	Business; Work place meetings	1081 (from different teams)	G: Input	-	No; -	Meeting effectiveness
Gerpott et al., 2018	LS; Discussion group	126 in 42 teams	G: Input	-	Yes; Video recording (non-verbal behavior); eye tracking	Emergent leadership
Grisoni & Beeby, 2007	G & Org; Decision-making	18 in 3 teams	G & GC: Input	Categorical (single-gender; mixed: not specified)	Yes; In-situ observations, field notes & video recordings	Leadership as sense-making process
Hawkins, 2013	G & Org; Work place meetings	2 teams	G & GC: Input	Descriptive (all females & two females)	Yes; Ethnographic approach & semi-structured interviews (three year period)	Negotiating core team values, translating value into actions, regulate actions
Hawkins & Power, 1999	Group Research; Decision-making	98 in 18 teams	G & GC: G = input; GC = control	Descriptive (Varied; "mostly balanced"= more than a token person)	Yes; Audio recordings; coded transcripts (verbal interaction)	Question types
Hawkins, 1995	Group Research; Task group	27 in 8 teams	G & GC: G = input; GC = not considered in analysis	Mixed (different constellations)	Yes; Audio recordings & coded transcripts (verbal interaction)	Emergent leadership

Herschel, 1994	Computer & Behav; VT, brainstorming	281 in 61 teams	G & GC: Input	Continuous (% of males)	Yes; Survey; task-oriented, socioemotional, procedural behavior of the group	Group performance
Holmes & Schnurr, 2005	Politeness; Meetings	Data from Wellington Language in the Workplace Project	G: Input	-	Yes; Ethnographic approach	Humor & politeness
Holmes & Schnurr, 2006	Linguistics; Meetings	Data from Wellington Language in the Workplace Project	G & Const.: G const. = outcome	-	Yes; Ethnographic approach	Managing and interpreting "feminity"
Hysom & Johnson, 2006	Sociology; Decision-making	120 in 30 teams	G, GC & Org: Input	Categorical (single-gender) in male or female organization	Yes; Video tapes & coded transcripts (verbal interaction)	Emergent leadership differentiation (influence vs. procedural behaviors)
Johnson, 1994	Sociology; problem solving	141 in 47 teams	G & GC: Input	Categorical (single-gender; token/leader-male; token/leader female)	Yes; Video recordings (verbal and non-verbal behavior)	Conversation patterns
Johnson & Clay-Warner, 1996	Psychology; decision-making	120 in 30 teams	G, GC, & Org: Input	Categorical (singel-gender) in male or female organization	Yes; Video recordings & coded transcripts (verbal interaction)	Group members' task and positive socioemotional behavior
Karakowsky & McBey, 2001	Management; Task group	216 in 36 teams	G, GC, TT, & SRO: G, TT, & SRO = input; GC = control	Categorical (token-male; token-female; 50-50%)	Yes; Video recordings (verbal interactions)	Member involvement & self-evaluations
Karakowsky et al., 2004	Group Research; Task group	216 in 36 teams	G, GC, TT, & SRO: G & TT = input; GC & SRO = control	Categorical (token-male; token-female; 50-50%)	Yes; Video recordings (verbal interaction)	Power displays (verbal interaction) & emergent leadership

Klein & Dologite, 2000	Computer & Behav; VT; Idea generation	171 in 46 team	G & GC: GC = Input	Categorical (single-gender, mixed; not specified)	Yes; Computer supported vs. analog	Innovation
Lucas & Lovaglia, 1998	Sociology; Task group	Study 1: 252 in 56 teams; Study 2: 178 in 52 teams	G: Input	-	No; -	Emotional reactions to the task, leader likability and competence, perceived group performance
Mabry, 1985	Group Research; Task group	168 in 44 teams	G & GC: Input	Categorical (single-gender; maj. Female; maj. Male)	Yes; Recording and coding (verbal interaction)	Communicative behavior
Mabry, 1989	Group Research; Task group	45 in teams (no. Not specified)	G & GC: G = input; GC = control	Constant (60% female; 40% male)	Yes; Recording and coding (verbal interaction)	Interactive behavior
Mallette, 2017	Communication; Meetings	1 team	G & Org: Input	-	Yes; Ethnographic approach (interviews, writing samples; observations)	Workplace dissatisfaction
Meyer & Schermuly, 2012	Psychology; Task group	158 in 43 groups	G, GS, & TT: Input	Not clearly specifed	Yes; Video recordings; Behavioral coding for information elaboration	Task performance
Mroz et al., 2018	LS & Org; Workplace meetings & Vignette	Study 1: 125 of 125 teams; Study 2: 331 in rating scenarios	G: Input	-	No; -	Leader warmth and competence
Mullany, 2004	Linguistics; Managerial meetings	51 in 6 meetings	G & GC: G = input; GC = control	Descriptive (continuous)	Yes; Recordings (verbal interaction)	Humor & politeness
Mullany, 2006	Politeness; Managerial meetings	4 meetings	G: Input	-	Yes; Audio recordings	Politeness through small talk
Ocker, 2007	Communication; VT; Project group	34 in 8 teams	G, GC, & TT: G & GC = input; TT = control	Mixed: not specified	Yes; Interprative analysis	Dominance

Pearsall et al., 2008	Psychology; Idea generation	320 in 80 teams	G, GC, GS, TT: Input	Categorical (single gender & balanced: 50-50%)	No; -	Team creativity
Savicki & Kelley, 2000	Computer & Behav; VT, task group	72 in ca. 15 teams	G & GC: Input	Categorical (Single-gender; mixed: balanced, not specified)	Yes; Messages of CMC	Communication, group development & satisfaction
Schwarz-Ziv, 2017	Finance; Board meetings	402 meetings	G & GV: Input	Continuous	Yes; Meeting minutes	Board activeness
Sesko & Biernat, 2010	Psychology; Discussion group	65 observing the same team	G: Input	-	Yes; Manipulated/constant	Memory of female Blacks' faces and speech contributions
Sheridan, 2007	W & Mgmt; Work place interaction	8 in 2 teams	G & GC: Input	Descriptive	Yes; Audio-recodings	Language patterns
Song et al., 2015	Computer & Behav; VT; task group	111 in 37 teams	G & GC: Input	Continous	No; -	Team performance
van Hiel & Schittekatte, 1998	Psychology; Discussion group	184 in 46 teams	G & GC: Input	Categorical (single-gender & mixed: 50-50%)	No; -	Information exchange
Wheelan & Verdi, 1992	Gender; Task groups	21 in three teams	G & GC: Input	Categorical (single gender & mixed: 14 w & 7 m)	Yes; Audio-tapes, transcribed and coded (verbal interaction)	Group communication
Wittenbaum, 1998	Group Research; Decision-making	224 in 56 teams	G, GC, & Org: G & Org = input; GC = control	Categorical (balanced: 50-50%)	Yes; Audio-recordings	Information sampling

Note. G & Org = gender and organizations; W & Mgmt = women and management; G & Mgmt = gender and management; LS = leadership; VT = virtual teams; G = gender; Org = organization; G const. = gender construction; GC = gender composition; TT = task type; GS = gender salience

General findings. The 43 studies reviewed here were published across 30 different journals. We clustered the journals into larger groups to provide a thematic overview. Gender journals (e.g., *Gender, Work and Organization; Women in Management Review*) comprised the largest group (20.3 %) followed but group research outlets (e.g., *Group Dynamics; Small Group Research*) (16.3 %), leadership and business journals (e.g., *Journal of Leadership & Organizational Studies; Journal of Management*) (16.3 %), communication journals (e.g., *Journal of Politeness Research; Journal of Sociolinguistics*) (14.0 %), and a large proportion of social and organizational psychological research (e.g., *Journal of Applied Psychology; Journal of Experimental Social Psychology*) (14.0 %), an interdisciplinary computer science journal (*Computers in Human Behavior*) (9.3 %) and sociology journals (e.g., American Sociological Review; Sociological Perspective) (7.0 %). The majority of studies constitute quantitative research (70.0 %), less studies were of qualitative nature (20.9 %), and a few studies took a mixed methods approach (9.3 %). Most of the studies were conducted in the lab (37.2 %), followed by field research (30.2 %), and student groups in a class context (16.3 %). A formal or assigned leader, chairperson or moderator was included in 30.2 % of the studies. Surprisingly, 76.0 % of the studies included the actual meeting process in their research design and analyzed either recordings, meeting minutes, or observational notes. Although most studies examined teams, only less than five percent took a multi-level approach in their analysis. Most of the work revealed a significant gender effect (79.1 %). The outcome variables examined in the research reviewed here are displayed in Table 1. These could be classified into four broad groups: interactive or behavioral measures (39.5%), emergent leadership (16.3 %), participants' evaluation of other participants or an aspect concerning group processes or outcomes (14.0 %), and performance measures (18.6 %).

Most samples reviewed here were dominantly white. Although the transition to general diversity research is close we would like to highlight that gender, as a diversity

variable, is intimately linked to other diversity variables (e.g., age, race, and economic status; Baines, 2010). For individuals this intimate link means that the effects of each of these variables are not in isolation of each other but lead to particular experiences. In our sample only two considered this aspect in their design (Baines, 2010; Sesko & Biernat, 2010). To illustrate the relevance of the interaction effects, Sesko and Biernat (2010) found that participants' memory of black women's faces and their speech contributions after a meeting conversation was worst compared to black and white men and white women. Thus, just looking at gender or just looking at race would not detect such results.

Gender variables. Turning to gender and its role for meeting contexts, in the articles analyzed we identified seven distinct variables which are directly related to gender (Table 2.1). ***Individual gender*** **(G)** refers to the gender assigned to individual participants. Most studies did not describe how this data was collected leaving the reader to assume it was measured via self-reports with a binary male/female option to tick off. One problem here is the binary approach which may not apply to all participants (Azul, 2015). While a binary approach may be simple and straightforward to apply in research contexts, it may not reflect reality and therefore lead to distorted conclusions. Especially for more applied contexts, such as workplace meetings, it becomes important to understand exactly how an individual's gender identity influences their behavior and how external gender ascriptions influence an individual's behavior (and attitudes toward the team and the larger organization). Nevertheless, the research conducted offers valuable insights into gender dynamics. Barett (2009), for instance, presented female students and female senior managers meeting scenarios (e.g., a meeting attendee is interrupted and wants to re-initiate his/her contribution) as well as possible communication strategies how the protagonist could re/act. Half of the scenarios featured a female and the other half a male protagonist. Barett asked her participants to rate the strategies with respect to their effectiveness and their likelihood of being performed by the

protagonist. Participants were also asked to indicate which strategy they would go for in such a situation. She found that the managers rated more "masculine" strategies as more effective than more "feminine" strategies. However, the effectiveness ratings also varied with the protagonist's gender, i.e., some strategies were rated as more effective for women than for men and vice versa. Moreover, if a female was the protagonist senior managers rated the likelihood that she would go for an effective strategy as less likely than if the protagonist was male. While students, rated the strategies' effectiveness similarly, their likelihood ratings showed a greater equality concerning gender differences. What remains unclear is whether these differences can be attributed to generational differences that would be coherent with a general trend towards reduced gender difference (Badura et al., 2018; Leaper, & Ayers, 2007). Alternatively, climbing up the organizational ladder may shape the psychology of individuals in a way conform to the organizational culture which may still conserve a stronger gendered pattern (Eagly & Carli, 2007).

Sex role orientation **(SRO)** is a concept that postulates that individuals have both masculine and feminine (as well as androgynous) elements that are part of their identity and personalities (Bem, 1974). Thereby, this measure does not take a binary approach to gender but conceptualizes masculinity and femininity as two parallel dimensions that at least to some minor extent exist in all humans. Bem's sex role inventory can be used to assess self-attributed levels of femininity and masculinity. Overall, two studies considered this variable in their research. Karakowsky and McBey (2001) hypothesized that higher levels of masculinity were related to increased meeting participation as well as to a higher self-evaluation of own contributions to the discussion. They tested their hypotheses in a laboratory experiment where participants were asked to develop two behavioral strategies for a protagonist in two different cases. The video-recorded interaction was coded for participation levels. Data for Bem's (1974) sex role inventory and self-evaluation were gathered via pencil-

paper. Results showed that masculinity scores were indeed related to a more active interaction style but not to self-evaluations of one's own contributions.

Gender composition **(GC)** denotes the number of men and women in a team. As a positive note, we observed that a large proportion (70.0 %) of the studies described the gender composition of the teams they investigated. Although in some cases it was merely treated as additional information and not included in the analysis (e.g., Hawkins, & Power, 1999; Lucas, & Lovaglia, 1998; Sheridan, 2007), most studies either controlled for gender composition (e.g., Dobbins, Long, Dedrick, & Clemons, 1990; Karakowski, & McBey, 2001) or conceptualized it as a manipulation (e.g., Berdahl, & Anderson, 2005; Johnson, Clay-Warner, & Funk, 1996; Klein & Dologite, 2000). As can be observed in Table 1, the gender composition was mostly included as a categorical variable. Often three categories were established namely two single-gender groups and a mixed-gender group. In some cases, "mixed" was precisely defined, whereas in other cases it was not further specified (Table 1). Descriptions like "gender balanced" meant a 1:1 ratio of males and females in some articles (e.g., Pearsall, Ellis, & Evans, 2008), more than a token person (Hawkins & Power, 1999), and a 3:2-ratio (Mabry, 1989) in other work. The ambiguity with which gender composition is defined and operationalized and inappropriate measures for gender composition have been pointed out as major challenges for synthesizing findings in group research with regard to gender (Williams, & Meân, 2004).

Gender salience **(GS)** describes the situation when individuals are clearly aware of their own and others' gender in the given moment (Meyer, & Schermuly, 2012). Alternatively, participants could process gender-related information non-consciously which may constitute a conceptual difference for predicting their behavior (Pearsall et al., 2008). Our review yielded two studies which accounted for salience via faultline activation (Meyer & Schermuly, 2012; Pearsall et al., 2008). Faultines describe hypothetical dividing lines that

separate a group into homogenous subgroups (Lau, & Murnighan, 1998; see also Chapter 5 in this volume). Pearsall and colleagues (2008), for instance, compared single-gender teams with mixed-gender teams (50-50%) on team creativity. Only when faultlines were activated via a gender-biased task, gender negatively affected creativity in the mixed groups but not in the homogenous groups. Thus, elements with the potential to trigger the category gender—thereby making it salient—should be considered in the design.

The social context is an important factor which can make gender salient (Pearsall et al., 2008). In parts, it is constituted by the meeting attendees. However, the ***larger organization*** **(Org)** in which the team is embedded and the ***task type*** **(TT)** or topic of discussion that the team is assigned to also carry social meaning that shape the social context (Meyer, & Schermuly, 2012). For example, an organization can be settled in a specific economic sector that is characterized or dominated by a particular gender (e.g., automotive industry vs. healthcare). Some of the studies included in our review accounted for the organizational environment (Berger, Benshop, & van den Brink, 2015; Hysom, & Johnson, 2006; Johnson, & Clay-Warner, 1996; Mallette, 2017; Wittenbaum, 1998). Hysom and Johnson (2006), for example, compared the behavior of single-gender groups from both male- and female-dominated colleges to study leadership structures during discussions. Contrary to their predictions, no differences were found across gender groups regardless of the organizational context.

Other studies put a larger emphasis on the task type (e.g., Karakowsky, & McBey, 2001; Meyer, & Schermuly, 2015; Ocker, 2007). Some researchers devoted great effort to establish the gender-orientation of their tasks and conducting independent ratings of the gender-orientation (Wittenbaum, 1998), other researchers described the task-type as gender-neutral (Ocker, 2007; Pearsall et al., 2008) or male-oriented (Pearsall et al., 2008) without providing further information. As Karakowsky and McBey (2001) could show, the task type

can have major impact on behavioral dynamics of a meeting. The authors administered two tasks that involved developing a behavioral strategy for a protagonist in two hypothetical cases to their teams, one with a female orientation and one with a male orientation. Thereby, the authors manipulated the expertise that males and females would be ascribed with (self- and other-ascription) in the respective cases. Indeed, the authors found that congruence between gender orientation of the task and individual gender favored participants in terms of self-evaluation and active participation. Thus, the study context is important to account for in the research design and for the interpretation of the results.

Gender construction **(Const.)** refers to the way how participants talk about gender within a specific conversation (i.e., in a meeting) and thereby "create" or reinforce what gender means in this particular context (Stokoe, 1989). Three studies in our sample examined this variable (Baines, 2010; Berger et al., 2015; Holmes, & Schnurr, 2006). Berger and colleagues (2015), for instance, studied networking meetings in the field, in a traditionally male domain through observational techniques and interviews with attendees about these meetings. With regard to the meetings, they found a three central aspects. First, the way women's gender was referred to often indicated an attitude of devaluation towards females and their professional role (e.g., jokes at the expense of women, addressing female professionals as secretaries). Second, men connected more with men maintaining old ties and challenging the formation of new ties, for example with women. Third, the strategies to cope with these situations, included to distance themselves from their womanhood through adjusting their attitudes and behavior. Examples are making an extra effort to demonstrate professional expertise or by down-playing critical situations during the meetings. This research illustrates the central role of constructing the notion of gender in organizational contexts, particularly in meetings. Likewise, it makes tangible how a stereotypical construction can negatively affect female employees.

Gender and the I-P-O model. In the studies reviewed here, the gender variables were mostly treated as *input*-variables, meaning that their relation with the outcome variable was investigated directly and gender was seen as a stable, fixed attribute (Table 1). For example, Mroz, Yoerger, and Allen (2018) compared male and female meeting attendees' ratings for their meeting leaders with regard to warmth and competence. Across two studies, the authors found that men generally gave higher ratings than women. More specifically, through a vignette study they found that men rated directive leaders as warmer and more competent than women. The ratings for participative leaders did not differ. Thus, gender alone explained differences in perceptions of meeting leaders.

None of the studies in our review treated gender as a moderator. Some studies accounted interaction effects of gender-related variables and other factors (Bommer et al., 2011; Meyer, & Schermuly, 2012; Pearsall et al., 2008). These studies illustrate how gender can be a factor that affects outcomes only when interacting with other situational or context-relevant factors such as the task (see studies on gender salience; Meyer, & Schermuly, 2012; Pearsall et al., 2008). A few studies treated gender construction as the outcome variable (Baines, 2010; Berger et al., 2015; Holmes, & Schnurr, 2006). This research underlines the constructivist nature of gender. The finding that gender is investigated at such different levels points towards its complexity but also towards its dynamic nature. Viewing it as just a fixed factor may conceal important relationships with other variables.

Methodological observations. A further critical observation which is of more methodological nature but intimately linked to interpreting behavioral data is the gender of raters and experimenters. Three studies included in our review addressed this issue to some extent in their designs (Karakowsky & McBey, 2001; Karakowsky, McBey, & Miller, 2004; Klein & Dologite, 2002). These studies represent the only work in our sample that controlled for the gender of their raters (balanced rater genders). Especially in the context of rating

behaviors that are prone to being gendered, controlling for gender rater can be vital. Karakowsky and colleagues (2001; 2004) also controlled for the experimenter gender. Karakowsky, McBey, and Miller (2004), for example, investigated perceived competence and power displays (operationalized as interruptions) in groups that were asked to complete two managerial-related tasks, one settled in a male-oriented context while the second had a female-orientation. The group discussion was split per case and each case was rated by a pair of expert judges. To avoid a gender bias in the ratings the authors ensured that each pair consisted of a man and a woman. Similarly, to avoid confounding effects the authors balanced the gender of the experimenters who instructed participants across groups. They found that gender composition was related to patterns of interruption (i.e., groups with higher number of males showed higher levels of interruptions for both men and women). Further, perceived competence was affected by gender congruence with the gender-orientation of the task context.

2.7 DISCUSSION

The above review aims at providing a critical account of the methodologies applied across disciplines in gender research in the context of meetings. The broad approach that we took returned a wide range of fields in which research is conducted in this respect. Gender and the gender composition of groups/teams showed significant impacts on team performance, behavioral measures, evaluations, and social influence. The methodological aspects pointed out above complicate the formulation of more precise conclusions. Nevertheless, they do offer lessons to learn for future work.

2.7.1 METHODOLOGICAL RECOMMENDATIONS

Our review showed that current gender measures may not reflect the complexity of this variable as found in real life. To identify an appropriate measure, the first step is to be clear about what aspect of gender is investigated. For some research questions it is important

to differentiate between individual identification and external attributions. In other cases, both perspectives and potentially an interaction between them would be relevant. Especially in contexts where behavior is in the focus it is key to consider individual characteristics, preferences, attitudes, etc. but also the social context in which the behavior is occurring. While this can be challenging, it also bears the opportunity to improve gender-related theories. Being forced to be more specific about gender effects on psychological processes could help to specify theoretical approaches.

As we have elaborated above, an appropriate measure for the gender composition constitutes a highly critical point (Williams, & Meân, 2004). It is imperative to adjust it to the research question at hand. To illustrate, when comparing communicative behavior in meetings between token women and men only two categories would be required (token male vs. token female). When analyzing how female communicative behavior in meetings differs across different gender compositions all six possible categories (all female, token male, majority female, 50-50%, minority female, and token female) would have to be included. Alternatively, a continuous measure could be employed.

A further critical point to bear in mind is the appropriate level at which gender (composition) is measured (Williams, & Meân, 2004). If the research interest lies in studying how men and women act in meetings depending on whether they are in the minority or the majority, an "individual" level measure would be appropriate (e.g., the proportion of meeting attendees of the opposing gender, Williams, & Meân, 2004). If the research interest lies in examining how the ratio of men and women affects certain meeting outcomes, a group level measure would be preferable (e.g., the proportion of women in the meeting). This brings us to our first recommendation:

Recommendation 1: Ask specific research questions in terms of conceptualizing gender (and gender composition) and identify an appropriate measure at the

appropriate level.

A further critical point in the context of appropriate measures are outcome measures. In our analysis we discussed these in terms of the content they record (e.g., emergent leadership, behavioral outcomes) and the level at which they are gathered (i.e., group level, individual level). However, there is another facet to outcome measures that is worth taking a closer look at. Biernat and Thompson (2002) provide an overview on the research conducted in their lab that deals with shifting standards and contextual variation in stereotyping. The basic idea of the shifting standards model is that individuals apply within-category reference points or standards (Biernat, & Thompson, 2002). This is particularly relevant for the context of emergent leadership. If an individual is asked to rate his/her fellow team members in terms of their level of influence he/she might give a female four out of five points because for a female she was rather influential. A male team member who for being a man was actually not that influential might also receive four out of five points. Thus, gender effects may be masked due to the shifting standard applied when answering "subjective" scales—scales whose units or anchors are not externally valid. An alternative, according to Biernat and Thompson (2002) is to use "objective" scales that operate with externally valid reference points. For instance, participants could be asked how much they would pay each team member for the effort they showed during the meeting. Indeed, Biernat and Thompson (2002) present a number of studies from their lab that demonstrate how gender effects are consistently masked when applying subjective scales but show high significance levels when applying objective scales (for the same research question).

Recommendation 2: Identify a set of appropriate and different outcome measures relevant to the research context.

Meetings are a form of social interaction that unfolds within a particular context (e.g., Meinecke & Lehmann-Willenbrock, 2015). The context involves, among other things, the

organization in which teams work, including its structure, policies and culture as well as the industry in which the organization is embedded (cf. Bloor & Dawson, 1994). Furthermore, the task or the discussion topic assigned to a meeting (and its attendees) can have a particular gender orientation and thus trigger gender-related dynamics (Karakowsky, & McBey, 2001; Karakowsky et al., 2004). All these areas can provide social information about gender. Gender salience can increase through such contextual factors (Pearsall et al., 2008) but also through personal factors (Randel, 2002). For example, a particular situation experienced just right before the meeting or a gender-related change in the team composition (such as one team member being away for parental leave) can potentially trigger this category. If made salient, a particular identity is much more likely to affect psychological processes (i.e., behavior, cognition, and affect) and thus employee performance in organizations (Randel, 2002).

Recommendation 3: Identify and control potential factors in the study context and participants' experience which may enhance gender salience.

In particular, in research on potentially gendered behavior, we strongly suggest to control for the gender of raters and experimenters as this may significantly affect important study results. Yet, our review has shown that this circumstance has received little attention so far. Only three studies reviewed above considered the gender of raters and the experimenter in their design. To better understand possible confounding effects of rater and experimenter gender, we can extrapolate from previous findings outside the meeting context. A study conducted by Okamoto, Slattery Rashotte and Smith-Lovin (2002) reveals how critical the role of rater gender is. Eight coders, four women and four men, coded transcripts of student conversations in a group decision-making task for interruptions. The authors found that rater gender affected what behaviors were coded as an interruption. Events that were coded as interruptions by female raters were not coded as such by male raters. Okamoto and colleagues (2002) propose that men and women seem to follow different rules when interpreting

interactions. Although eight raters are a very small sample size to draw firm conclusions and only one aspect of interaction (i.e., interruptions) was analyzed, these findings raise concerns for the (relative) objectivity assumed for coding techniques. Similarly, Burian and Yanikco (1998) found an interaction effect between experimenter gender, gender composition, and gender with regard to ratings of credibility concerning a case of sexual harassment.

One option is to balance gender evenly across test sessions/video- or audio recordings (have at least one man and one woman; cf.Karakowsky and McBey, 2001; Karakowsky et al., 2004; Klein & Dologite, 2002). For rating and coding in particular, the gender bias is a key aspect that should be included in coding manuals and be thoroughly discussed in coder trainings.

Recommendation 4: Balance raters/coders and experimenters with regard to gender and sensitize them for a gender bias during trainings.

2.7.2 Avenues for Future Research

Take advantage of the classic control variable. Most of the studies we identified show significant gender effects. This clear illustration of the publication bias is a serious limitation to draw conclusion from this work. To illustrate, Gerpott and colleagues (2018) conducted a study on interactive behavior and emergent leadership. The authors found no gender effects and reported this in their results. The study, however, would not be identified within gender-related research. Nevertheless, as a classic control variable gender is usually reported. While the publication bias poses a threat, in this case, we also have the unique opportunity to retrieve studies that are not published as a gender study but which provide relevant data. A systematic analysis of a larger spectrum of the meeting literature could reveal a more realistic picture of the role of gender for meeting contexts.

Bring the classic control variable upfront. Related to the previous suggestion, our review shows that articles on gender and meetings were largely scattered across a wide range

of journals. Likewise, although four journals are included that specifically deal with women or gender and organizational or managerial contexts (*Gender and Organization; Gender, Work, and Organization; Gender in Management,* and *Women in Management*), through our review we only identified a total of eight meeting-related articles within these journals. On the one hand, this indicates that meetings have not yet reached sufficient attention in research that integrates gender and organizational contexts. On the other hand, this indicates that in other research fields gender is mostly conceptualized as "just" another variable. Work in similar contexts has shown how important it is to include a critical reflection of key variables in all stages of research. In the context of gender and leadership for instance, Parker and Ogilvie (1996) make a case for not treating race and gender as two independent variables. The authors elaborate why common leadership models at the time did not apply to black women and thus failed to explain organizational reality. Their work exemplifies how all elements that are part of the phenomenon to be investigated have to be included not only in the study design and participant recruitment but also in the stage of theory-building. Especially in the light of increasingly heterogeneous organizations (Acker, 2012), treating gender (and other key variables such as race) simply as a control variable in meeting research and leaving more complex questions to the larger gender and diversity research fields will probably not lead to acquiring a comprehensive understanding of the social processes unfolding in meetings. These are necessary to manage heterogeneous organizations—and meetings successfully (Acker, 2012).

Consider wider areas of research to identify appropriate analytical tools. To tackle the dynamics of the process that makes up a meeting, innovative methods have to be combined with psychological, sociological, organizational, and communication sciences to understand how the *input* and the *process* of meetings interact to yield specific *outcomes*. Sequence analysis (e.g., Bakeman & Quera, 2011; Herndorn & Lewis, 2015; Klonek, Quera,

Burba, & Kauffeld, 2016), for example, is a technique which is applied to detect behavioral contingencies in coded interaction data. That is, specific forms of contributions may stimulate or inhibit specific reactions. Put simple, asking questions will very likely elicit a response to that question, while uttering an impolite critique will very likely inhibit positive reactions. In a similar but more complex vein, previous work has shown that solution-focused contributions and general positivity promote the production of similar behavior and are positively related team performance work (Lehmann-Willenbrock et al., 2017). Thereby, sequence analysis can assist in identifying particular communicative patterns within a conversation. Thus, it is a promising technique to identify whether particular patterns of sequences are related to gender and gender composition of the meeting attendees.

Investigate gender and gender composition in longitudinal designs. All of the studies identified by our literature research were cross-sectional studies. Cross-sectional designs provide "snap-shots" of the dynamics occurring in a team. Since teams are highly dynamics systems (Kozlowski, & Ilgen, 2006) it raises serious concerns for external validity. Real teams may show different interaction patterns across time (Gerpott et al., 2018). For example, different project phases pose different requirements to the team (Morgeson, DeRue, & Karam, 2010) which may benefit more from typically masculine behavior (e.g., agentic behavior, Schaumberg, & Flynn, 2017) or typically feminine behavior (e.g., relational communication, Holmes, & Schnurr, 2006). Moreover, contextual factors may change over time and may thus ignite, amplify, or attenuate gender-related dynamics. This may be the case, for example, when a team member is absent for parental leave or when switching from a male to a female CEO.

A further element with a temporal component is the role of surface- and deep-level characteristics and interpersonal interaction (Harrison, Price, Gavin, & Florey, 2002). With regards to gender, one could postulate that strangers coming together to form a new team will

be more prone to surface-level cues such as gender. More mature teams then would rely less on this cue but rather on deep-level characteristics (e.g., attitudes). On the other hand, organizational cultures may have gendered cultures themselves (Holmes, & Schnurr, 2006). Thus, the longer an employee works there, the more he/she might be exposed to this (gendered) mind-set and potentially be influenced by it. Thus, it is worth exploring the effects of gender in meetings in the long term.

Consider how individuals may differ across different contexts. Following up on the preceding point, we observed that in order to investigate effects of different gender constellations on particular outcomes, different groups were compared to each other. What we did not came across neither within the reviewed studies nor in other meeting research that we have dealt with is to compare how individuals differ across different team constellations. If the impact of others is really that significant than the same individual should act quite differently depending on varying gender compositions. Holmes (2008), for instance, reviewed research on gendered discourse at work. Her conclusions make transparent that gender identity is not a fixed characteristic for individuals. Rather, "individuals unavoidably enact gendered roles, adopt recognizably gendered stances, and construct gender identity in the process of interaction with others at work" (p. 489, Holmes, 2008). Thus, specific team constellations may well trigger different behavioral patterns in individuals.

PRACTICAL RECOMMENDATIONS

Our review does not provide "cookbook style" answers as to how exactly gender affects meeting dynamics. Simplified statements such as "more women guarantee higher meeting effectiveness" or "female meeting leaders are generally more/less suitable to run a meeting" do not pay justice to the complexity of (potentially) gendered behaviors and evaluations unfolding during workplace meetings. Nonetheless, our review points at certain aspects that are prone to gender effects. Being sensitive for these aspects will help to plan and

lead meetings in a way that a greater (gender) diversity of attendees will be able to contribute effectively.

The first central aspect is how a meeting is structured and led. Meeting leaders, whether they are male or female, should ensure that all attendees have equal opportunities to prepare for the meeting and to contribute to the discussion (see also Lehmann-Willenbrock, Rogelberg, Allen, & Kello, 2018; Odermatt, König, & Kleinmann, 2015). For example, the date for the meeting and the agenda for the meeting can be communicated in advance to all attendees via email. While leading the meeting, leaders should ensure that the agenda is put in practice and that attendees are able to participate equally. This entails that they do not interrupt each other. Meeting leaders have to be highly self-reflective to avoid producing a gender bias themselves. Since research has shown that interruptions, for instance, may be conceptualized differently between men and women (Okamoto et al., 2002), in stable teams who have regular meetings it is worth discussing this point and agreeing on a common concept. This will not only be beneficial for women but also for men who do not follow stereotypically male patterns.

Recommendation 1: Meeting leaders should ensure equal participation when planning and conducting a meeting.

The second central aspect is the context of the meeting. Specific gender compositions may trigger particular dynamics (e.g., who dominates the floor). Also the purpose of the meeting (a particular task or topic) may impute expertise on a particular gender. If it becomes transparent during the meeting, addressing the issue directly can help to increase awareness amongst attendees and ameliorate the effects. However, it is not easy to identify these factors and their influence on the meeting outcome in the middle of the meeting. Actively encouraging members to think out of the box when discussing a problem for instance can be useful to leave stereotypical paths.

Recommendation 2: Meeting leaders should be sensitive for automatic dynamics created by the context of the meeting.

The third central aspect is that many elements that trigger or influence gender effects are dynamic. The gender composition of a team can vary with employee fluctuation. New tasks or task formats may have a different gender-orientation than the previous ones. A team member may become a parent and reduce working hours. All these factors introduce change and just with any other type of change, a leader is advised to be prepared for it and be attentive for potential consequences of this change. This also entails that there is no one recipe for successfully managing gender diversity. Rather, each situation requires an individual approach. Change always requires a certain degree of adaptation (Armenakis, & Bedeian, 1999; Jimmieson, Terry, & Callan, 2004). Leaders should take this into consideration and assist their co-workers where possible. If leaders are aware of such a change they can address it openly and inviting attendees to share thoughts. This can help to uncover how exactly a particular change is affecting employees and if necessary specific measures can be taken to deal with it effectively.

Recommendation 3: Meeting leaders have to be alert to changes that can affect or trigger gender patterns and integrate them in a flexible manner.

Finally, we must bear in mind that gender is a social category and is socially constructed. While meetings are interactions where gender identity can be expressed and can affect meeting dynamics, meetings themselves are spaces where gender is constructed (Berger et al.,2015; Stokoe, 1998). Some people will strongly identify with their gender, others less, and others may vary in their identification depending on the particular context (Randell, 2002). These variations are vital to consider because they can affect what behaviors and attitudes an individual chooses to display (Bosson, & Michniewicz, 2013). This means that meetings (amongst others) are spaces where the expectations for gender roles are kept alive

and develop within organizations. This bears the opportunity for meeting leaders to create spaces within their meetings where typical gender patterns do not limit the productivity and effectiveness of the meeting. One option is to avoid the reproduction of stereotypes and typical gender patterns. For example, avoiding that a female is appointed to write the meeting notes. Another option is to actively encourage individuals to explore new roles and take challenges. For example, an employee who is usually shy and behind the scenes can be encouraged to present results of the last week during the meeting.

Recommendation 4: Meetings should be designed in such a way that gender identities do not limit the process.

2.8 Conclusion

Meetings are crucial instruments to convey key messages to employees about organizational culture, organizational goals, and practices. They are opportunities were employees can learn about their role within their team and the wider organization. Thus, meetings are arenas where employees also learn about how gender is seen and valued within their organizations. For an overview of research in this field, in this chapter, we introduced a systematic summary of the work on gender in the context of meetings that has been conducted so far. Specifically, we identified aspects that are particularly prone to gender effects. Based on our analysis we developed methodological recommendations that aim at providing orientations to conduct more rigorous research on gender and meeting. Further, we pointed out promising avenues for future research that can help to advance this research field. We end our work with managerial recommendations to manage meetings successfully with regard to gender. We hope this book chapter inspires fellow meeting scholars to further explore this important topic. As the examples in our introduction show, women often have a harder time during workplace meetings than men. Women frequently report that they get less credit for their ideas and that they need to make an extra effort to be heard and recognized. This chapter

tried to contrast these personal stories and anecdotes with empirical research on the work of gender in the context of meetings.

CHAPTER 3: GENDER AND HUMOR IN MEETINGS: A MODERATION ANALYSIS (STUDY 2)[2]

[2] This chapter has been published as Hemshorn de Sanchez, C.S., Allen, J., Lehmann-Willenbrock, N. (2022). Gender and humor in meetings: A moderation analysis. *Psychology of Leaders and Leadership, 25*(3-4), 165-186. https://doi.org/10.1037/mgr0000133. This chapter is not the copy of record and does not precisely replicate the final, authoritative document published in the outlet.

ABSTRACT

Meetings are at the core of organizational life. Yet, gender, as a central social cue, is poorly understood in this context. Here, we investigate how gender and humor, an integral communicative element, influence meeting experiences by analyzing a subsample of a larger database on meeting research with US working adults across different industries (N = 662). Confirming our hypotheses, perceived positive and interactive humor positively related to perceived meeting satisfaction. This relationship was moderated by gender such that women benefited more from high perceptions of positive and interactive humor in terms of their meeting satisfaction, compared to men (β = .14, p = .010, Cohen's f^2 = .01). This study highlights the importance of individual attendee characteristics in meeting science and addresses previously overlooked gender differences in meeting experiences. It also informs meeting leaders on the benefits of promoting a meeting culture that fosters both benign and social humor.

Keywords: Gender differences, positive humor, organizational meetings, meeting satisfaction, perceived behavior

Meetings are a core element of organizational life (Allen et al., 2014; Myrsiades, 2014). They have a direct financial impact on organizations, and are an important part of most employees' weekly routine (Lehmann-Willenbrock et al., 2018). Meeting research revealed that meeting satisfaction represents a distinct facet of job satisfaction and affects broader workplace attitudes including employee engagement and emotional exhaustion (Lehmann-Willenbrock et al., 2016; Rogelberg et al., 2010). Accordingly, what happens in meetings and how this affects attendees' meeting experience is of great importance to both the organization and the individual.

Given that a large number of meetings is perceived as ineffective and exhausting (Allen et al., 2012; Bagire et al., 2015), more research is required to promote designing and managing meetings successfully. One issue that remains well under-researched to date concerns the gender-related differences in meeting experiences. Gender is one of the key social variables that influence how we perceive and interpret others' behavior at work (Holmes, 2008). The popular press has published a number of articles that explicitly address the different experiences of men and women in business meetings (Chira, 2017; Conley, 2020; Grant, 2021; Green Carmichael, 2018; Gupta, 2020; Heath et al., 2014; Masters, 2021; Merchant, 2021). Yet, in meeting science systematic insights into the role of gender in workplace meetings remain sparse to date (Hemshorn de Sanchez & Meinecke, 2020).

Gender is a multi-layered phenomenon, that can affect psychological processes on many different levels, including an individual's own behavior and attitudes as well as their perceptions and evaluations of others' behavior and attitudes (Deaux, 1984; Deaux and Major, 1987). Men and women may behave differently in meetings; or they may show similar behaviors, but yield different results; or they may perceive and evaluate specific within-meeting dynamics differently, bringing about different meeting experiences and perceived outcomes. As gender represents a major social cue (Deaux, 1984), successful meeting

leadership requires an understanding of how this complex construct is embedded in the meeting context. Given the growing workforce diversification across industries, acquiring comprehensive insights on potential gender effects is becoming more and more relevant.

Qualitative work in sociolinguistics suggests that gender plays a vital role in social processes and, particularly, in those related to communication in the context of workplace meetings (Holmes, 2008). Empirical research in this regard is much more scattered across disciplines and usually does not focus on meeting experiences or meeting processes (Hemshorn de Sanchez & Meinecke, 2020). A major drawback of the limited gender-related research in the context of workplace meetings is that behaviors and perceptions are not distinguished appropriately. Such lack of methodological precision is dramatic since behaviors and perceptions of such behaviors can diverge to a large extent (e.g., Lehmann-Willenbrock & Allen, 2018). A second limitation of prior research on workplace meeting processes and outcomes concerns strongly differing methodologies that prevent a concise synthesis of the findings (Hemshorn de Sanchez & Meinecke, 2019). To understand which psychological aspects are relevant for individual meeting experiences, it would be helpful to know how gender, as a strong social cue (Deaux, 1984), influences perceptions of within-meeting processes and their relationships to perceived meeting outcomes.

One particular within-meeting process that affects meeting dynamics and outcomes is humor (Lehmann-Willenbrock and Allen, 2014). Defined as “amusing communications that produce positive emotions and cognitions in the individual, group, or organization” (Romero and Cruthirds, 2006, p. 59), humor serves diverse social functions in human interactions, such as reducing social distance and facilitating communication and promoting motivation (Ziv, 2010). In the workplace context, research demonstrated beneficial effects of humor on a range of relevant constructs including sensemaking (Blanchard et al., 2014), team cohesion (Mesmer-Magnus et al., 2012), leader effectiveness (Evans et al., 2019), job satisfaction and

commitment (Decker, 1987), and employee performance (Avolio et al., 1999). In the gender context, two comprehensive reviews revealed small but persistent differences in areas such as humor production, humor use, and humor appreciation (Hofmann et al., 2020; Kotthoff, 2006). In sum, humor is sensitive to gender differences and is also relevant for positive outcomes in work settings. While the role of humor in organizational meetings is receiving increased attention (Crowe et al., 2019; Lehmann-Willenbrock and Allen, 2014), we still know little about the gender-humor relationship in meeting contexts.

The current study addresses this research gap by bridging the literature on gender differences at work and the literature on workplace meetings. By showing that individual attendee characteristics are related to perceived meeting outcomes, we shed light on a largely overlooked topic in meeting science. We build on previous research on positive and interactive humor (Crowe et al., 2019; Kangasharju and Nikko; 2009; Lehmann-Willenbrock & Allen, 2014; Pham & Bartels, 2021) and argue why perceptions of this type of humor are particularly beneficial for perceived meeting outcomes and sensitive to gender differences. Our specific focus on humor perceptions in meetings provides insights into how gender differences result in distinct meeting experiences. We discuss implications for meeting scholars as well as meeting leaders with a view to managing gender-diverse meetings successfully.

3.1 MEETINGS AND THE ROLE OF HUMOR

Meetings are typically held to share information, solve problems, or to socialize (Allen et al., 2014). Their inherently interactive character makes meetings particularly relevant for key organizational processes (for an overview, see Lehmann-Willenbrock et al., 2018). Within-meeting behaviors have also been linked to team productivity (e.g., Lehmann-Willenbrock et al., 2017) and organizational success (e.g., Kauffeld and Lehmann-Willenbrock, 2012). At the individual level, perceptions of specific meeting behaviors are

related to employee engagement and well-being (Lehmann-Willenbrock et al., 2016). In short, meetings impact organizations on many levels. Identifying what makes meetings effective and successful is therefore of great interest to leaders and organizational development.

One focal meeting outcome is meeting satisfaction. Drawing on affective events theory, Rogelberg and colleagues (2010) argued that meetings represent powerful affect-generating contexts that impact job satisfaction. Research based on job satisfaction theory shows that work characteristics as well as the social setting impact job satisfaction via independent effects (Hackman & Lawler, 1971). In meetings, that are per definition arenas of social interaction, organizational members share information, make decisions, and discuss tasks (Allen et al., 2014; Meinecke & Lehmann-Willenbrock, 2015). Therefore, meetings combine two central aspects that impact job satisfaction. Rogelberg and colleagues (2010) demonstrated empirically that meeting satisfaction represents a distinct facet of job satisfaction. Prior work revealed that meeting satisfaction also predicts more distal outcomes including emotional exhaustion, empowerment, and engagement (Allen et al., 2016; Lehmann-Willenbrock et al., 2016). Therefore, managing meetings such that attendees have a positive and satisfying experience has far-reaching implications for organizational success (Allen et al., 2016; Cohen et al., 2011; Rogelberg et al., 2010).

Humor bears the potential to make meetings more enjoyable, remove feelings of exhaustion, ease tension, and create social cohesion (Romero & Pescosolido, 2008; Ziv, 2010). As a process that is constructed in a communicative context, humor is an integral element of human interaction (Lynch, 2002). Previous work has revealed the benefits of humor to the organizational domain. Humor can improve social and work relationships (Mesmer-Magnus et al., 2012; Romero & Cruthirds, 2006). It may help to make sense of ambiguous situations interpreting them such that identification with the organization increases (Blanchard et al., 2014). Also, humor has the potential to boost performance (Lehmann-

Willenbrock et al., 2014; Mesmer-Magneus et al., 2012).

The concept of humor is complex and includes different facets. Martin et al. (2003), for instance, developed a humor framework to investigate individual differences in *humor use*. They integrated different conceptualizations of humor use and styles based on the respective focus and nature of humor. According to this model, humor can either have a self-enhancing focus or enhance relationships with others. Additionally, humor can be either positive or negative in nature. These two dimensions (i.e. self-enhancing or relationship enhancing and positive or negative) with their two poles define four functions of humor: coping/self-enhancing humor, affiliative humor, self-defeating humor, and aggressive humor.

From a managerial perspective, making meetings as enjoyable as possible for all attendees is a key goal. Affiliative humor has the greatest potential to enhance meetings in this manner. Affiliative humor is defined as "an essentially non-hostile, tolerant use of humor that is affirming of self and others and presumably enhances interpersonal cohesiveness and attraction" (p. 53, Martin et al., 2003). The interactive nature of affiliative humor makes it more attractive than self-enhancing humor which has a stronger "intra-psychic than interpersonal focus" (p. 54, Martin et al., 2003). The use of negative humor types (self-defeating and aggressive humor) may cause joy in some attendees but may also irritate or offend other attendees (Janes & Olson, 2015; Thomae & Pina, 2015). Thus, affiliative humor has the greatest potential for positive experiences in meetings.

Most work-related humor research has indeed focused on positive (i.e., benign and benevolent) humor (Mesmer-Magnus et al., 2012). This pattern also applies to meeting contexts. Previous qualitative findings highlight the benefits of humor in workplace meetings. For example, Kangasharju and Nikko (2009) investigated laughter patterns in leader-employee conversations of two large Scandinavian corporations. Next to different functions of joint laughter in these meetings (e.g., underline shared understanding, reduce conflict and

tension), their findings suggested that mutual laughter improved task accomplishment. Daugherty (2019) used ethnographic observations and qualitative interviews to examine humor use in meetings of a volunteer organization. She found that meeting leaders used humor to keep attendees motivated during the meeting and bundle group efforts towards effective collaboration.

Previous quantitative work has provided similar insights, suggesting positive humor has the potential to make meetings better. Lehmann-Willenbrock and Allen (2014) studied regular workplace meetings in two industrial organizations and found that patterns of positive humor and laughter evoked constructive meeting behavior (e.g., positive socioemotional contributions and solution-oriented statements) and predicted overall team performance. Pham and Bartels (2021) investigated the effect of playfulness, positive humor, as well as negative in- and out-group humor on meeting outcomes. They found that meeting satisfaction was related to positive humor, play, and negative out-group humor. Crowe and colleagues (2019) conducted two studies indicating that positive humor behaviors affected meeting satisfaction, particularly when impression management behavior was not present.

Besides demonstrating a beneficial relationship between benevolent humor and successful meeting outcomes, these studies highlight the key role of benign humor with a strong interactive component (e.g., mutual laughter, interaction patterns of humor and laughter, positive effects of coworkers' humor, frequently occurring humor amongst colleagues). This is unsurprising, given that meetings are inherently interactive in nature (e.g., Meinecke and Lehmann-Willenbrock, 2015). Note, that humor is an inherently social process (Romero and Cruthirds, 2006, p. 59). Thus, any form of humor involves a social context and social interaction to some extent. However, we are focusing on humor with an affiliative character that is actively co-created within a group. To emphasize the benign and co-creative potential of that humor in meetings we refer to our focal construct, and its associated measure,

as *positive and interactive humor*.

Based on both the qualitative and quantitative findings and theories so far, we sought to reaffirm that perceptions of positive humor behaviors, that have an interactive orientation use should generally benefit individual meeting experiences in terms of reported meeting satisfaction, regardless of gender.

Hypothesis 1: Perceptions of positive and interactive humor are positively related to perceived meeting satisfaction.

3.2 The Moderating Role of Gender

Meetings are complex organizational phenomena with an inherently multilevel character. These points of intersection of individual, group, and organizational interactions set the stage for a range of intraindividual, dyadic, team, and organizational as well cross-level processes (Allen & Lehmann-Willenbrock, in press). Within this complex meeting cosmos, attendee characteristics have received insufficient attention. To better understand how individuals navigate through meetings, attendee characteristics require more attention in meeting science.

One central meeting attendee characteristic is gender. This social cue, is particularly dominant and gender stereotypes as well as gendered norms play into most workplace interactions (Holmes, 2008). Gender affects how we perceive and evaluate others and which behavioral actions we choose when we interact with these individuals (Deaux, 1984). Meetings as central arenas of workplace interactions are spaces where the social relationships within an organization are actively built and developed (Meinecke and Lehmann-Willenbrock, 2015), where employees form attitudes about themselves and others (Allen et al., 2016), and offer opportunities for sense-making (Scott et al., 2015). Therefore, understanding how gender shapes meeting dynamics and outcomes has implications for other key organizational processes. Regarding workplace perceptions and experiences at large prior

work has established gender effects (e.g., Drory & Beaty, 1991; Hitlan et al., 2006; Kiser, 2015; Sweeney & McFarlin, 1997). Yet, gender insights in the field of meeting science are limited (Hemshorn de Sanchez and Meinecke, 2020). Given that meetings are so complex, the mesh of mechanisms and effects in which gender feeds in and in which it is embedded is equally complex. Here, we seek to investigate how specific individual meeting experiences differ across gender in terms of evaluating said meetings.

Social role theory (Eagly, 1987) provides a framework to conceptualize gender effects. The theory postulates that the division of labor gave rise to fundamentally different social roles for men and women. These social roles are associated with particular behaviors, attitudes, and expectations. While women's social role is typically characterized as communal (e.g., warm, caring, nurturing), men's is typically characterized as agentic (e.g., assertive, dominant, competent). With regard to humor, previous work has identified small but stable gender differences that reflect this communal-female/agentic-male duality (Hofmann et al., 2020; Kotthoff, 2006). For instance, women tend to appreciate stimuli with an affiliative humor content more than those with an aggressive humor content and described the humor they use as "positive" and "cohesion-building". Men, on the other hand, reported to resort to "aggressive", "negative", and "outgroup" humor. Similarly, in a study of student group discussions, Robinson and Smith-Lovin (2001) found that men's humor highlighted differences between group members, whereas women's humor was more focused on building group cohesion.

As a result of the internalization of social roles, conformity with sex-typed norms can become a source of positive affect (Sczesny et al., 2019). Wood et al. (1997) showed that contexts eliciting positive affect via social role conformity were motivationally more relevant to individuals. In conceptualizing positive and interactive humor as a communal behavior, we suggest that perceptions of this type of humor render meetings more motivationally relevant

for women. Positive and interactive humor involves saying funny things and making spontaneous jokes for the amusement of others, where participants build on each other's humor and laugh with each other (Crowe et al., 2019; Kangasharju and Nikko; 2009; Lehmann-Willenbrock & Allen, 2014; Pham & Bartels, 2021). It functions as a social lubricant that enables positive relationships, increases cohesion, and reduces conflict (Martin et al., 2003). As such, positive and interactive humor relates to the notion of warmth-communion that emphasizes warm relationships with others, as well as being caring, empathetic, affectionate, and friendly (Abele et al., 2016), which is typically associated with female preferences (Hofmann et al., 2020). From this theoretical stance, situations that are rich in this type of humor should have a higher motivational relevance and stronger salience for women when evaluating their satisfaction with that situation (i.e., the meeting). Taken together, we expect that women are more likely to pay attention to and appreciate the value of positive and interactive humor. Therefore, the positive relationship between perceptions of this type of humor and perceived meeting satisfaction should be stronger for women than for men. Put formally,

> *Hypothesis 2:* Gender moderates the positive relationship between perceptions of positive and interactive humor and perceived meeting satisfaction such that it will be stronger for female attendees than for male attendees.

3.3 METHODOLOGY

For this study, we re-analyzed a database created by the Center for Meeting Effectiveness which consists of compiled survey data from 26 published and unpublished studies. The database covers participants' general experiences with their meetings, experiences with their last meeting in particular, and their work outcomes as well as individual differences. All studies were approved by the respective local ethics committee (IRB approval). Two of these studies included a variable on how participants perceived

behaviors of affiliative humor in their *last meeting*[3] and were re-analyzed for this study. This US-based convenience sample was collected in fall of 2015 via Amazon's mechanical Turk crowd sourcing system and comprised $N = 662$ participants. Of this sample, 50.5 % were female (44.7% were male, 4.8% did not provide an answer) , and 12.7 % had been the leader of their last meeting. In terms of ethnicity, 77.3% were Caucasian/White, 7.9% were African American, 3.0% were Hispanic, 6.0% were Asian, and 1.2% identified as "other". Regarding education, 10.3% had a at least a graduate degree, 42.6% had at least a college degree, 42.0% had at least a high school degree, and .9% had some high school education. In terms of job level, 17.5% reported working at the highest level, 26.9% worked next highest level, 35.3% were employed at the middle level, 11.8% worked at a lower level, and 3.6% were employed at the lowest level. With respect to the market sector, 63.2% worked at publicly traded, for profit organizations (both quoted and not quoted on the stock), 18.7% worked for private nonprofit organizations, 11.8% were employed in the public sector (national, state, or city government), and 2.1% indicated another sector. Further descriptive statistics are presented in Table 3.1.

[3] The original survey did not include an item on meeting format. Based on the 2019 numbers of modality, we estimate that 80% of the meetings were conducted face-to-face. The remaining 20% cover virtual, teleconference, or hybrid meetings.

Table 3.1

Means, Standard Deviations and Intercorrelations

Variable	Mean (SD)	1.	2.	3.	4.	5.	6.
1. Age (years)	36.23 (12.44)	-					
2. Job tenure (years)	5.86 (5.58)	.55**	-				
3. Time since last meeting[a]	2.94 (1.30)	.14**	.06	-			
4. Average no. of meetings/week	2.43 (6.01)	.09*	.09*	-.02	-		
5. Gender	.53 (.50)	.11*	.07	.18**	.03	-	
6. Positive and interactive humor	2.69 (.90)	-.05	-.08	-.08*	-.06	-.02	-
7. Meeting satisfaction	3.35 (.97)	.06*	.08*	-.20**	-.04	.06	.33**

Note. $N = 605$. Intercorrelations were calculated among the z-values of the standardized scales.
* $p < .050$; ** $p < .001$.
[a] Time since last meeting: 0 = Today; 1 = This week; 2 = Past two weeks; 3 = Past three weeks; 4 = Past four weeks; 5 = More than four weeks

3.3.1 MEASURES

Gender was measured as a binary variable (0 = male; 1 = female). Subsequent analyses must be interpreted according to the categorical nature of gender.

Perceptions of *positive and interactive humor* during the last meeting were measured with a 9-item scale. The scale was developed based on the framework by Martin et al (2003) as well as on a review of various definitions of humor cited in the literature (Berger, 2013; Janes & Olson, 2015; Tavery, 2014). The measure has a Cronbach's $\alpha = .94$ for the sample used in the analyses presented here, suggesting adequate internal consistency reliability. Example items include "During the meeting, friendly teasing occurred"; and "During the meeting, inside jokes between employees were brought up" (see Appendix A for the full

scale).

Perceived meeting satisfaction of the last meeting was assessed using a 6-item scale by Rogelberg et al. (2010). On a 5-point Likert scale participants were asked to rate to what extent six adjectives described their last meeting (e.g., satisfying, annoying, stimulating; see Appendix B for the full scale). Negative adjectives were reverse coded. The measure as used in this sample has a Cronbach's $\alpha = .92$, suggesting adequate internal consistency reliability.

Several demographics were collected concerning individuals' work situation and their experience in meetings. These include participant age, job tenure, average time spent in meetings during a typical week, and the amount of time passed since the last meeting. These showed potential relationships with the main study variables and were included as potential control variables prior to data analysis.

3.4 RESULTS

Table 1 shows means and intercorrelations. We then conducted a confirmatory factor analysis (CFA) of the two latent constructs positive humor behaviors and meeting satisfaction. In the model, all of our items loaded exclusively onto their respective latent factors and we allowed covariation between the two latent factors. According to the CFA, our two latent constructs have appropriate convergent and discriminant validity ($\chi^2(89) = 831.22$, $p < .001$; RMSEA = .11, CI = .11 - .12, CFI = .91; TLI = .88). Comparing this model to two alternative models that consider a single factor structure (M0) and an uncorrelated two factor structure (M1), our model (M2) returned the best fit values (Table 3.2).

Table 3.1

Means, Standard Deviations and Intercorrelations

Variable	Mean (SD)	1.	2.	3.	4.	5.	6.
1. Age (years)	36.23 (12.44)	-					
2. Job tenure (years)	5.86 (5.58)	.55**	-				
3. Time since last meeting[a]	2.94 (1.30)	.14**	.06	-			
4. Average no. of meetings/week	2.43 (6.01)	.09*	.09*	-.02	-		
5. Gender	NA	.11*	.07	.18**	.03	-	
6. Affiliative humor	2.69 (.90)	-.05	-.08	-.08*	-.06	-.02	-
7. Meeting satisfaction	3.35 (.97)	.06*	.08*	-.20**	-.04	.06	.33**

Note. N = 605. Intercorrelations calculated among the z-values of the standardized scales.
* p < .050; *** p < .001.
[a] Time since last meeting: 0 = Today; 1 = This week; 2 = Past two weeks; 3 = Past three weeks; 4 = Past four weeks; 5 = More than four weeks

Table 3.2

Confirmatory Factor Analysis of Positive Humor Behavior and Meeting Satisfaction: Model Fit Values

Model	Chi-square	Df	RMSEA	RMSEA CI low	RMSEA CI high	CFI	TLI
M0	3288.72	91	.23	.22	.22	.61	.48
M1	929.70	90	.12	.11	.13	.90	.86
M2	831.22	89	.11	.11	.12	.91	.88

Note. M0 = one factor model; M1 = uncorrelated two-factor model; M2 = correlated two-factor model

To test H1, we ran a regression analysis in SPSS with standardized variables. The model accounted for a significant amount of variance in individual meeting satisfaction (R^2 = .05, p < .001). As expected, positive humor behavior positively predicted meeting satisfaction (Table 3.3). These results hold when controlling for age, job tenure, and time since the last meeting. Thus, H1 was supported.

Table 3.3

Hierarchical Regression Analysis: Positive Humor Behavior and Meeting Satisfaction

	R^2	B	SE_B	B
Constant		3.35	.04	
Positive and interactive humor	.11**	.32**	.04	.33**

Note. N = 662. The analysis was performed with standardized scales.
* p < .050; ** p < .001.

Table 3.4

Hierarchical Regression Analysis: Positive Humor Behavior, Gender, and Meeting Satisfaction

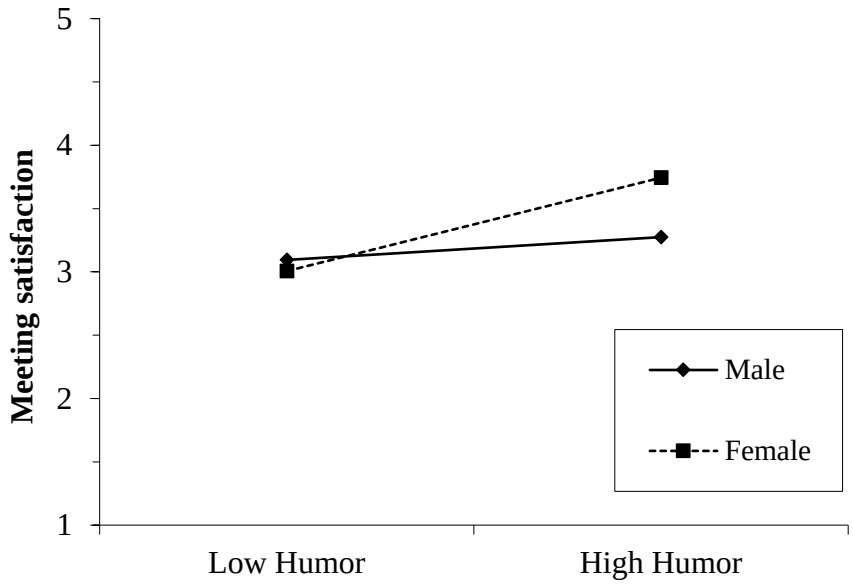
	R^2	B	SE_B	β	f^2
Step 1	.12**				
Constant		-.11	.06		
Positive and interactive humor		.32	.04	.33**	.13
Gender		.14	.08	.07	.01
Step 2	.13**				
Constant		-.11	.06		
Positive and interactive humor		.25**	.06	.23**	.03
Gender		.15	.08	.07	.01
Positive and interactive humor *Gender		.21*	.08	.14*	.01

Note. N = 630. The analysis was performed with standardized scales. * p < .050; ** p < .001.

To test H2, we conducted a hierarchical regression analysis with standardized variables (Table 3.4). First, we entered positive humor behavior and gender and found that the model significantly predicted meeting satisfaction (R^2 = .12, p <.001). Second, we entered the interaction of gender and positive humor behavior and found a significant moderation effect (ΔR^2 = .01, β = .14, p = .010). A simple slopes analysis test using Hayes' (2012) PROCESS plug-in showed that for female attendees, the positive relationship between positive humor behavior and meeting satisfaction was stronger than for male attendees (female: b = .45, SE = .06; t = 8.26; p < .001; male: b = .25, SE = .06; t = 4.23; p < .001). These findings hold when controlling for age, job tenure, and time since the last meeting. The results lend support to H2. The moderation effect is visualized in Figure 3.1.

Figure 3.1

Interaction between positive humor behavior and gender as predictors of meeting satisfaction



3.5 Discussion

In this study, we examined the interaction of gender and humor in meetings. As hypothesized, perceptions of positive humor behavior in the last meeting were positively related to the satisfaction with that meeting. Our results further illustrate how individual participant gender can affect meeting experiences. Specifically, female attendees' meeting satisfaction benefitted more from positive interactive humor in their last meeting than male attendees. These findings have implications for the consideration of individual attendee characteristics in meeting science, as well as practical implications for leveraging the potential of positive humor behavior as a valuable resource.

3.5.1 Theoretical Implications

We focus our discussion on two main theoretical implications. First, our findings advance meeting science by showing how an individual attendee characteristic (i.e., gender) has meaningful relations to meeting outcomes. Yet, meeting research has largely focused on matches between attendees and meeting content (Lehmann-Willenbrock et al., 2018). While there is research on the relationship between team diversity or attendee composition with meeting outcomes (for an overview, see Gerpott and Lehmann-Willenbrock, 2015), individual attendee characteristics have been hardly considered in meeting research nor in theories applied to study meetings (Lehmann-Willenbrock et al., 2018). Interestingly, in their large, cross-cultural study, Geimer and colleagues (2015) showed that men and women did not differ in their perceptions of meeting outcomes. Similarly, Frederick and Lazzara (2020) found that men and women did not differ in their overall job satisfaction and well-being. However, Frederick and Lazzara (2020) also examined whether different dimensions of enjoyment predicted well-being and job satisfaction of men versus women. Indeed, they found that to some extent there exist variations according to gender. In a similar way, our findings indicate that the picture is more complex than just looking at gender differences in

specific outcomes. Gender can still be relevant to meeting outcomes and via that way also has the potential to be related to more distal, organizational outcomes. This is important to consider, given the substantial temporal (and financial) resources consumed by workplace meetings every day and the impact of meeting satisfaction on individual employee outcomes including work engagement (for an overview, see Mroz et al., 2018; Lehmann-Willenbrock et al., 2018). Therefore, meeting scholars should consider gender as an important attendee characteristic in their theoretical models and research designs.

Second, our findings show that social role theory still matters, as evidenced by our finding that men and women draw differently on their perceptions of humor experiences in meetings. Note that male and female attendees did not differ in the level of positive humor behavior they perceived in meetings. However, the extent to which these experiences affected their satisfaction with the meeting did differ across gender. This finding complements previous work that established gender differences in the production, use, and appreciation of humor (Hofmann et al., 2020; Kotthoff, 2006). It also adds another component to the gender differences identified in the literature on management communication. Gender differences were established with regard to communicative behaviors. For example, Mullany (2004) found female chairs used repressive humor as a mitigation strategy to gain compliance whilst male chairs did not draw on such strategies. Smith-Lovin and Robinson (1989) examined patterns of interruptions and identified differences across gender regarding who is interrupted and who interrupts others. Likewise, gender differences were identified with respect to perceptions of communication. Evans and colleagues (2019), for instance, demonstrated that male and female leaders using the same wording in a particular situation were evaluated differently in terms of their perceived competence. In her Study 3, Brescoll (2011) conducted an experiment manipulating CEO gender and CEO talking time (long vs. short) in the description of a CEO, and compared how male and female participants rated the CEO's

suitability for leadership. Male CEOs received high suitability ratings when their volubility was high (and low ratings with low volubility). For female CEOs, the reverse effect was found. Here, our findings point to a further element in the context of communication and gender difference: the role of specific perceptions of communication patterns (i.e., humor) in the evaluation of a situation (i.e., a meeting), which may differ across men and women. This indicates women and men may resort to different facets of their meeting perceptions when assessing their meeting experience. Taken together, these insights highlight the importance to study gender, behavior, and perception in meetings. Humor, as one important communicative process in meetings that depends on behavior (production of humor and reaction to humor) and perception represents an interesting starting point to study the role of gender in meetings.

Meeting satisfaction is an important, standalone aspect of job satisfaction (Rogelberg et al., 2010). It directly impacts emotional exhaustion, employee empowerment and engagement (Allen et al., 2016; Lehmann-Willenbrock et al., 2016). Thus, meeting satisfaction represents a central employee variable that bears great potential to enhance organizational functioning. Managing meetings such that attendees have a positive and satisfying experience has far-reaching implications for organizational success (Allen et al., 2016; Cohen et al., 2011; Rogelberg et al., 2010). As such, understanding how the use of positive humor behavior and attendee gender interact in relation to perceived meeting satisfaction is meaningful for both research and practice.

3.5.2 PRACTICAL IMPLICATIONS

Due to the key role of meeting satisfaction, conducting enjoyable meetings should be on the agenda of managers and meeting leaders. Satisfied meeting attendees will be healthier, empowered, and engaged (Allen et al., 2016; Lehmann-Willenbrock et al., 2016). Here we offer insights for boosting meeting satisfaction by creating more enjoyable meetings in practice. First, given the positive link between benign and interactive humor and attendees'

meeting satisfaction, managers can take active steps to introduce humor as a regular ingredient in their meetings (cf. Aaker, 2021). Previous work has shown that the team members of supervisors who show support for humor (e.g., not sanctioning humorous behavior displayed by employees, not equating humor as distraction from work, not always expecting a serious atmosphere at work) also display more positive humor (Blanchard et al., 2014). Managers can further lead by setting a positive example in this regard, displaying positive humor behaviors themselves. They can also encourage humor expressions in others by promoting a psychologically safe climate that allows jokes and friendly banter. A meeting culture that promotes positive and socially oriented humor represents a strategy to boost meeting satisfaction and thereby positively influence proximal meeting outcomes such as job satisfaction and organizational performance (Kauffeld and Lehmann-Willenbrock, 2012; Rogelberg et al., 2010). Importantly, to help establish this culture, meeting leaders should consider their own humor behavior and ensure that they heighten their positive and socially-oriented humor.

As a further implication for the practice of leading workplace meetings, understanding that the link between humor and meeting satisfaction is sensitive to gender will help managers to conduct mixed gender meetings more successfully. Creating an atmosphere where benign and socially-oriented humor can flourish is particularly relevant for meetings with female attendees. This may be achieved through encouraging well-intended inside-jokes that highlight similarities amongst attendees, and an attitude of bringing attendees together.

3.5.3 LIMITATIONS AND FUTURE DIRECTIONS

The current study has four limitations, which provide opportunities for future research. First, our cross-sectional design only provides a snapshot of the measured constructs. As such, the study focuses on relationships, rather than causal claims, which are possible with other research designs. For example, future research in a laboratory setting could manipulate

different types of humor behaviors to test how they impact attendee satisfaction.

Second, we did not control for gender-related variables. Prior work in meeting science has shown that individual gender may interact with gendered task types or discussion topics to affect group members' perceptions and behavior, interruption patterns, and team creativity, (e.g., Karakowsky & McBey, 2001; Karakowsky et al., 2004; Pearsall et al., 2008). Likewise, individual gender may interact with gender composition to affect interruption behavior, leadership structures, idea generation, and, indeed, humor patterns (Berdahl & Anderson, 2005, Karakowsky et al., 2004; Klein & Dologite, 2000; Robinson & Smith-Lovin, 2001). Robinson & Smith-Lovin (2001) investigated six-person groups with different gender compositions (all female, one to six men). They found that in in all-female groups humor rates and successful humor rates (humor that produces laughter in others, i.e., *interactive humor*) were higher compared to the other groups. No differences were found between the other types of groups. Thus, understanding how our findings with regard to humor, gender and meeting satisfaction relate to other gendered variables is an important next step for future research.

Third, we did not control for individual levels of humor appreciation nor humor production. Wilbur and Campbell (2011) showed that women appreciated humor to a larger extent than men, but men produced more humor than women. Such differences may affect levels of humor perception in meetings. Future research could identify humor episodes and humor types in specific meetings, and look at the effects of distinct humor types on meeting processes and outcomes from the perspective of female and male attendees.

Fourth, this study is based on self-reported data collected via online surveys posing a risk of common method bias (Conway & Lance, 2010; Podsakoff et al., 2003). Since we were interested in understanding *subjective meeting experiences*, self-report measures for perceived humor behavior and meetings satisfaction were an adequate method for this study (compared

to other-reports or behavioral observations for instance; Conway & Lance, 2010). However, we sought to reduce the risk for a common method bias via the design and through providing support for construct validity. Following Podsakoff and colleagues (2003), we aimed at creating psychological and proximity separation of the constructs by assessing them independently of each other in the survey and we ensured anonymity to reduce social desirability. As recommended by Conway and Lance (2010), we conducted a CFA to examine the factor structure of our target constructs to provide support for construct validity. In addition, we provide a full list of items in the Appendix A and B to demonstrate content-wise that the items for perceptions of positive humor behavior and perceived meeting satisfaction do not overlap (Conway & Lance, 2010).

There are a number of other potential future directions. Since humor is a process that is constructed in a communicative context (Daugherty, 2019; Lynch, 2002) and group joking emerges from multiple interactions (Fine and De Soucey, 2005), including temporal consideration to the research design is critical. Designs that account for the temporal component of humor unfolding over time (within a single meeting but also across several meetings) would enable a more comprehensive understanding of the social dynamics surrounding humor in meetings.

Furthermore, humor may also have a dark side. In certain contexts, the use of humor, including benign humor, may signal counterproductive messages, or cause irritation. Rosing and colleagues (2021), for example, investigated fire-fighters' perceptions of leader communication in emergency contexts. They found that leader communication that was non-humorous was perceived as clearer and more effective than humorous communication. Accordingly, future research may focus more on how different contexts interact with the effect that humor use has on employees and their work outcomes. A further dark side of humor is the use of negative humor. Negative meeting behaviors have shown to affect

meeting outcomes as well (Lehmann-Willenbrock et al., 2016). Therefore, studying the impact of negative humor in this context could provide important additional insights: Janes and Olson (2015), for instance, focused on two negative dimensions of humor: self-ridiculing and others-deprecating humor. They showed that observing somebody else displaying self-ridiculing humor enhanced creativity, while other-deprecating humor had inhibiting effects on participants. Pursuing these humor facets in meeting contexts could therefore complement the findings of the current study.

Moreover, across three studies, Fluegge-Woolf (2014) demonstrated that having fun at work is positively related to organizational outcomes (i.e., task performance, organizational citizenship behavior, and creative performance). In this context, future research could examine which role humor in meetings plays for perceptions of having fun at work. Given the prevalence of meetings and given that having fun at work is a central predictor of applicant attraction for young job seekers (Tews et al., 2012), this may become a relevant leverage to make organizations more attractive and to recruit talented job starters.

Finally, stereotypes may change over time (Wood & Eagly, 2012). Eagly and colleagues (2020) analyzed U.S. public opinion polls on gender stereotypes from 1946 to 2018. They found an increase in gender equality with regard to competence ascriptions over time. Thus, for contexts that activate competence-related self-concepts we may expect small or no gender differences at all. With respect to changes in the association between being female and communal ascriptions the authors identified an increase. Over time the change in this female stereotype resulted in larger gender differences. Haines and colleagues (2016) compared data collected in the 1980s to new data collected in 2014 and found a similar pattern: female gender roles showed a significant increase in gender stereotyping. Thus, we may conclude that in the past few years communal contexts may have become more relevant to women than ever. Nevertheless, these patterns may change in the future. Likewise, other

humor types or other meeting processes that are based on mechanisms sensitive to stereotype contents may be affected by such changes. Consequently, meeting scholars and meeting leaders need to be aware of social change and understand how this may translate to meeting contexts.

3.6 Conclusion

Meetings are a fundamental component of organizations incurring financial costs and time resources. Successfully conducted meetings boost motivation, employee satisfaction and organizational performance. Given the prevalence and significance of meetings to organizational life, effective strategies to promote successful meetings are worth its weight in gold. Positive and interactive humor is a promising strategy towards that end. Meeting leaders can employ socially oriented and benign humor to create an atmosphere that will increase meeting satisfaction. This is particularly relevant for female attendees as they benefit more from this type of humor. As individual attendee characteristics may also be linked to other meeting processes, bearing them in mind is crucial to both scholars and practitioners. As the trend for diversification of workforce is increasing, these insights help to manage diverse organizations successfully.

3.7 Appendix – Chapter 3

3.7.1 Appendix 3.A

Measure for perceptions of positive and interactive humor:

To what extent do you agree with the following statements with regard to your last meeting:

During the meeting, employees laughed.

During the meeting, people joked around.

During the meeting, friendly teasing occurred.

During the meeting, people chuckled after funny comments.

During the meeting, inside jokes between employees were brought up.

During the meeting, jokes were followed by laughter.

During the meeting, employees used jokes to aid their explanations/points.

During the meeting, the atmosphere was kept playful with the use of humor.

During the meeting, laughter helped the group bond.

3.7.2 APPENDIX 3.B

Measure for perceived meeting satisfaction:

To what extent do the following adjectives describe your last meeting:

Stimulating

Boring

Unpleasant

Satisfying

Enjoyable

Annoying

CHAPTER 4: UNDERSTANDING EMERGENT LEADER-FOLLOWER PATTERNS AND THE ROLE OF GENDER IN TEAMS: A MICRO-TEMPORAL ACCOUNT (STUDY 3)[4][5]

[4] This chapter is currently submitted as Hemshorn de Sanchez, C. S., Mangels, J., Degner, J., & Lehmann-Willenbrock, N. "Understanding emergent leader-follower patterns and the role of gender in teams: A micro-temporal account" to the Leadership and Organizational Development Journal. This chapter is not the copy of record and may not precisely replicate the final, authoritative document published in the outlet.

[5] This chapter refers to a number of supplementary files (S1-S6). I have not adjusted these file names to S3.1-S3.6 because I cannot adjust the online files that these names refer to. Note, that these supplementary files are not the same as the supplementary files referred to in chapter 5.

ABSTRACT

By investigating the dynamics of leader and follower behavior during small group interactions, we provide insights into the behavioral patterns that give rise to leadership emergence. We also identify gender-related differences in these behavior patterns that may explain the persistent gap in emergent leadership ascriptions between man and women. We video-recorded verbal interactions of 34 zero-history three-person teams collaborating on a task in the laboratory. One team member was a confederate (male vs. female) trained to show emergent leader behavior. To quantify verbal interaction patterns and examine to what extent these team dynamics depend on the confederate's gender, we conducted a fine-grained interaction analysis of utterances over the interaction period. Our findings show that leadership claims by one team member evoked subsequent granting behavior in another team member. The more individuals' claims were granted (counterclaimed) by others, the higher (lower) their level of ascribed emergent leadership. Claims uttered by male or female confederates were equally likely to be granted by team members. However, leadership claims by female confederates elicited more counterclaims. Our results highlight the importance of considering leader-follower interaction patterns for the discussion around gender differences in leadership processes.

Keywords: leadership emergence; emergent leadership; leader-follower interaction; follower behavior; communication; gender; teams

Leadership emergence is an important mechanism that enables coordination and collaborative performance in groups (Badura et al., 2022). We define leadership emergence as the recurring sequences of leading and following behavior unfolding between team members as they interact with each other (DeRue, 2011). Through this dynamic process, individuals ascribe leader and follower roles to each other (DeRue, 2011). Whereas the literature tends to use the terms *leadership emergence* and *emergent leadership* interchangeably, we emphasize the importance to conceptually distinguish between the observable interaction process of leadership emergence and the leadership ascriptions that result from this process (cf. Schneier, 1978). Within this framework, we adopt an embedded perspective (cf. Fairhurst, 2008) on leadership emergence in teams, viewing it as a relational process of social influence of which behavioral interactions form an integral part. We argue that this perspective provides valuable insights for our understanding of leadership dynamics (e.g., Cox et al., 2022; DeRue & Ashford, 2010; Uhl-Bien, 2006).

The key role of considering behavioral leader-follower interactions is exemplified in a study by Lee and Farh (2019), who documented that the predictive power of focal behaviors for emergent leadership ascriptions in teams depended on the overall level of that behavior displayed in the team. These findings illustrate that leader and follower behaviors do not occur in a social vacuum but are embedded in a specific interaction context. However, empirical insights into the role of follower behavior and above all leader-follower interactions giving rise to leadership emergence remain limited. Although behavior is focal in theories explaining leadership emergence, the extant literature is largely survey-based and leader-centric (Banks et al., in press). Moreover, studies adopting a behavioral approach often focus on discrete leader behaviors (Gerpott et al., 2019; MacLaren et al., 2020; McClean et al., 2018; Schlamp et al., 2020). Despite valuable insights into the role of specific leader behaviors, these previous studies do not speak to the behavioral team interactions that are central to the temporal mechanisms underlying leadership emergence.

An embedded temporal process perspective of leadership emergence may also help us explain how other social factors, such as social category memberships and associated social roles, are intertwined with the behavioral mechanisms resulting in leadership emergence and emergent leadership ascriptions. It acknowledges that team interactions occur within complex social contexts where behaviors function as social signals triggering interpretations and behavioral responses by others (Vinciarelli & Esposito, 2018). These may also be influenced by more stable characteristics like a person's gender (Cox et al., 2022) that may trigger different gender-role expectations and evaluation standards. Although women and men have been shown to be equally effective in their leadership (Appelbaum et al., 2003; Shen & Joseph, 2021), the literature points to a persistent gender imbalance in emergent leadership ascriptions (Badura et al., 2018; Eagly, & Karau, 1991). Through the lens of gender-role behaviors (Eagly, 1987; Fiske et al., 2002), scholars typically argue that gender influences behavior which mediates the effect on leadership ascriptions (Shen & Joseph, 2021). However, men and women hardly differ in their (leader) behavior (Hyde, 2014; Shen & Joseph, 2021). Accordingly, empirical designs that only consider discrete leader behaviors provide a limited perspective to explain how leadership emerges in teams and how exactly gender is involved in this process.

Our study seeks to overcome these limitations and offers the following contributions: First, we draw on process-oriented approaches to leadership and adopt an embedded social interaction perspective to understand the micro-level behavioral dynamics of leadership emergence in team interactions. We provide an empirical account of leader-follower patterns as the building blocks underlying leadership emergence. This offers new insights into the theoretical concept of leadership emergence as a social interaction phenomenon unfolding within seconds of time. Second, we seek to investigate how gender may relate to the behavioral mechanisms underlying leadership emergence. Specifically, we illuminate the role of emerging leaders' gender in triggering supportive and challenging follower responses

within the team interaction flow. Hence, we provide empirical support but also extend previous theorizing on processes of leader identity construction (DeRue & Ashford, 2010) by proposing a mechanism that links leader characteristics such as gender to the reciprocal process of leadership and followership.

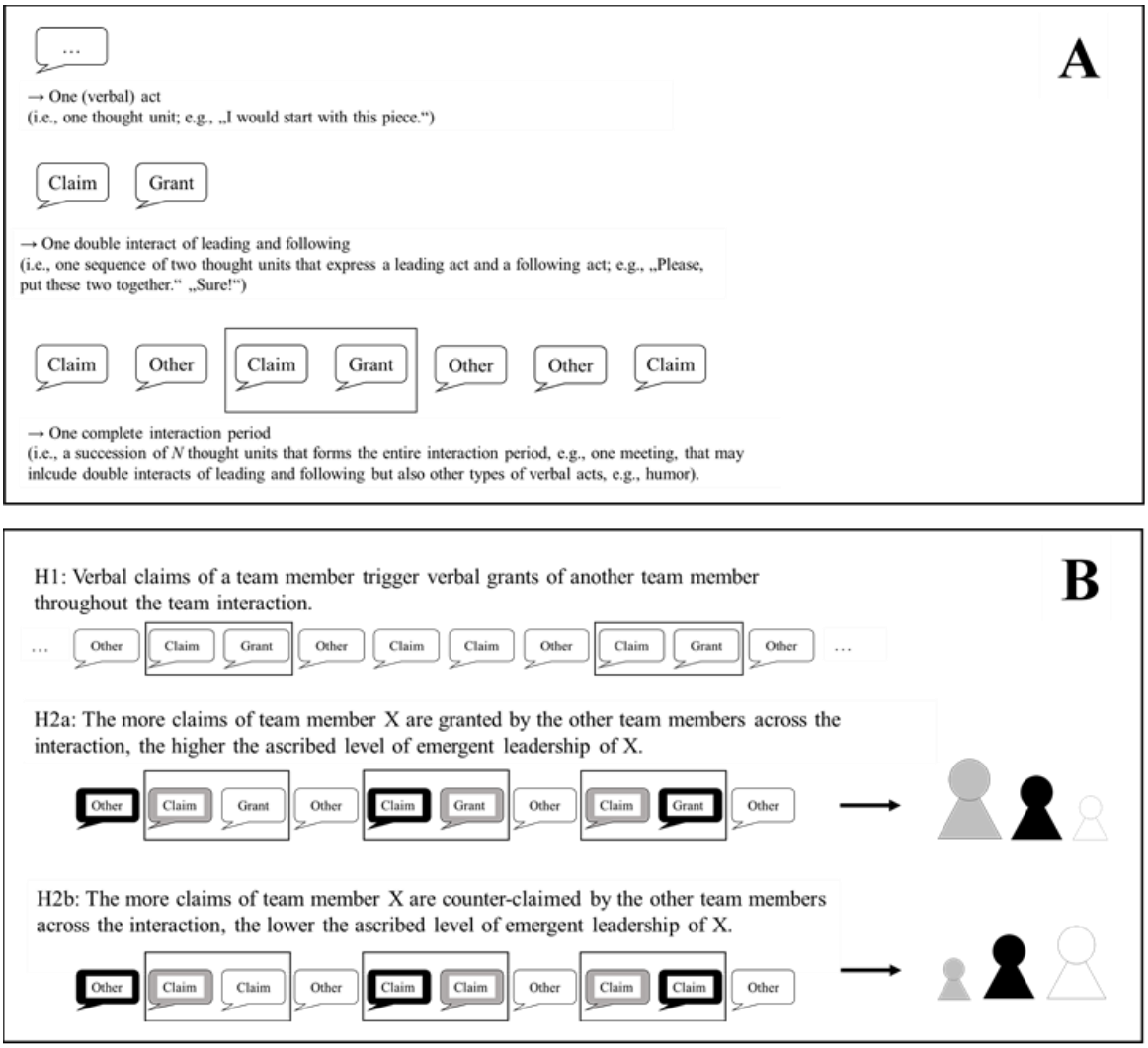
4.1 A Micro-Level Behavioral Perspective on Leadership Emergence

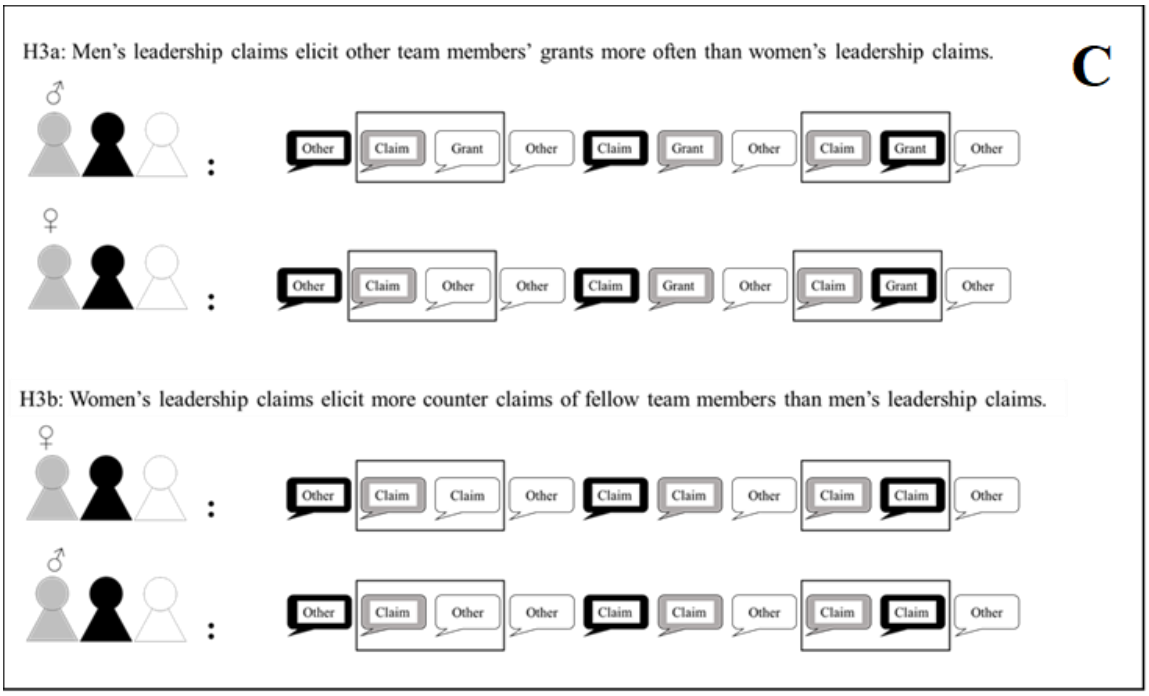
By conceptualizing leadership emergence as a dynamic *process* evolving over the course of team interaction, we follow constructionist approaches and postulate that team members co-create leadership as they interact with each other (e.g., Acton et al., 2019; Cox et al., 2022; Uhl-Bien, 2006). Adaptive leadership theory and the leadership identity construction model posit that leadership is constructed as recurring sequences of leading and following (i.e., claiming and granting leadership; DeRue, 2011; DeRue & Asford, 2010). One such sequence of leading and following – a *double interact* – represents the smallest unit of leadership (see Figure 4.1, panel A). Although such terminology evokes the idea of a brief period of time during which these behaviors unfold, previous theories have underspecified their temporal scope. We believe that integrating considerations on the temporal scope at which a particular leadership phenomenon develops is central to understanding leadership as a process. Temporal considerations are not just a methodological contribution but represent an integral part of theorizing about the behavioral mechanisms of leadership (Banks et al., in press; Hemshorn de Sanchez et al., 2022).

Here, we adopt a temporally high-resolution lens on the actual instances of leading and following (cf. Klonek et al., 2019) to understand how leadership emerges from systematic, interdependent patterns of leading-following behavior in team interactions. Although not yet applied to leadership emergence, the notion of systematic, micro-temporal patterns shaping social process phenomena is well established in the team literature (e.g., Lei et al., 2016; Uitdewilligen et al., 2018). Such patterns imply non-random sequences of behavioral units unfolding within short moments of time (Klonek et al., 2019).

Figure 4.1

Illustration of hypothesized interaction patterns





Note. In panel B and C, the contributions by team members A (grey), B (black), and C (white) are represented in speech bubbles in their respective color code. In panel B, the size of team members A, B, C denotes the level of ascribed emergent leadership (large size = high score, mid-size = medium score, small size = low score).

Thus, we may infer a causal relationship between two consecutive behaviors, the former triggering the latter (e.g., *leading→following).* Interpersonal theory explains such patterns arguing that a particular act constrains the range of possible acts that may follow in response (Kiesler, 1983). Thereby, individuals mutually adjust their communication as they interact with each other (Sadler et al., 2009). Accordingly, leading behaviors should confine the range of possible reactions to occur in response.

Following functional leadership theory (McGrath, 1962), leading behaviors are those that fulfill the team's current needs (i.e., functional behaviors). We may extrapolate that a team member's utterance which is functional to the team process (e.g., providing direction for the task) will constrain subsequent responses and likely trigger a receptive reaction (e.g., agreeing) by another team member to enable the team to collaborate effectively toward their goal. Thereby, functional, leading behaviors should facilitate following behaviors in response, unfolding as systematic patterns of leading and following. These patterns represent a behavioral manifestation of leadership emergence. Hence, team interactions should give rise to fine-grained, recurring sequences of leading and following (i.e., *claim→grant* sequences). Stated formally:

H1: Leading-following double interacts unfold as systematic sequences across team interactions, such that claiming statements trigger granting statements.

4.2 Leading-Following Patterns and Emergent Leadership Ascriptions

While our first hypothesis zooms in on the immediate reactions to single behavioral units (i.e., leadership claims) to identify systematic leading-following patterns, our second hypothesis zooms out to examine how systematic interaction patterns give rise to leadership ascriptions (Figure 4.1, panel B). Here, the magnitude of *claim→grant* sequences is one central element (DeRue, 2011). It describes the frequency at which these double interacts recur and is one of the defining parameters that will determine leading and following patterns (DeRue, 2011). Indeed, DeRue and Ashford (2010) postulated that leader and follower

identities become collectively endorsed via repeated cycles of claims and grants. If the interaction process lacks this reciprocal nature and claims are not asserted by grants, leader and follower roles are unlikely to be collectively endorsed (DeRue & Ashford, 2010) and leadership emergence is less likely.

While many scholars have drawn on DeRue and Ashford's (2010) leadership identity construction model (e.g., Lee & Farh, 2019; McClean et al., 2018), we are aware of only one study that has explicitly tested the effect of actual *claim→grant* behavioral sequences on leadership ascriptions. In a vignette study, Marchiondo and colleagues (2015) presented their participants with a single *claim→grant* vs. a *claim→rejection* sequence. Participants rated actors whose claims were granted by another team member higher on leadership, compared to actors whose claims were rejected via a counter-claim. However, since these authors only considered a single behavioral sequence, their findings do not permit conclusions about the magnitude of double interacts (DeRue, 2011). Therefore, we revisit these hypotheses in a team interaction setting considering recurring patterns of behavioral sequences. As predicted by the leadership identity construction model, we hypothesize:

H2a: The frequency of claims uttered by a focal team member and granted by others across the team interaction, positively predicts her/his level of emergent leadership ascriptions.

H2b: The frequency of claims uttered by focal team member and challenged with a counter-claim by others across the team interaction negatively predicts her/his level of emergent leadership ascriptions.

4.3 Gender Effects Within Leadership Emergence Processes

Meta-analyses underscore the robust evidence for a male advantage in emergent leadership ascriptions (Badura et al., 2018; Eagly & Karau, 1991). Typically, this finding is explained by gender-role consistent behaviors (Eagly, 1987; Eagly & Karau, 2002; Fiske et al., 2002). Often, scholars propose a mediation effect where gender influences a focal

behavior, which predicts emergent leadership ascriptions (e.g., Badura et al., 2018; Shen & Joseph, 2021). However, men and women hardly differ in their actual behavior, including leader behavior (Hyde, 2014; Shen & Joseph, 2021). This raises the question how gender and the interaction processes giving rise to leadership emergence intertwine. Hence, our final hypothesis focuses on how gender, as a social role perceived by other team members, shapes the interaction dynamics at the core of leadership emergence, rather than the perceptual outcome of leadership ascriptions.

Behavior is constantly interpreted within the relational (i.e., social and interactive) context (Uhl-Bien, 2006). Hence, interpreting a behavior as a leadership claim also hinges on who expressed it (DeRue, 2011). Here is where the actor's social category memberships and/or the perceiver's social role expectations may come into play (e.g., gender; Deaux, 1984; Heilman et al., 2019). According to social role theory and role congruity theory (Eagly, 1987; Eagly & Karau, 2002), gender is associated with descriptive norms about actual behavior and prescriptive norms about ideal behavior of women and men. Leadership roles are associated with characteristics that are congruent with male, but incongruent with female social roles (see also lack of fit theory, Heilman, 1983). Based on this normative account, people's acceptance for men's leadership claims should be higher than for women's claims. Additionally, women violating their ascribed follower-role – by displaying claiming behavior – may be disapproved others (Eagly & Karau, 2002). Although gender biases in judging leadership behavior are well-documented, it remains to be shown how they apply to behavioral responses in interactive contexts (Biernat, 2012; Schuh et al., 2018).

Taken together, we argue that is important to understand how gendered social norms about leadership behavior may translate to systematic differences in fine-grained behavioral interaction patterns (i.e., different leading-following patterns depending on the focal actor's gender). We expect the following systematic differences (Figure 4.1, panel C):

H3a: Men's leadership claims elicit other team members' grants more often than

women's leadership claims.

H3b: Women's leadership claims elicit other team members' counterclaims more often than men's leadership claims.

4.4 METHOD

We complied with the Declaration of Helsinki and received approval by the local ethics board (November 11 2019/No. 2019_257). We describe our sampling plan, data exclusions, and manipulations. Research materials, (anonymized) behavioral annotations, and the analytical code are available on OSF (https://osf.io/84rtv/?view_only=4183b23f802845aeaee324e65fdb1cc8. Raw audiovisual data are protected under EU GDPR and are therefore confidential. Details on the preregistration are included in supplement S1 and S2.

4.4.1 DESIGN

We conducted a laboratory study with zero-history teams engaging in an interactive task. To ensure that enough claiming behavior occurred throughout the group interactions for comparing reactions towards men and women's claims, we introduced one female or male confederate per team. They were trained to exhibit claiming behavior across team interactions. The main dependent variables of the present work were (a) team members' behavioral responses following others' leadership claims, and (b) participants' post-interaction leadership ratings of fellow team members.

4.4.2 PROCEDURE

Upon enrollment for the study, participants completed an online pre-test survey, including demographics, motivation to lead, and individual control measures (see pre-test items in S1). A few days later, they participated in a video-recorded team task in the laboratory. Each team included two participants and one of five extensively trained confederates (two women, three men; details on the training in supplement S3). They sat at a

table in a fixed constellation, with the confederate sitting across from the two participants. Teams were instructed to compete in a "domino challenge": They were given 30 minutes to create a line-up of dominoes for which a set of points could be reached (e.g., number of included dominoes, incorporated hurdles, creative design). Then, the experimenter triggered the start domino and team members completed a post-test survey to assess ascribed emergent leadership in a round robin design and other variables pertaining their overall team experience. Finally, participants received their team performance score and were fully debriefed (details in supplement S4).

4.4.3 Sample

Seventy-two participants that were fluent German speakers and not psychology students commenced the study. Data of two participants, and hence their teams, were deleted because they withdrew consent for data storage and analyses after the study. The final sample consisted of *N*=68 participants (41 female, 25 male, 1 nonbinary, 1 other), nested in 34 teams of three (two participants and one confederate, respectively). Participants' average age was 29.5 years (*SD*=10.1). Most of them were students (*n*=46), *n*=21 were working adults employed across a range of industries, and *n*=35 did not provide employment information. Data collection began in February 2020 and had to be terminated early due to prohibited group laboratory usage during the COVID-19 pandemic in Germany.

4.4.4. Measures

4.4.4.1 Leading and following patterns

We measured verbal *claims* and *grants* by analyzing the recorded audiovisual team interaction data using INTERACT software (Mangold, 2010). Two extensively trained research assistants blind to the hypotheses annotated the verbal interaction with the act4teams scheme (Kauffeld et al., 2018). We adapted the scheme to fit our study context and allow for more differentiation between *leading* and *following* behaviors (see supplement S5).

For interrater reliability, seven videos were double-annotated (κ =.71; substantial agreement; Landis & Koch, 1977). We aggregated the annotations into four meta-categories (Table 4.1). The two central categories of interest were *claiming* – containing task- and relations-oriented functional leading behaviors and *granting* – comprising following behaviors. The other two categories, *positive social behaviors* and *dysfunctional behaviors*, were not pertinent for our study hypotheses, but necessary to obtain exhaustive annotations and a comparable level of abstraction for the analysis of H1 via lag sequential analysis (see Lehmann-Willenbrock & Allen, 2018).

Via INTERACT, we extracted the number of claims for each team member that were responded with either a grant (i.e., *claim→grant* sequence) or counter-claim (i.e., *claim→claim* sequence) by one of the other team members (Figure 4.1, panel B). Following earlier recommendations (Bakeman et al., 1996; Quera, 2018), we calculated the log odds ratios (LORs) of the raw sequences. This index represents the ratio of the sequence of interest in relation to all other sequences in the interaction (details in supplement S6). Note that for the H2, these sequences represent the independent variable. For the H3, these sequences comprise the dependent variable.

Table 4.1

Meta-Categories of Verbal Behaviors and Corresponding Behavioral Annotations

Meta category	Fine-grained behavioral annotations after act4teams (Kauffeld et al., 2018)		Frequencies in total sample
Claiming	Overall frequency of claiming behaviors		14550
	Task-oriented behaviors	Solution-oriented statements (proposing, explaining, or linking solutions)	6734
		Providing information	1479
		Discussing procedures	205
		Clarifying own and other's contributions	69
		Summarizing	140
		Assigning and delegating tasks	706
		Self-assigning tasks; sharing one's current steps	427
		Taking responsibility for implementing actions	125
		Articulating visions and goals	252
		Encouraging change	217
		Prioritizing tasks in line with goals	98
		Problem-oriented statements that serve for monitoring others and raising awareness of problems	1386
		Monitoring others via questions	562
		Time management	203
		Encouraging change	
		Including others, encouraging participation	110

	Relations-oriented behaviors	Appreciating others	1318
		Managing team emotions in uncertain situations	519
Granting		Overall frequency of granting behaviors	6766
		Explicit granting/recognition of leadership	46
		Taking on assigned tasks	269
		Agreeing	3831
		Active listening	1769
		Expressing helplessness, highlighting own failure	851
Positive social behaviors		Overall frequency of positive social behaviors	9127
		Joking	274
		Laughing	1991
		Expressing positive emotions	101
		Common courtesies	369
		Neutral questions	2626
		Sharing one's current knowledge/ understanding	3766
Dysfunctional behaviors		Overall frequency of dysfunctional behaviors:	6457
		Complaining	629
		Expressing negative emotions	79
		Reproaching	172
		Expressing reluctance/resignation	63
		Refusing/rejecting	349
		Self-promotion	229

Denying responsibility	3
Empty talk	126
Side conversations, task-irrelevant small talk	1080
Non-categorizable remark	106
Interrupting others	9
Interrupted/non-finished sentences	1417
Incomprehensible remarks	158
Breaks (no speech)	2037

4.4.4.2 EMERGENT LEADERSHIP

Post interaction, team members rated each other on *emergent leadership* in a round robin design. We selected four items from Cogliser et al. (2012) that were particularly fitting for the current study context (e.g., "To what extent did team member X try to exert influence on the team?"; scale: 1=*not at all*; 7=*a great deal*; see supplement S7 for all items). To ensure independence between measures, we excluded ratings provided by confederates from analyses, resulting in two perceiver ratings per team for the confederate (provided by participant 1 and 2), but only one rating for each participant (provided by the other participant, respectively). For each team, we thus averaged the two ratings for confederates (mean $r_{WG(J)}$ with uniform distribution=.89; mean $r_{WG(J)}$ with slightly skewed distribution=.83; *ICC(1)*=.32; *ICC(2)*=.48).

4.4.4.3 CONTROLS

We considered individuals' gender (H2), age (H2&3), motivation to lead (H2&3; 15-item scale by Hossiep & Paschen, 2012; Cronbach's α=.85), role (H2; confederate vs. participant), and gender composition (H2 & 3; proportion of women) as controls. Additionally, the LORs we calculated for the behavioral sequences account for the number of

claims per individual.

4.4.4.4 MANIPULATION CHECKS

Confederates succeeded in displaying high levels of leading by uttering more claims (*M*=229.18, *SD*=66.79) than participants (*M* =87.82, *SD*=48.35), *t*(50.84)=10.99; *p*<.001, *d*=2.56, 95% CI=115.51;167.19. Confederates also received higher emergent leadership ratings (*M*=5.64, *SD*=.72) than participants (*M*=3.48, *SD*=1.14), *t*(94.32)=11.62; *p*<.001, *d*=2.11, 95% CI=1.79; 2.53). Participants did not report experiencing any suspicion for the research question and study hypotheses (*M*=22.0, *SD*=0.12; *Median*=2.0; scale: 0=*no suspicion at all*; 100=*strong suspicion*) and reported normal behavior during the interaction (*M*=5.1, *SD*=1.09; scale: 1=*not at all;* 6=*very well*).

4.5 RESULTS

Overall, we annotated 36,900 utterances (Table 4.1). To test H1, we performed a lag sequential analysis at the sense unit level using INTERACT (Mangold, 2010). This method examines whether two focal behaviors X and Y occur systematically (i.e., X triggers Y; Klonek et al., 2016). It tests the observed frequencies of specific sequences (X→Y) against their expected frequencies. These differences are standardized (z-scores) and interpreted as *p*-values (Quera, 2018). *Z*-scores above 2.58 are significant at $\alpha < .001$. We ran one analysis per team which is more conservative than one analysis across pooled teams (Klonek et al., 2016). For the sequence *claim→grant*, 32 of the 34 teams yielded *z*-values above the threshold of 2.58 (α=.001). With *z*-scores of 1.57 and 1.83, the remaining two teams did not reach significance. Overall, these results indicate that leadership emergence is characterized by meaningful interaction patterns, where functional leadership claims triggering grants in team interactions lending support to H1.

For H2a and H2b, Table 4.2 presents the descriptive statistics and intercorrelations of all study variables including potential controls. Only *frequency of claims*, *age,* and *role*

significantly correlated with the criterion. Since *frequency of claims* is controlled for by the measure calculated for the two main predictors (see supplement S6), we only included *age* and *role* as covariates in our model.

To test Hypothesis 2, we conducted a multi-level hierarchical regression analysis to control for the nested structure of the data in R (R Core Team, 2021; packages: lme4, Bates et al., 2015; lmerTest, Kuznetsova et al., 2017; multilevel, Bliese, 2016; texreg, Leifeld, 2022; tidyverse, Wickham, 2022) with a restricted maximum-likelihood approach by adding a random intercept for team membership at level 2. Covariates and the two predictors (LORs of *claim→grant* and *claim→claim* sequences per individual) were group-mean centered (Enders & Tofighi, 2007) and included as fixed effects at level 1. The criterion (emergent leadership scores) was also included at level 1. Table 4.4 displays the results of this analysis. The frequency of *claim→grant* sequences was a significant positive predictor of emergent leadership ratings. In contrast, the frequency of the sequence *claim→claim* was a significant negative predictor. These results did not change when adding *role* and *age* as covariates to the model (M2, Table 4.4). Thus, our findings lend support to H2a and H2b. For exploratory purposes, we also ran an additional model (M3, Table 4.4) to examine the predictive power of *frequency of claims* alone (i.e., discrete leader behavior) in comparison to the two main predictors (i.e., leader-follower interaction patterns). Considering the regression weights, the leader-follower interaction patterns had a higher predictive power than the discrete leader behavior alone.

Table 4.2

Intercorrelations for Study Variables of Total Sample (H2)

	M (*SD*)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Age	26.74 (8.87)											
2. Gender[a]	.59 (.49)	-.07										
3. Team gender composition	.59 (.23)	.01	.47**									
4. Motivation to lead	2.99 (.58)	-.03	.08	.21								
5. Role	NA	.41**	.09	.00	NA[b]							
6. Number of claims	134.94 (86.56)	-.28*	.05	.08	.26*	-.77**						
7. Number of grants	65.46 (27.68)	-.03	.14	.05	-.18	-.13	.43**					
8. Raw number of *claim→grant* sequences	31.43 (22.37)	-.24*	.01	.06	.16	-.67**	.86**	.45**				
9. Raw number of *claim→claim* sequences	25.55 (14.35)	-.21*	.15	.22*	.27*	-.48**	.77**	.34*	.57**			
10. *Claim→grant* sequences	6.95 (1.02)	.03	.15	.07	-.15	-.12	.38**	.67**	.57**	.22*		
11. *Claim→claim* sequences	7.24 (.86)	.20*	.25*	.19	.03	.34**	-.02	.52**	-.12	.36**	.40**	
12. Emergent leadership	4.20 (1.44)	-.32*	-.13	.09	.02	-.71**	.71**	.17	.66**	.47**	.25*	-.28**

Notes. The analysis for H2a&b is based on the LORs of *claim→gran*t and *claim→claim* sequences. To make more sense of these numbers, we additionally present the raw frequencies of both variables. See supplement S6 for a details on the calculations for the LORs.

[a] Gender is represented as binary variable (0=male; 1=female). One participant indicated "other" and one participant indicated "nonbinary". For parsimony, we set these two values as missing to retain participants in the sample.

[b] We did not include confederates' scores for motivation to lead, hence there are systematic missings for this correlation.

*=$p < .05$; **=$p < .001$

Table 4.3

Results of Multilevel Regression Analyses Predicting Emergent Leadership Ratings (H2)

Level and Variable	Model								
	M1: Random Intercept and fixed slopes, without covariates			M2: Random Intercept and fixed slopes, with covariates			M3: Random Intercept and fixed slopes, M2 + claiming frequencies		
Level 1	Estimate (SE)	95% CI	*p*	Estimate (SE)	95% CI	*p*	Estimate (SE)	95% CI	*p*
Intercept	4.20 (.12)	3.97; 4.43	<.001	5.29 (.20)	4.90; 5.69	<.001	4.63 (.29)	4.07; 5.20	<.001
Claim→grant sequences[a]	.97 (.18)	.62; 1.32	<.001	.60 (.16)	.29; .92	<.001	.39 (.17)	.06; .72	.027
Claim→claim sequences[a]	-1.12 (.19)	-1.49; -.76	<.001	-.43 (.18)	-.79; -.07	.022	-.44 (.18)	-.78; -.10	.015
Role[b]				-1.67 (.28)	-2.20; -1.14	<.001	-.66 (.43)	-1.48; .16	.126
Age				-.01 (.02)	-.04; .02	.470	-.02 (.02)	-.05; .02	.359
Frequency of claims							.01 (.00)	.00; .01	.003
Level 2									
Variance (SD)		.00 (.00)			.00 (.00)			.00 (.00)	
N		34_{Team}			34_{Team}			34_{Team}	
Model fits									
AIC		335.09			288.69.68			292.17	
BIC		348.21			306.64			3.12.68	
Log Likelihood		-162.54			-137.34			-138.08	

Notes. ICC(1) = 0.00. Approximate *p*-values are based on Satterthwaite's degrees of freedom method.
[a] See supplement S6 for calculations of LORs for these variables.
[b] Team members' role in the experiment were denoted as 0=confederates and 1=participants.

As Hypothesis 3 addresses gender differences in leading-following patterns, we focused on confederates' claims and the corresponding reactions by participants. Given that there was one confederate per team, we tested these hypotheses at the team level (N=34) with two linear regressions that each included (confederate) gender as the predictor and the LORs for (a) *claim→grant* and (b) *claim→claim* sequences as the dependent variable, respectively. We included gender composition, age, and motivation to lead (all three averaged across the two participants) as covariates.

While descriptive statistics revealed that female confederates' claims were granted slightly more often (M=7.18, SD=.88) than male confederates' (M =7.06, SD=.96), this difference was not significant (Table 4.4). Male and female confederates' claims were granted at comparable frequencies. H3a was thus not supported. However, gender significantly predicted the number of *claim→claim* sequences: Female confederates' claims were counter-claimed significantly more often (M =7.19, SD=.65) than those of male confederates (M=6.41, SD=.67). These results hold when including the covariates, providing support for H3b (Table 4.4). Thus, female confederates' leadership claims were challenged more frequently than those of male confederates.

Table 4.4

Results of Regression Analyses Predicting Magnitude of Claim→Grant and Claim→Claim Sequences (H3)

	Model											
Variable	Only predictor						Including controls					
	Criterion: claim→grant[a] sequences[1]			Criterion: claim→claim[a] sequences[2]			Criterion: claim→grant[a] sequences[3]			Criterion: claim→claim[a] sequences[4]		
	B(SE$_B$)	β	*p*	*B(SE$_B$)*	β	*p*	*B(SE$_B$)*	β	*p*	*B(SE$_B$)*	β	*p*
Intercept	7.00 (.24)		<.001	6.36 (.17)		<.001	8.67 (1.54)		<.001	4.81 (1.14)		<.001
Confederate gender	.22 (.32)	.11	.491	.83 (.22)	.42	<.001	.35 (.35)	.18	.323	.81 (.26)	.41	.004
Participants' gender composition							1.04 (.58)	.33	.088	.29 (.43)	.09	.514
Participants' age							.01 (.02)	.04	.825	.02 (.02)	.16	.231
Participants' motivation to lead							-.81 (.44)	-.33	.076	.26 (.32)	.11	.422

Notes. The gender composition, age, and motivation to lead represent the average values of participants.
[a] See supplement S6 for calculations of LORs for these variables.
[1] R^2 = .02, $F(32,1)$ = .49, p = .491. [2]R^2 = .30, $F(32,1)$ = 13.78, p = .001. [3]R^2 = .19, $F(24,4)$ = 1.41, p = .260. [4]R^2 = .35; $F(24,4)$ = 3.16, p = .032.

4.6 DISCUSSION

This study addresses three voids in the literature. First, we identified systematically occurring *claim→grant* double interacts. Second, results showed how these behavioral manifestations of leadership emergence as well as patterns involving challenging behavior predicted team members' ascriptions of emergent leadership. Our findings also provide evidence that the predictive power of these patterns for emergent leadership ascriptions is larger than leader behavior taken alone. Third, we showed how gender effects were interwoven with these dynamics. While no gender-bias transpired in the granting patterns, female confederates' leadership claims were more frequently challenged than those of male confederates.

4.6.1 THEORETICAL IMPLICATIONS

Identifying systematic *claim→grant* patterns at the act-by-act-level, we found empirical support for the existence of double-interacts of leading and following in dynamic team interaction settings previously described in theoretical models (DeRue, 2011; DeRue & Ashford, 2010). Thereby, we provide evidence for leadership emergence as an interactional, observable phenomenon in teams. Importantly, we add a specific temporal perspective to these models. We show that some building blocks of leadership occur at a micro-temporal scope unfolding within a couple of seconds. This represents a valuable insight to inform and specify leadership theory from a temporal perspective.

Furthermore, we show how these very brief sequences accumulated over an interaction period of 30 minutes shape team members' leadership ascriptions. One previous vignette study had demonstrated that a single *claim→grant* double interact affected observers' leadership impressions (Marchiondo et al., 2015). Here, we replicate this finding in a dynamic team setting and add insights on the important role of the magnitude, i.e., the frequency, of double interacts (DeRue,

2011). The more often *claim→grant* sequences recur (rather than leader behaviors alone), the clearer the leader (and follower) roles that have established by the end of the team interaction. Thereby, our findings underscore the need to consider leader-follower patterns for understanding leadership dynamics, instead of isolated leader behaviors. How followers respond in reaction to leader behavior is key to understanding how individuals ascribe emergent leadership to each other. Hence, we also add to the literature on follower behavior, which has gained theoretical consideration in recent years (Matshoba-Ramuedzisi et al., 2022).

Finally, we provide further insights into the role of gender within the behavioral dynamics that give rise to leadership emergence. Counter to our expectations, female confederates' claims were granted equally often as those of male confederates. A more differentiated look at different types of claims (e.g., task- vs. relations-oriented) may help to explain these findings. For example, it is conceivable that women uttering relation-oriented claims (e.g., encourage participation) may be granted more often than when uttering task-oriented claims (e.g., task-distribution), which should be investigated in future research. Our finding that female confederates were confronted with more challenging behavior compared to male confederates is consistent with backlash research: Women performing role non-conforming behavior often experience sanctions and negative evaluations, or are perceived as less likeable (Eagly & Karau, 2002; Williams & Tiedens, 2016). Given that (a) women faced more *claim→claim* sequences, and (b) *claim→claim* sequences negatively predicted emergent leadership ratings of the claimer, such patterns may provide an additional explanation for the consistent gender gap in emergent leadership ascriptions (Badura et al., 2018; Eagly & Karau, 1991).

4.6.2 Practical Implications

Our findings highlight the influential role of behavioral *patterns* to leadership emergence. If replicable, these results suggest potential implications for both leadership training and team

development. Designing leadership trainings in conventional terms and tailored solely to formal leaders may not adequately equip self-managed teams with essential leadership skills required for efficient work. Instead, team development may benefit from modules on constructive interactions that enable successful leadership emergence. Similarly, leadership trainings may benefit from a more holistic approach involving the entire team. Both leaders and team members could learn to communicate constructively to optimize their collaboration.

Given our findings that participants reacted more negatively towards women's than men's claims and *claim-claim* sequences negatively predicted emergent leadership ascriptions, we argue that differential reactions towards men and women may also impact how they are evaluated by other team members. This may have implications for performance evaluations of employees and young leaders. Critics of assessment centers have argued that role-plays and simulations are particularly prone to evaluation biases (e.g., Highhouse, 2002). Our findings underscore these concerns and suggest greater sensitivity towards the potential effects of gender and other social categories on evaluations.

4.6.3 Limitations and Future Directions

There are at least three main limitations to this work. First, our analyses focus entirely on verbal behavior. While this constitutes an important component of leadership, future research should additionally consider nonverbal behavior as well as the interplay of different behavioral modalities within the double interacts (Hemshorn de Sanchez et al., 2022). Future work could build on insights on specific nonverbal behaviors like gaze (e.g., Capozzi et al., 2019) and gestures (e.g., Talley & Temple, 2013). It may also benefit from interdisciplinary work based on social signal processing (Vinciarelli & Esposito, 2018). This field has started to explore how different social signals, including gaze, tone/pitch, or movement cues relate to leadership (e.g., Beyan et al., 2018; 2019; Sanchez-Cortes et al., 2013). However, theoretical development is needed to guide the

integration of different modalities in explaining leadership processes.

Second, we only investigated the frequency of double interacts (i.e., the magnitude), but we did not examine how they were distributed across team members (i.e., dispersion; DeRue, 2011). Future research could explore whether different subtypes of claiming and granting are involved in different dispersion patterns of leadership (e.g., more vs. less centralized patterns). Future work could also consider the role of *grant→claim* double interacts. Here, we only investigated one-directional sequences (*claim→grant*). Research on the reverse direction found that leader behavior can also be contingent on follower behavior (Güntner et al., 2020). Considering both directions and how they relate to dispersion patterns are important next steps to investigate.

Third, while our confederate design had the important advantage of keeping male and female behavior as comparable as possible to examine the impact of gender, it also introduced two limitations. First, we could not observe whether and how participants' behavior affected subsequent expression of confederates' claims. In more naturalistic situations, individuals experiencing resistance in their team may feel demotivated to continue claiming leadership or may turn to different strategies (e.g., nonverbal claiming). Future work could investigate behavioral trajectories over time more in depth. Second, confederates' emergent leadership ratings were generally very high (M=5.64), with quite low variance (SD=0.72) indicating a ceiling effect which may mask potential gender differences in leadership ratings. Thus, we were unable to test whether gender differences in the interaction patterns also produced gender differences in leadership ascriptions. Future research could test for a moderation effect to obtain a more comprehensive understanding.

CHAPTER 5: A REVIEW AND FUTURE AGENDA FOR BEHAVIORAL RESEARCH ON LEADER–FOLLOWER INTERACTIONS AT DIFFERENT TEMPORAL SCOPES[6][7]

[6] This chapter has been published as Hemshorn de Sanchez, C.S., Gerpott, F., & Lehmann-Willenbrock, N. (2022). A review and future agenda for behavioral research on leader–follower interactions at different temporal scopes. *Journal of Organizational Behavior*, *43*(2), 342-368. https://doi.org/10.1002/job.2583. This chapter is not the copy of record and does not precisely replicate the final, authoritative document published in the outlet.

[7] This chapter refers to a number of supplementary files (S1-S3). I have not adjusted these file names to S3.1-S3.3 because I cannot adjust the online files that these names refer to. Note, that these supplementary files are not the same as the supplementary files S1-S6 referred to in chapter 4.

ABSTRACT

Scholars are increasingly embracing innovative research designs and measures to capture actual leader and/or follower behaviors in real interactions. Our systematic review of this emerging research stream and development of a research agenda seek to move the literature further in this direction. Specifically, we aim to inspire scholars with techniques for observing, manipulating, or training actual leader- and/or followership behaviors at different temporal scopes in the laboratory or field and identify which future research areas are worth exploring. To achieve these aims, we perform a review of existing studies in this domain according to their underlying conceptual model and temporal scope. We analyze which types of leader or follower behaviors (i.e., verbal behavior, text-based behavior, choice behavior, gaze, facial expressions, gestures, voice tone and pitch, movement cues, unspecified nonverbal behavior) have been studied, how they have been studied (i.e., using which methodological approaches), and in which study context (i.e., laboratory or field). We distill these findings to derive six future research directions: conducting studies that connect actual and perceived leader/follower behaviors, considering temporal granularity in a nuanced manner, exploring interdependent behavioral patterns, leveraging unconventional research methods, performing multimodal behavior analyses, and conducting more studies "in the wild" (i.e., field research).

Keywords: communication; follower behavior, leader behavior; nonverbal behavior; time

Leadership can be defined as a formal or informal, contextually rooted, and goal-influencing process that occurs between leaders and followers (Day & Antonakis, 2012). In a process-oriented definition of leadership, social interactions take center stage (Uhl-Bien, 2006). Accordingly, leadership constitutes an interactional phenomenon that unfolds through discrete observable behaviors (e.g., Gerpott et al., 2019; Uhl-Bien, 2006). This conceptualization of leadership has resulted in a growing scientific interest in observing, manipulating, or training actual leader behaviors, the effects thereof on the behaviors and perceptions of followers, and the dynamics between leader and follower behaviors that unfold over time. Focusing on the behavioral building blocks of leadership and followership in specific temporal contexts can contribute to the development of process theories (Acton et al., 2019; Fischer et al., 2017; Hanna et al., 2021), advance our understanding of the role of time in leadership (McClean et al., 2019; Shamir, 2011), capture the interplay between leaders and followers more accurately (Uhl-Bien, 2006; Uhl-Bien et al., 2014), and ultimately have a greater impact on developing more effective leaders in organizations and societies (Gardner et al., 2020).

Although several reviews have examined the downstream consequences of leader behavior (e.g., Ceri-Booms et al., 2017; DeRue et al., 2011; McClean et al., 2019), they have largely included studies that exclusively rely on followers' *perceptions* of leader behavior instead of actual leader *behavior*, with such perceptions often being captured at one point in time. Furthermore, it is notable that studies and reviews on leader behavior have rarely focused on follower *behavior* as a central ingredient in the construction of leadership (Bastardoz & Van Vugt, 2019; Uhl-Bien et al., 2014). Perceptions of leader behavior obtained via self-reports ostensibly provide a valuable inward-directed perspective on an individual and their understanding of others (Behrendt et al., 2017). Nevertheless, because people's perceptions are often biased, such perceptions do not necessarily reflect what actually occurred in a particular interaction (e.g.,

Hansbrough et al., 2015; Lee et al., 2015). From a practical perspective, this potential inaccuracy impedes deriving assumptions concerning the concrete behaviors that leaders and/or followers should learn and develop. For instance, should a follower know that the performance outcomes of their leader are positive, the follower may tend to rate the leader positively on any behavior that could theoretically explain the high performance – even though, in reality, these behaviors may be unrelated to the leader's performance. Training leaders to perform behaviors identified in such a manner, however, may not necessarily improve performance. From a theoretical perspective, the numerous limitations of questionnaire research – including, among others, the fact that the use of perceptual measures of leadership has played a considerable role in upholding ill-defined or tautological constructs such as transformational leadership (van Knippenberg & Sitkin, 2013; Yukl, 1999) and fostered the study of nonconsequential outcomes (cf. Fischer et al., 2021) – have been labelled "inconvenient truths" and scholars have ignored these for too long (Fischer et al., 2021). The failure to address these limitations has ultimately resulted in a crisis in the leadership field, which has been reflected in several recent publications (e.g., Antonakis et al., 2016; Eva et al., 2019; Fischer et al., 2021; Gottfredson et al., 2020; Rudolph et al., 2021; Rudolph et al., 2020) criticizing vague leadership constructs and calling for research that goes back to the drawing board to identify unique behavioral building blocks (i.e., concrete behaviors that build the foundation of broader leadership styles) to be used to differentially predict specific outcomes.

Evidently, behavior-based research does not represent a solution to all problems in the leadership field and certainly requires greater investment of resources on the part of scholars and increased commitment by participants. Ultimately, people act upon their perceptions of behaviors, and research has repeatedly found substantial differences between reported and observed behavior in leadership studies (e.g., Hansbrough et al., 2015; Lee et al., 2015). However, whereas survey designs can shed light on one (perceived) side of the coin, they can scarcely illuminate the other site –

namely what leaders actually do or how followers truly react as opposed to the hypothetical responses the provide to a questionnaire. Only if we illuminate both sides of the coin can we draw a complete picture of how leadership is created as leaders and followers interact and form perceptions of one another. Against this background, we expand the literature beyond prior reviews, the majority of which relied on followers' *perceptions* of leader behavior (e.g., Ceri-Booms et al., 2017; DeRue et al., 2011; McClean et al., 2019) and instead offer a systematic review of studies that have observed, manipulated, or trained *actual* leader and/or follower behaviors.

Our analysis of extant studies answers the question of how behavior-based research has studied leader- and followership from perspectives that go beyond the possibilities of designs that exclusively rely on surveys and self-reports. Furthermore, focusing on actual leader and/or follower behavior implies that insights regarding the role of *time* can be more easily derived than from questionnaire-based studies, as behaviors can be sampled at a much higher rate. To illustrate, while it would be highly disruptive to ask leaders or followers to continuously fill in questionnaires throughout a meeting, videotaping a meeting interaction allows one to code all observed verbal and nonverbal behaviors retrospectively, resulting in a fine-grained temporal scope. We adopt the concept of time-theoretical levels developed in team research (cf. Klonek et al., 2019) to accurately map extant behavior-based leadership research on five time-theoretical levels: nano-, micro-, meso-, macro-, and giga-time. The results of this analysis can inform leadership scholars about underrepresented temporal levels, thus allowing them to pinpoint where exactly the role of time requires more scientific attention (Castillo & Trinh, 2018; Shamir, 2011). Lastly, although our work is grounded in a review of empirical studies, it has theoretical implications for overcoming the crisis in the leadership field because it indicates which behavioral types (i.e., verbal behavior, text-based behavior, choice behavior, gaze, facial expressions, gestures, voice tone and pitch, movement cues, other nonverbal behaviors) are understudied and

thus also underrepresented in current conceptualizations of leadership styles.

Our review offers two key contributions. First, we provide an integrative overview of the underlying questions addressed in previous behavior-based research on leader–follower interactions by aggregating existing studies according to their underlying conceptual models, thereby also categorizing extant studies based on their temporal scopes into nano-, micro-, meso-, macro-, and giga-time. Clarifying which research questions have been addressed at which temporal scope allows for identifying understudied areas and critically reflecting on the underlying reasons, which may provide guidance for scholars who wish to exploit the full potential of behavioral data. Our review findings serve as the foundation for discussing research directions 1–3, namely developing theories and collecting data that connect actual and perceived leader and follower behavior, analyzing data over time and at more than one temporal level, and analyzing interdependent behavioral patterns between leaders and followers. Second, we provide scholars with a systematic overview of the types of behaviors that have been studied using different methodological approaches (i.e., observation, training/manipulation, critical incidents) in lab or field settings. Through this overview we hope to inspire scholars to explore the richness of behavioral data and to serve as a "go-to" reference list indicating how research questions related to leader–follower interactions can be appropriately tested with designs that capture actual behavior. We utilize the insights from this overview to elaborate on research directions 4–6, namely to encourage leadership scholars to leverage unconventional data collection methods, develop theories and analyze multimodal interaction patterns, and spend more time studying leader–follower interactions "in the wild" – that is, in their real-life context.

5.1 Leader–Follower Interactions at Different Temporal Scopes

Understanding leadership as a temporal process or a sequence of discrete behaviors that evolves through interactions between leaders and followers over time (e.g., DeRue et al., 2011;

Uhl-Bien, 2006; Morgeson, et al., 2010) requires reflecting on what is meant by the terms "behavior" and the "temporal scope" at which the behaviors of interest unfold.

5.1.1 What Is Meant By "Behavior"?

There is an ongoing debate in the general behavioral research literature on what is considered behavior (Agnew et al., 2010; Henrique & Michalski, 2020). Henriques and Michalski (2020) illustrate the complexity of this construct through categorizing it at four levels: matter (e.g., atoms), life (e.g., bacteria, plants), mind (e.g., animal behavior), and, finally, culture (e.g., people's socio-linguistic behavior). The appropriate level or type of behavior to be investigated is determined based on the level on which the research question focuses. Following this model, scholars who want to understand what the experience of leader- or followership means to an individual's perceptual process and potentially to their biological system may want to study brain mechanisms (mind level) or even cellular behavior (life level). In contrast, should we want to understand leadership as an interactional phenomenon that unfolds through discrete, observable behaviors (e.g., Gerpott et al., 2019; Uhl-Bien, 2006) – which is what we focus on in this review – we would need to investigate behavior at the cultural level. This level of behavioral complexity refers to "the shared, socially constructed reality of human persons, and their systems of verbal communication and propositional meaning making" (Henriques & Michalski, 2020, p. 341).

We define the term *behavior* at the cultural level as any overt conduct on the part of a person that is *observable* and *functionally relevant* in the present moment (Kelly & Agnew, 2012; Uher, 2016). The reference to the present moment emphasizes that behavior is different from development (Uher, 2016). Furthermore, note that this definition includes both actions and inactions, as not reacting to a given behavior (e.g., not responding to a question) is observable and functionally relevant in a given social context (e.g., showing disinterest). Observable behaviors include verbal utterances, text-based behavior, and nonverbal behavior (e.g., gaze, facial

expressions, gestures, movement cues, and voice tone and pitch). Internal bodily functions such as heartbeat or galvanic skin response, neurotransmitter activities, and cognitive processes (e.g., thinking, reflecting, internal processing, and sensemaking) are excluded from the observable behaviors at the socio-linguistic level. It should be noted that while our definition entails that answering a questionnaire is an observable behavior (i.e., the behavioral act of ticking answer categories), this would only fall within the scope of this review in the unlikely event that the ticking behavior itself is of focal interest to the researcher. However, should a study focus on investigating phenomena such as perceptions of inner convictions, perceived behaviors, or attitudes via questionnaires such that ticking a box in a questionnaire serves only as a proxy for these phenomena, that study would not be included.

5.1.2 What Is Meant By "Temporal Scope"?

Scholars can account for time in theoretical models and research designs in various ways. For example, McClean et al. (2019) developed theory specifying the *degree* and *pattern* by which leader behavior dynamically change over time. Their research describes the steepness of trajectories or the patterns of cyclicality in leader behavior (i.e., shift, growth and decay, ebb and flow). Such trajectories or patterns can unfold over timeframes ranging from milliseconds to years. Developing a language with which to accurately describe the temporal scope of leadership and followership research would be an important step towards developing theoretical models that are able to precisely predict leader–follower interactions. To illustrate why doing so is theoretically meaningful, consider the following example: Within a single meeting, leaders may promote higher meeting satisfaction and a more productive meeting outcome by uttering solution-oriented statements at a high frequency (Lehmann-Willenbrock et al., 2015). In the long term, however, an excessive focus on creating solutions could lead to a lack of problem-orientation, which could result in teams overlooking important shortcomings in the project work. Thus, while a behavior

may have positive results at a small temporal scope, it may result in problematic patterns at higher temporal levels.

While conceptual work on leader- and followership has often remained silent regarding the timeframes that should be considered when observing a phenomenon of interest (Castillo & Trinh, 2018; Shamir, 2011), scholars conducting empirical studies must decide on the temporal scope at which they will collect their data on leader–follower interactions. In that regard, the team dynamics literature can contribute to thoroughly classifying extant leadership research in terms of its temporal scope because scholars in the team dynamics domain have long discussed the theoretical importance of defining timeframes for topics of interest (e.g., Kozlowski, 2015; Kozlowski & Klein, 2000; Schecter et al., 2018).

To accurately describe the temporal scopes of studies, we rely on the time-theoretical levels proposed by Klonek et al. (2019): nano-time (leader–follower interactions or behaviors that evolve within microseconds or frames per second), micro-time (leader–follower interactions or behaviors that evolve over the course of seconds, minutes, or an hour), macro-time (leader–follower interactions or behaviors that evolve over multiple days or weeks), and giga-time (leader–follower interactions or behaviors that evolve over several months/years). Recognizing that there is a significant difference between micro- and macro-time, we further add the meso-level as a fifth time-theoretical level. This level refers to behaviors that evolve over the course of a day because it is plausible to assume that leadership scholars may use diary studies or experience sampling data to capture daily fluctuations in leader and/or follower behavior.

5.2 Methodology of the Review

We conducted a multi-step systematic literature review. For all steps, we applied the following formal inclusion criteria: (a) published in English; (b) peer-reviewed, empirical journal articles or articles in preparation for submission; (c) included participants who were at least 18

years old; (d) studies conducted in lab or field settings; and (e) positioned within the disciplines of organizational behavior, psychology, communication, management, economics, anthropology, or sociology. Furthermore, to identify studies that observed, manipulated, or trained actual leader- and/or followership behaviors, we defined two inclusion criteria: First, a study had to consider both leader *and* follower roles. This included research on initially leaderless teams that researchers studied to advance our understanding of emergent leadership processes, as well as experimental and laboratory studies with leader and follower roles (either because participants were assigned to one of the roles or because they interacted in these roles when working on a task or confronted with a stimulus). For field studies, this criterion meant that both employees and supervisor/managers had to have participated in a study. For instance, intervention studies on leadership training programs were only considered if they involved employees at any point (e.g., employee ratings of leaders pre- and post-training). In contrast, studies that assessed interactions between CEOs and other parties, such as shareholders (Hou et al., 2017; Kolev et al., 2017), or feedback from the media (König et al., 2018; Shani & Westphal, 2016) were not included because they did not involve direct followers.

Second, studies needed to capture, manipulate, or train *real* (actual) behavior of leaders and/or followers. We applied a broad understanding of this criterion, meaning, for example, that researchers trained leaders or followers on a specific behavior in the context of a development program, but then "only" captured leader and/or follower perceptions of changes in behavior. Furthermore, experimental designs with confederates were included if the latter took over the role of the leader or the follower(s) and exhibited instructed behaviors to observe how leaders and/or followers would react to this behavior. Alternatively, scholars could also assign leader and follower roles and provide participants with detailed instructions on how to behave in their role as a leader or follower, such as requiring them to behavior in a particularly cooperative way (i.e.,

behavioral manipulation). Lab studies that investigate leader–follower interactions through independent observations or other objective methods (e.g., eye-tracking) also fulfill this criterion. For research employing text vignettes, this criterion meant that only studies that involved displaying *actual* behavior in the form of written messages (e.g., a supervisor's email or a dean's speech) were included. Vignettes describing a leader's (or follower's) behavior in more general terms were not included (e.g., Braun et al., 2018). Furthermore, we excluded diary studies that relied on survey instruments that were administered over several time points during the course of a day or week because while this method captures a temporal component of leader–follower interactions, it captures perceptions of behavior, as opposed to actual behavior. Lastly, we also did not include studies that utilized agent-based models of leadership (e.g., Castillo & Trinh, 2018) because although they include data at a high temporal resolution, they do not investigate actual behavior.

We followed five steps to identify studies that met the two inclusion criteria. During each step, we scanned the titles and abstracts of identified articles to verify whether they met the inclusion criteria. In cases of doubt, we analyzed the studies' methods sections in detail. In the first step, we searched the databases Web of Science, EBSCOhost, and PsychINFO using keywords that cover leader and follower behaviors as well as methods used to capture these behaviors. The complete search string is provided in the online supplementary material S1A. Once the search string was applied to all three databases, we combined the results into a single data set that consisted of 41,299 titles. We then cleaned this data set by deleting duplicates as well as articles belonging to irrelevant disciplines (e.g., animal research, cell biology research, clinical research). The remaining titles were scanned, and irrelevant titles were excluded, which reduced the number of potentially relevant articles to 2,836. We then read the abstracts of these publications, which reduced the data base by another 1,852 articles that obviously did not meet the inclusion criteria. The remaining 985 articles were examined in greater

detail, with particular attention being paid to each article's methods section, resulting in a set of 209 articles. In the second step, we inspected the last five years of publications in the *Journal of Organizational Behavior*, *Journal of Applied Psychology*, *Academy of Management Journal*, *Organizational Behavior and Human Decision Processes, Journal of Management, Organization Science,* and *The Leadership Quarterly*. This manual search resulted in 18 additional articles. Third, we conducted Google Scholar queries for leader-/followership research utilizing methods ("eye-tracking," "social signaling," "wearables," "language style matching," and "public goods games") that are not common in the leadership field. This step yielded 10 additional studies. In the fourth step, we browsed the reference lists of review articles on leadership behavior that were identified in the second step to identify additional potentially relevant studies. This resulted in three additional publications being identified. In the final step, we sent out a call for (unpublished) work being prepared for journal submission via the AOM ListServ and directly contacted leadership scholars who had published research involving behavioral variables. This step added three previously unidentified articles. An illustration of this search process is included in the online supplementary material S1B.

The final set of papers comprised 243 articles covering 266 empirical studies. Table S2A in the online supplement provides a detailed overview of the identified 266 studies, including information about the methodological approach utilized and the types of behavior investigated, a brief description of the research design, outcome measures, temporal scope, underlying conceptual model, and sample size. A complete reference list for these studies is included in the online supplementary material S2B. The first author and three research assistants coded the identified articles by considering the following questions: (1) What is the study context (lab vs. field)?; (2) Which methodological approaches were employed to investigate behavior?; (3) Which behavioral types were investigated?; (4) At which temporal scope were the focal variables analyzed?; and (5)

What was the underlying conceptual model that describes the studied relations among the focal variables? For completeness, we also noted the outcome measure(s), the sample size, and a brief description of the study set-up. *Methodological approaches* indicate how leader and/or follower behaviors are captured in a study. Specifically, we differentiate between training, manipulation, observations, and critical incidents.[8] By *behavioral types*, we refer to the types of behavior that were studied. Specifically, we distinguish between verbal behavior, text-based behavior, choice behavior, gaze, facial expressions, gestures, voice tone and pitch, movement cues, and unspecified nonverbal behavior (i.e., behavior that is labeled as "nonverbal" in a study without further specification of what precisely is examined). In terms of temporal scope, we considered the five time-theoretical levels introduced above (i.e., nano-, micro-, meso-, macro-, and giga-time).[9]

[8] *Training* included all field studies that trained real leaders (managers and supervisors) and employees with a particular focus (e.g., charismatic leadership; Antonakis et al., 2011; employee behavior in appraisal interviews; Korsgaard et al., 1998; Study 2). *Manipulation* included all laboratory studies that manipulated leader or follower behavior via trained confederates, specific stimulus material (e.g., video clips), or specific participant instructions. *Observation* included both field and laboratory studies that involved observing behavior live or via video and audio recordings. Finally, *critical incidents* included qualitative field studies that focused on interviewing participants to describe in detail the unfolding of leader–follower interactions (from both perspectives). Please note that many studies employed several methodological approaches (e.g., manipulation and observation), which is why the numbers in Figures 5.1A and 5.1B do not add up to 100%. For example, Antonakis et al. (2011, Study 2) invited participants to their lab to deliver a short speech before and after a charisma workshop (= Manipulation). Speeches were video-recorded, and independent raters rated the charismatic behavior exhibited by the participants in both speeches (= Observation).

[9] Note that there is a critical difference between the (temporal) level of data collection and the (temporal) level of analysis. For example, a researcher who records an hour-long meeting and codes all verbal utterances (which are typically a few nanoseconds to seconds long) has two broad options in terms of temporal scope considerations: First, they could run analyses on overall frequencies or percentages across the entire duration of the meeting (i.e., micro-level), thereby losing more fine-grained temporal information. Second, they could consider behaviors at a smaller scale (e.g., at five-minute intervals) or even conserve the temporal sequence in their analysis, which would make it possible to draw conclusions at smaller temporal scopes (i.e., nano-level). In this review, we focus on the level of analysis to determine the temporal scope a specific study focuses on.

5.3 Review Findings

Table 5.1 presents detailed descriptions of the nine behavioral types identified in this review and offers exemplary insights into how these types have been applied in the reviewed articles.[10] In the following sections, we first discuss the underlying conceptual models and the investigated temporal scopes. We then turn to a comparison of predominant methodological approaches and behavioral types studied in the laboratory and field context.

5.3.1 Underlying Conceptual Models of Extant Behavior-Based Research

To understand which types of research questions scholars have sought to answer utilizing behavior-based research designs, we aggregated the concrete variables used in every reviewed study and their relationships with each other to a higher (abstract) level. This overview helps to answer the question of how behavior-based research has studied leader- and followership from perspectives that go beyond what we can investigate with designs that rely exclusively on surveys/self-reports. Table 5.2 summarizes the underlying 26 generic conceptual models of the studies included in this review and categorizes them into seven broad research questions. The online supplementary material S3A offers a detailed explanation of the steps that we took to cluster the variables included in the 266 identified studies into 19 higher-level categories (i.e., the boxes in Table 5.2, such as leader behavior), which served as the foundation for the 26 generic models and were further analyzed in terms of their respective temporal scopes.

[10] It is interesting that several studies have collected data on more than one behavioral type, but, as we outline in more detail in the future research section, they have rarely considered several modalities simultaneously. For example, Maran et al. (2019, Study 2) recorded their participants' (i.e., leaders') *gaze* while the latter talked to their followers (i.e., confederates) to motivate them to contribute to a task. Naïve observers rated these motivational speeches in terms of *verbal* and nonverbal (*facial expressions* and *gestures*) charisma.

Table 5.1

Overview and description of behavioral types identified through the literature review and examples of their application in the reviewed articles

Behavioral method (% of included studies)	Description	Application in the reviewed articles	Exemplary references (full list in online supplement S2B)
Verbal behavior (74.1%)	Spoken behavior	In the lab: audio/video stimuli presented to participants and confederates verbalizing specific leader/follower behavior, live observations of leader–follower interactions through one-way mirrors, observations from leader–follower interactions from audio/video recordings In the field: audio/video recordings of the public media, observations during team meetings	Baxter, 2014; Luria & Berson, 2013; Meinecke & Kauffeld, 2019; Schlamp et al., 2020; Shi et al., 2019; Wasike, 2017; Weiss et al., 2018
Text-based behavior (19.2%)	Written behavior	In the lab: text-based vignettes that represent concrete behaviors, such as emails, written speeches, etc.; written material produced by participants In the field: emails, posts on virtual team platforms and online communities, chat logs Note that most of these forms are more likely to be asynchronous.	Carton & Lucas, 2018; Carte et al., 2006; Griffith et al., 2011; Reyt & Wesenfeld, 2015; Study 1; Yoo & Alavi, 2004
Choice behavior (9.8%)	*Repeated* leaders' (or followers') choice behavior per round of a (economic) game	Only found in lab settings; paradigms included sequential public good games and variants, the dictator game, or other games based on similar principles	Bendahan et al., 2015; Study 2; Brandt & Cooper, 2007; Rivas &

			Sutter, 2011; Sorrentino & Boutiller, 1975; Weber et al., 2001
Gaze (6%)	Gaze movements, gaze directions, and eye contact	In the lab: eye-tracking machines recording participants' gaze while watching a screen displaying the target stimulus (e.g., a scene of a leader–follower interaction, a video of the leader/follower[s] with which the participant "interacts," such as by delivering a speech); gaze patterns are tracked with high-resolution cameras during in vivo leader–follower interactions; human coders note down timing and direction of gaze behavior in dyadic or team settings In the field: eye contact with employees as one element of a leadership training programs	Beyan et al., 2019; Capozzi et al., 2019; Gerpott et al., 2018; Korsgaard et al., 1998; Study 2; Maran et al., 2019; Tindall et al., 1978
Facial expressions (7.1%)	Orofacial movements and expressions (e.g., smiling, frowning)	In the lab: observations of participants' facial expressions via rating and coding; manipulations of specific facial expressions via confederates or visual stimuli to express a particular leadership style, mood, or emotions In the field: facial expression as a concrete element of a charismatic leadership training	Antonakis et al., 2011; Butler & Geis, 1990; Ito et al., 2018; Jiang et al., 2015); Maran et al., 2019, Study 2; Venus et al., 2013
Gestures (6.4%)	Expressive movements with hands and arms	In the lab: observations of participants' gestures via rating and coding; manipulations of specific gestures via confederates or visual stimuli to express a particular leadership style, dominance, mood, or emotions In the field: gestures as a concrete element of a charismatic leadership training	Antonakis et al., 2011; Boies et al., 2015; Jaussi & Dionne, 2004; Kay & Christophel, 1995; Olsen et al., 2020
Voice tone/pitch (5.6%)	All nonverbal elements of voice	In the lab: observations of participants' tone of voice via ratings (positive, negative, neutral) and levels of pitch via machine detection; manipulation of voice tone via confederates to express leader/follower emotions and mood and particular leadership styles In the field: tone of voice as a concrete element of a charismatic leadership training	Antonakis et al., 2011; Beyan et al., 2018; Griffith et al., 2015; LaPlante & Ambady, 2002;

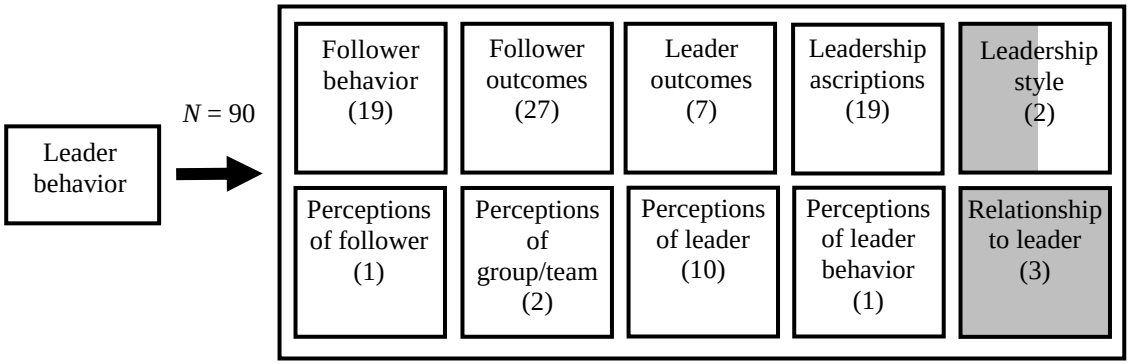
			Lewis, 2000; Stein, 1975; Tee et al., 2013
Movement cues (6.4%)	Body orientation, distance between individuals, posture and position	In the lab: observations of participants' distance or orientation to each other (via Bluetooth, infrared, accelerometers, and kinematic sensors) and body postures via rating and coding; manipulations of specific movement cues by confederates to express a particular leadership style or follower behavior In the field: measurements of participants' distance from each other and movement patterns through a particular site (e.g., building); specific body orientations as part of an appraisal training program for employees	Chafin et al., 2017, Studies 3a & 4; Cook et al., 2019; D'Aussilio et al., 2012; Korsgaard et al., 1998; Meyer et al., 2016; Venus et al., 2013
Nonverbal behavior unspecified (14.3%)	Behavior that is labeled as "nonverbal" in the study without further specifying which behaviors are examined (specific nonverbal behaviors are listed above)	In the lab: imprecise descriptions of confederates' behavior (e.g., "strong vs. weak nonverbal communication," "working slowly"); confederates trained to act consistently with one another without further specifying precise behaviors; rating scales that imply nonverbal components without specifying precise behaviors (e.g., "seeks attention," "paints an interesting picture of the future for the group") In the field: qualitative observations of unspecified nonverbal behavior (e.g., "comprehensive notes on nonverbal communication," "preparing the operation room"); rating scales that imply nonverbal components without specifying precise behaviors (e.g., "paints an interesting picture of the future for the group")	Andersson et al., 2015; Borg, 1957; Cooper & Wakelam, 1999; Dubno, 1963; Gitter et al., 1975

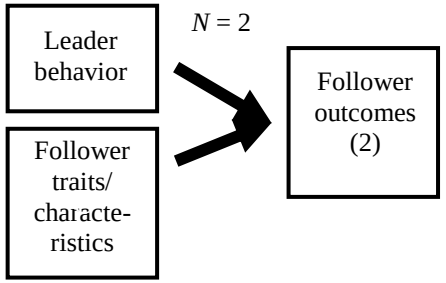
Note. In many studies, several types of behaviors were investigated. Hence, the cumulative percentages exceed 100%.

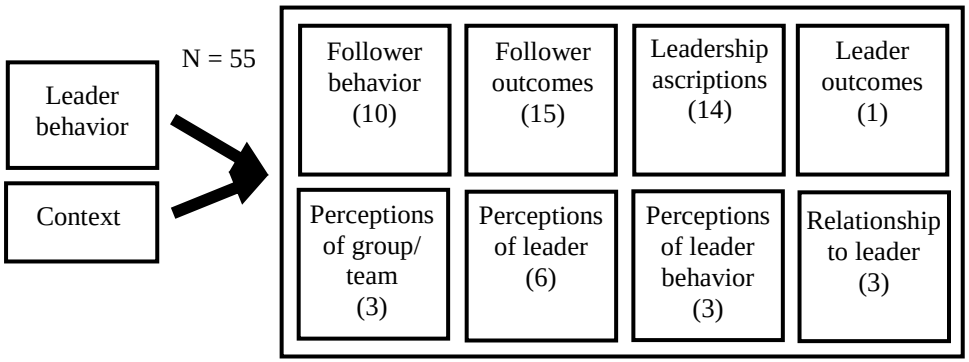
Table 5.2

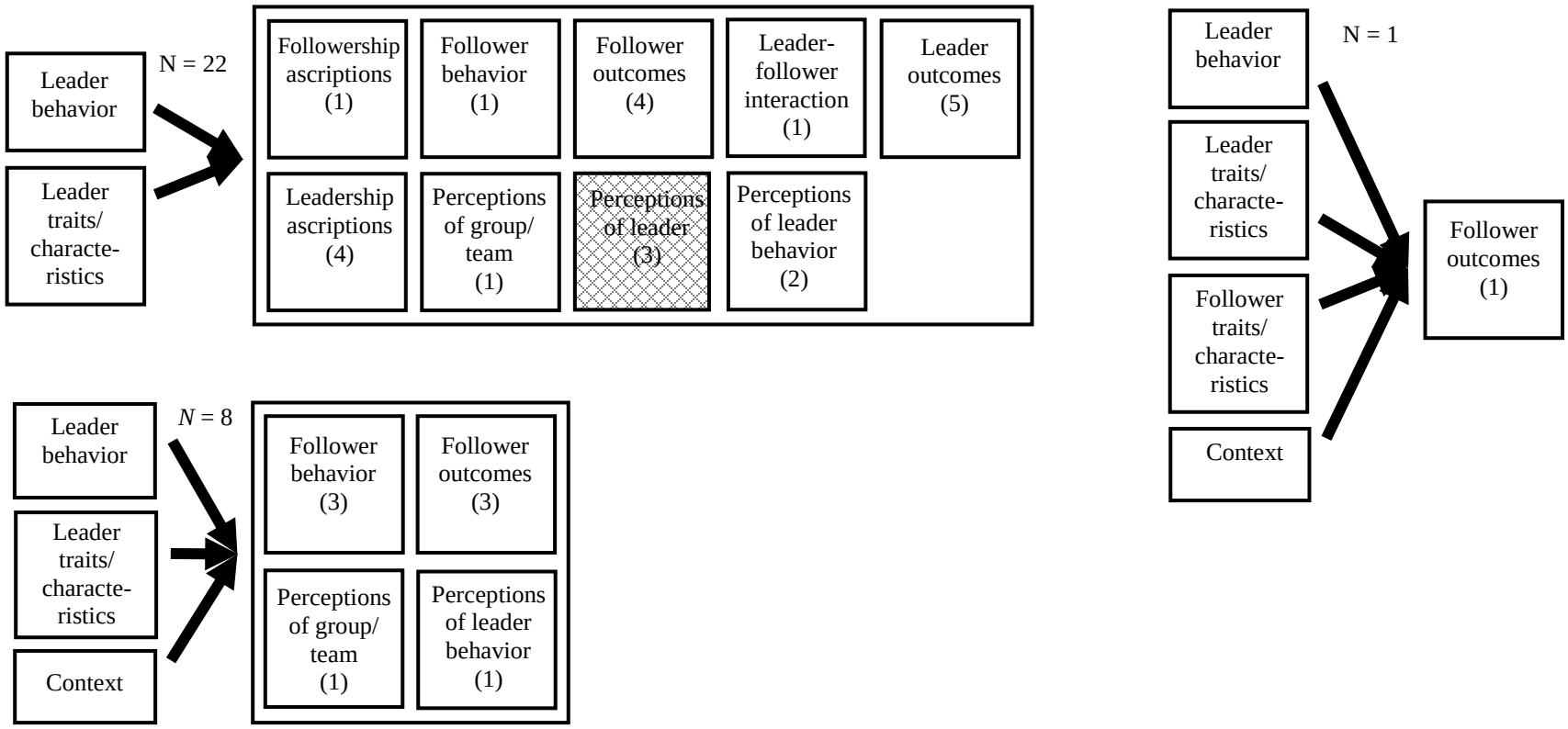
Overview of investigated research questions in behavioral leadership studies, generic models, temporal scope (color-coded), and total number of studies per research question

1. How are specific leader behaviors (in combination with leader traits and context) related to outcomes such as follower behavior, perceptions of leaders, or leader outcomes?

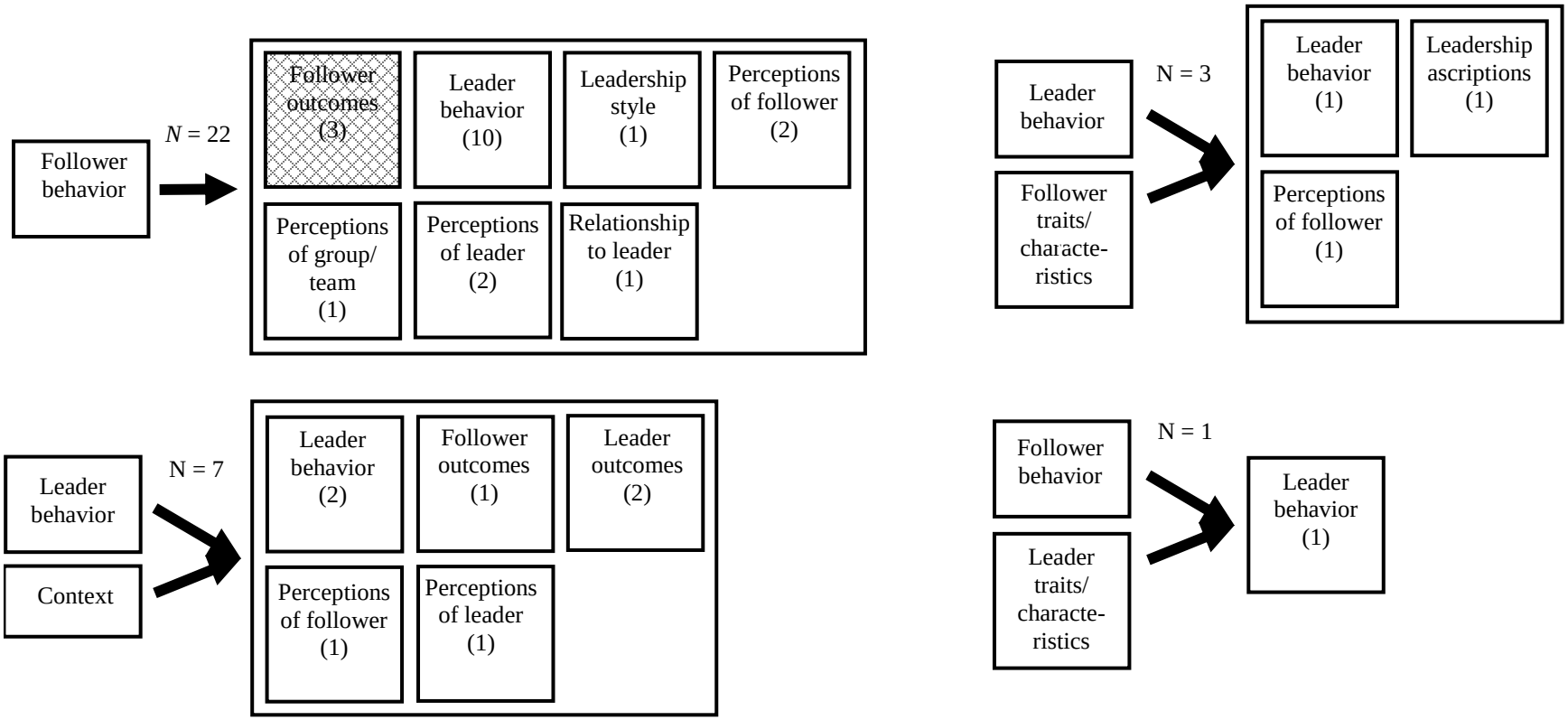




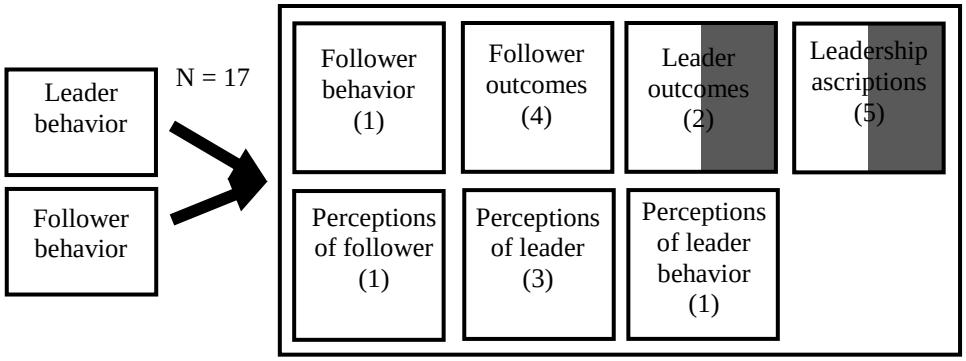


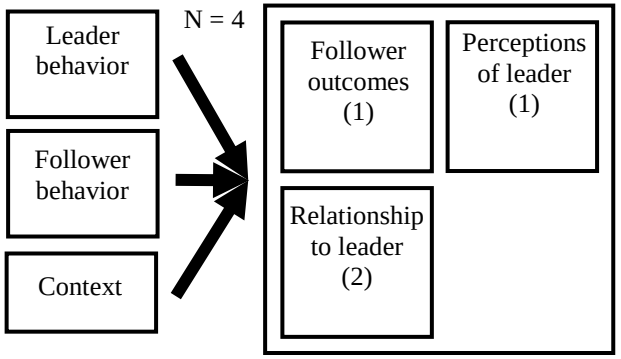

Leader behavior
Leader traits/ characte-ristics
N = 22
Followership ascriptions (1)
Follower behavior (1)
Follower outcomes (4)
Leader-follower interaction (1)
Leader outcomes (5)
Leadership ascriptions (4)
Perceptions of group/ team (1)
Perceptions of leader (3)
Perceptions of leader behavior (2)
Leader behavior
Leader traits/ characte-ristics
Context
N = 8
Follower behavior (3)
Follower outcomes (3)
Perceptions of group/ team (1)
Perceptions of leader behavior (1)
Leader behavior
Leader traits/ characte-ristics
Follower traits/ characte-ristics
Context
N = 1
Follower outcomes (1)

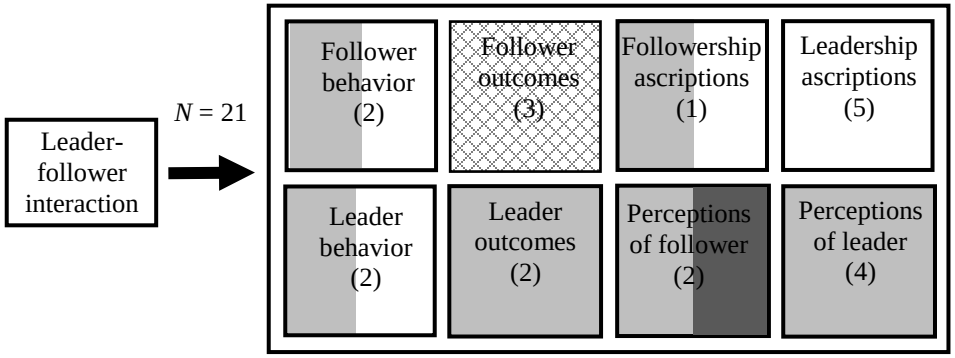
2. How are specific follower behaviors (in combination with follower traits and context) related to outcomes such as leader behavior, relationship to the leader, or perceptions of followers?



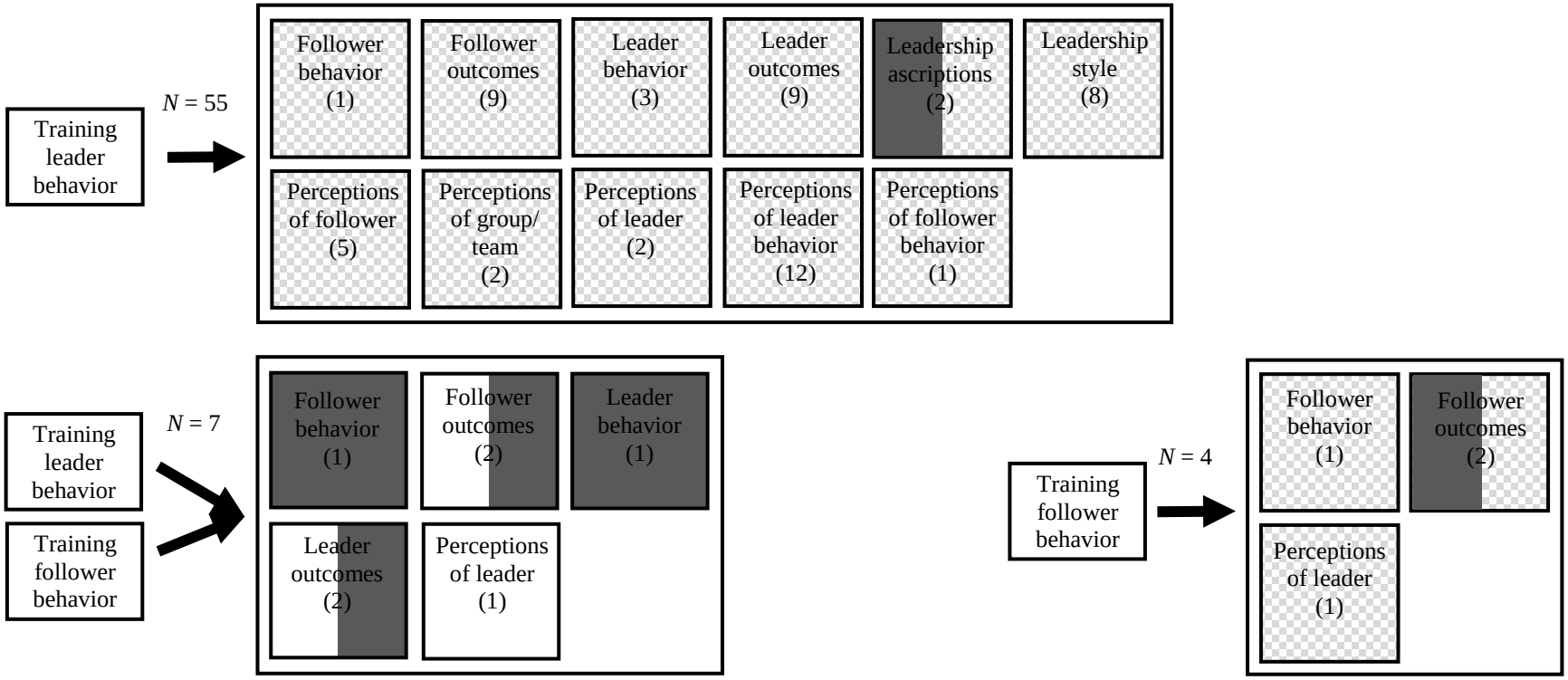
3. How are specific combinations of leader and follower behavior related to outcomes such as follower outcomes, perceptions of leaders, or leadership ascriptions?



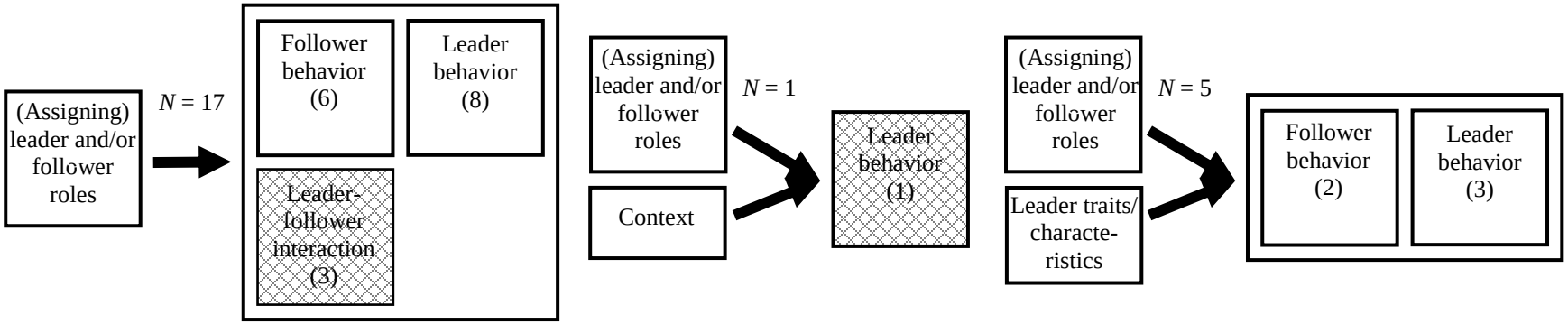




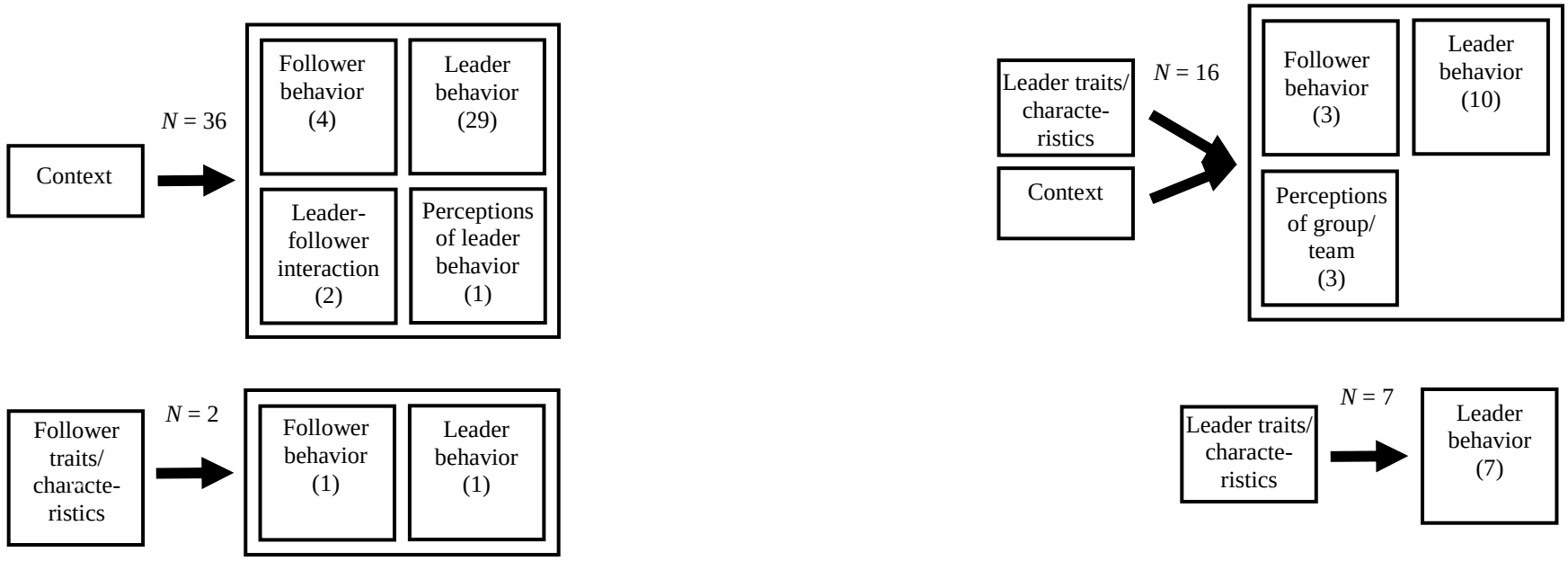
4. Can training specific leader and follower behaviors affect outcomes such as follower behavior, perceptions of leaders, or follower outcomes?



5. How do leader and follower roles (and individuals' traits) affect individuals' behavior?



6. How are context and individuals' traits and other characteristics related to leader and follower behavior?



7. How are leadership styles and leadership ascriptions related to leader and follower behavior?

Note. N describes the total number of studies investigating the depicted generic model. The number of studies per outcome variable are in brackets. Each outcome variable is colored according to the predominant temporal-level at which that generic model has been investigated (light grey = nano-level; white = micro-level; dark grey = macro-level; white-grey checked = giga-level; two shade-types = two predominant temporal levels; crisscross= no predominant level). Some studies investigated their research questions at different temporal levels, which is why some outcome variables are marked with two temporal levels.

Our classification reveals that scholars preferably aim to answer the question of how specific leader behaviors relate to a wide range of outcomes, with the most prevalent being follower outcomes (see Table S3B in the online supplement for a detailed analysis), leadership ascriptions (e.g., emergent leadership, leader prototypicality, leadership rank, status), and follower behavior (e.g., verbal, nonverbal, gaze patterns, movements). The predominant temporal level at which scholars have investigated this question is the micro-level. In addition to studying the direct links between leader behavior and the dependent variables (90 studies), it has also become increasingly popular to consider contextual factors (55 studies) or leadership traits/characteristics (22 studies) as additional predictors or boundary conditions of leader behavior. For example, Schlamp et al. (2020) demonstrated that while male and female team members did not differ in their overall task-oriented verbal behavior, they did differ in the degree of leadership that was ascribed to them for displaying these behaviors. What would be interesting here would be to also have round-robin data concerning team members' perceived task-oriented communication to determine whether the task-oriented communication of female team members is simply overlooked (i.e., does not manifest in perceptions, which could explain the lower emergent leadership rating) or is perceived but evaluated differently. This combination – that is, studies collecting both actual and perceived behavior from leaders – is, however, rarely represented in Table 2. Such knowledge would be not only theoretically interesting (e.g., in terms of information processing theory) but also practically relevant, as it could help to answer questions such as whether practitioners would be well advised to train leaders in certain leader behaviors or whether they should focus more about training those who may form (biased) perceptions of the focal leaders' behavior. Against this backdrop, we further elaborate on research designs that combine the "best of both worlds" in the first future research direction (i.e., "Developing theories and collecting data that connect actual and perceived leader and follower behavior").

A related prevalent research area concerns the question *whether training specific leader behaviors can positively influence a wide range of outcomes*, with the most prevalent outcomes being perceptions of leader behaviors and leadership style and leader or follower outcomes (see Table S3B in the online supplement for a breakdown of outcomes). These types of studies investigated, for example, whether training programs can promote charismatic leader behaviors (e.g., Antonakis et al., 2011), collaborative and inclusive leadership practices (Leigh et al., 2010), or transformational leadership (e.g., Tafvelin et al., 2019; Parry & Sinha, 2005). In terms of their temporal scope, these studies operated on the giga-time level by comparing a pre-intervention measure with a post-intervention measure collected a few to several months later. Training studies provide important insights with respect to the effectiveness of particular interventions and – provided that these programs are grounded in theory – may help support or reject hypotheses that link specific leader behaviors to specific follower outcomes. However, due to the prevalent focus on the giga-time level, we know little about what precisely occurs in the months following an intervention. In fact, only a minority of studies explicitly discussed time-theoretical choices (as is true for most of the studies identified in this review); that is, only very few studies explicitly considered time, or the passing of time, as a variable in their design. To enrich an evidence-based perspective on leadership training programs, it may thus be a promising endeavor to more often pose these research questions on different time-theoretical levels (i.e., nano-, micro-, or macro-level) or consider an integration over temporal levels to understand how different temporal levels depend on and affect each other (e.g., a newly learned behavior may help in the short term but become detrimental in the long term). We revisit these ideas when discussing the second future research direction (“Data analysis over time and over more than one temporal level”).

The two predominant research foci (i.e., using leader behavior as a predictor or training leader behavior as an independent variable) reflect a strong focus on the leader as the main driver

of outcomes. Reversing the lens, 33 studies considered follower behavior as the driving factor of behavioral or perceptual outcomes measures (see Research Question 2). While likely not surprising against the backdrop of what is published in the leadership field (i.e., studies celebrating the deeds of leaders; see Alvesson, 2020), the analysis of the underlying conceptual models shows that more complex research designs and studies investigating the co-construction of leadership through followers remain rare. Although the conceptual models depicted in the context of the third (i.e., How are specific combinations of leader and follower behavior related to outcomes?) and fifth (How do leader and follower roles (and individuals' traits) affect individuals' behavior?) research questions point in this direction, extant studies have only rarely zoomed into (nano-level) sequences of leader and follower behavior – a topic that we critically reflect on in the discussion of the third future research direction ("Analyzing interdependent behavioral patterns between leaders and followers").

The two predominant research foci (i.e., using leader behavior as a predictor or training leader behavior as an independent variable) and their corresponding preferred temporal scope (i.e., micro- and giga-time) also reflect the overall preference for temporal scopes. Across all studies included in this review, 65.7% reported data at the micro-level (i.e., evolving over minutes or within an hour), 14% at the giga-level (i.e., evolving over multiple months or years), 8.7% at the macro-level (i.e., evolving over multiple days or a week), 7.2% at the nano-level (i.e., evolving within seconds, microseconds, or frames), and only 0.4% at the meso-level (i.e., evolving over the course of a day). There is a clear general trend for larger temporal scopes in field studies, as is evident in training intervention research which is mainly captured at the giga-level. This entails that the overall

preference for testing generic models at the micro-level is considerably driven by the preference for laboratory settings when conducting behavioral research – a topic we turn to next.[11]

5.3.2 Study Context, Methodological Approaches, and Behavioral Types

Understanding which types of behaviors have been studied how (i.e., through which methodological approaches) in which study context at which temporal level allows for pinpointing what we know about specific leader and follower behaviors in controlled environments (i.e., the laboratory) as compared to their manifestation "in the wild" (i.e., the field). Figures 5.1A and 5.1B present visual illustrations of the number of studies identified in the laboratory versus field context and further divides them based on the methodological approaches utilized, behavioral types investigated, and temporal scopes.

5.3.2.1 Laboratory Study Context

Our systematic review reveals that scholars who seek to study actual behavior preferably do so in laboratory contexts (traditional laboratory studies and online experiments). More specifically, of the 266 studies that we identified in total for this review, 185 (69.6%) were conducted in the laboratory, with roughly two thirds of the studies relying on the manipulation of behavior and another two thirds utilizing behavioral observations. In terms of the preferred temporal scope, lab data were collected mainly at the micro- (87.6% of all lab studies) and nano-level (11.4% of all lab studies). These temporal foci are likely driven by the fact that, realistically, scholars can generally only keep participants in a laboratory for limited periods of time.

We next turn to the question of which types of behaviors scholars preferably study in the lab. Verbal behavior is the dominant investigated behavioral modality (cf. Figure 5.1A); it was

[11] Note that some studies (4.1%) considered the same behavior at two or more temporal levels. For example, Lehmann-Willenbrock et al. (2015) examined sequences of solution-oriented leader statements and solution-oriented team communication at the nano-level and overall frequencies of solution-oriented behavior across a meeting.

manipulated in 79 studies (42.7% of all lab studies) and observed in 70 studies (26.3% of all lab studies). As a representative example of the research focus on verbal behavior, Jurma and Wright (1990) conducted an experimental laboratory study in which participants completed a problem-solving task in teams. Confederates played the team leaders and were trained to make helpful, supportive, informative, and assertive utterances (leader gender and power loss vs. gain were also manipulated). The team interaction was audiotaped and coded by independent raters for communication content (task-oriented, instrumental, socio-emotional, and expressive behaviors). The authors then analyzed the effects of leader behavior on team communication.

Figure 5.1A

Number of identified studies that manipulated or observed behavior in a laboratory context, further split up into the investigated behavioral types and temporal scopes

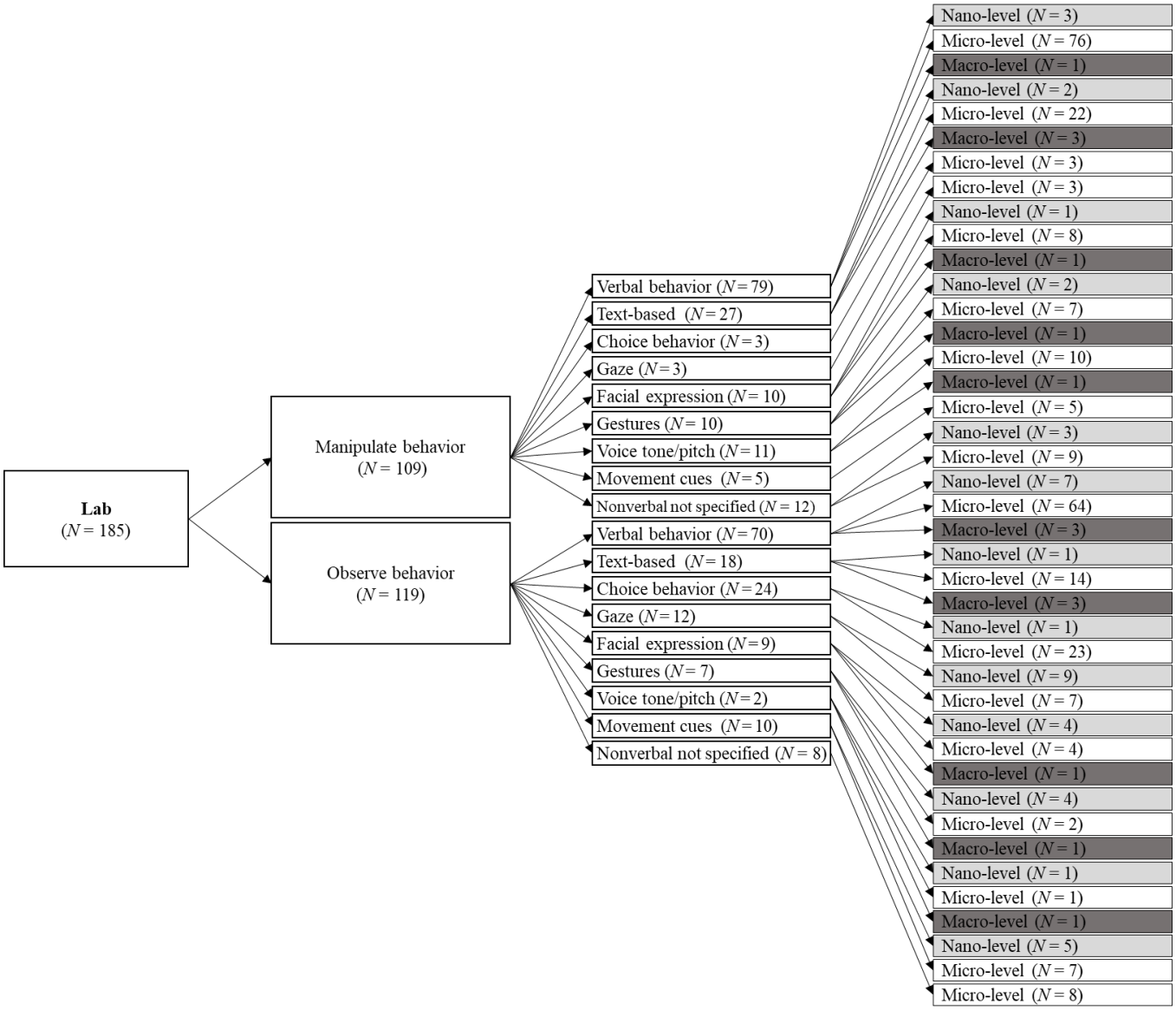


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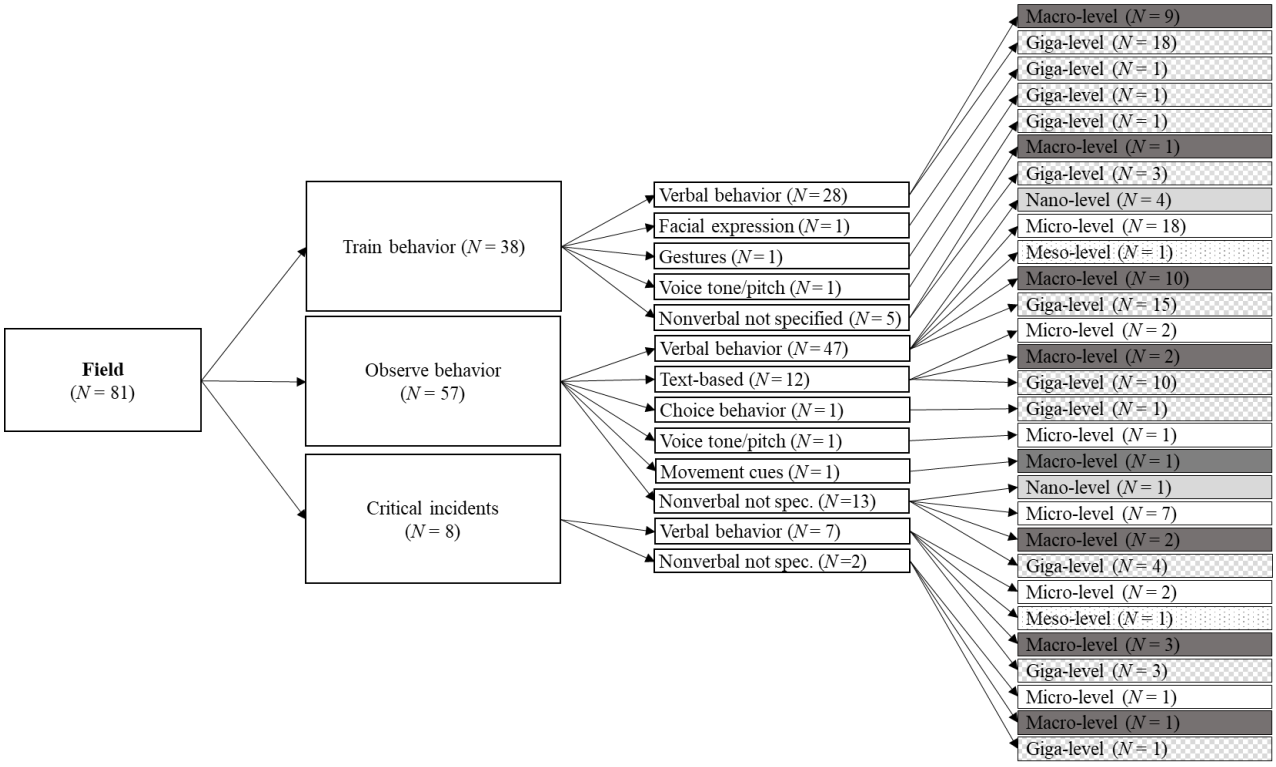
Figure 5.1B

Number of identified studies that trained or observed behavior or utilized critical incidents in a field study context, further split up into the investigated behavioral types and temporal scopes



Note. Several studies employed more than one methodological approach (e.g., training and observing behavior) and collected data on more than one behavioral type (e.g., verbal and nonverbal behavior), which is why the numbers do not add up to 100%.

The second preferred behavioral type is text-based behavior, which was manipulated in 27 studies (14.6% of all lab studies) and observed in 18 studies (9.7% of all lab studies). Likely because written material represents a relatively straightforward way to manipulate specific behavioral components while keeping others constant in a neat way, it is particularly attractive for (online) experiments. A laboratory study by Griffith et al. (2011) that investigated the effects of leader deception serves as a representative example of research including this behavioral type. Participants were assigned an employee role and had to read and respond to a series of emails containing information about the company, their team, their own role, their team members' perspectives on the leader, and emails from the leader himself. Emails were written according to one of four conditions to manipulate whether the leader deceived or not and whether he benefited from the deception or not to investigate how the respective behaviors influenced participants' perceived leader–member exchange and organizational commitment.

Although leadership research on nonverbal behavior is still in its infancy, to date, laboratory studies indicate a greater variety of nonverbal behavioral types than field studies, with eye-gazing studies being particularly popular. Of particular interest for exploring new avenues in leadership research are those laboratory studies that use relatively unconventional tools for data collection, such as Bluetooth and infrared or kinematic sensors. Recognizing that these studies allow asking novel questions related to an embodied understanding of leader- and followership, we consider this an intriguing area for future research, a point to which we return in the future research directions.

It is striking that even though in the laboratory context, nonverbal behaviors were captured in 54 (29.2% of all laboratory studies) studies, this figure still presents a considerable mismatch with the fact that nonverbal behaviors comprise 65% to 93% of human communication (Birdwhistell, 1970). This empirical shortcoming may not necessarily represent an oversight on the

part of leadership scholars but may instead also point to a theoretical shortcoming, namely that existing leadership theories rarely include nonverbal cues. An exception in that regard concerns the (re-)conceptualization of charismatic leadership to explicitly include nonverbal signals such as gestures (Antonakis et al., 2017, Antonakis et al., 2011). Taking this consideration of nonverbal cues one step further, we identified four studies that even explored multimodal interaction patterns (i.e., the simultaneous analysis of several modalities) in controlled laboratory settings. We presume that this constitutes an area that will grow in the future given advancements in machine learning that allow for more easily analyzing complex multimodal data sets (e.g., Lee et al., 2020; Luciano et al., 2018). To contribute to this advancement, we discuss potential avenues for multimodal studies in the future research section.

5.3.2.2 Field Study Context

The majority (70.4%) of the 81 studies conducted in a field context relied on observations of leader and/or follower behavior. In addition, approximately half of these studies used some form of intervention design to train a behavior of interest. Eight studies also relied on critical incidents. In terms of the preferred temporal scope, field data were collected mainly at the giga-level (71.6%; i.e., covering a timeframe of multiple months or even years). Just as in the laboratory context, verbal behavior constituted the predominantly studied type of behavior in field studies. Specifically, verbal behavior was targeted in the majority of studies that trained leader/follower behavior (28 of 38 studies in total), observed in 57 studies, and captured in seven studies utilizing critical incidents. An illustration of a field study investigating verbal behavior is that by Chan and Du-Babcock (2019), who recorded two meetings of different teams with formal leaders and examined these data with a micro-analytic approach (i.e., conversation analysis) to explore how leadership was constructed during the meetings via turn allocation, agenda management, and task assignment.

The second most frequently investigated behavioral type was unspecified nonverbal

behavior. This code was assigned to studies that clearly incorporated nonverbal behavior but did not further specify which precise behaviors were targeted. Skarlicki and Latham (1997), for instance, conducted a semi-experimental field study with two groups of shop stewards. One group received leader training, while the other served as the control group. The authors were interested in studying whether training leaders on organizational justice principles would positively impact union members' organizational commitment and their fairness perceptions of the leaders. In their manuscript, the authors wrote that the training included lectures, case studies, role-playing exercises, and group discussions; however, they did not provide further details in terms of concrete behaviors. It goes without saying that such descriptions pose difficulties when designing replication studies and fostering the development of theory, as the focus constructs are only vaguely defined and the insights provided in the study can hardly be compared with those offered in other behavioral research studies. Against the backdrop of the rising open science movement (Tenney et al., 2021), we hope that this state of affairs will change in the future.

Interestingly, only 14 studies analyzed text-based communication. This is somewhat surprising given that emails and asynchronous communication (e.g., via virtual team spaces such as MS Teams, Slack, or Webex) have become increasingly popular and offer large amounts of data that scholars could easily leverage to test and develop theory on leadership communication (Kobayashi et al., 2018; Short et al., 2018).

Lastly, it is striking that we were only able to identify a few studies conducted in the field that explicitly investigated the occurrence of the influence of a specific nonverbal behavior in the leadership process. For example, despite its popularity in the lab, no study has investigated gaze in the field. The lack of attention to this topic can partly be explained with reference to the need for specific devices to capture eye gaze or for a constant environment, which is only offered by lab settings. However, recent technological advancements may facilitate investigations focused on eye

gaze patterns in the field – a topic that we discuss in more detail in the future research section on unconventional methods for data collection.

To conclude, our joint analysis of study context, methodological approaches, and behavioral types in extant research indicates a clear preference for laboratory studies or online experiments over field studies to establish the causal influence of manipulated behavior. The leadership field needs to invest more efforts into collecting field data to explore new phenomena relating to leader- and followership (Antonakis, 2017) and to understand these phenomena in their full situated context. We return to this point in our discussion of future research directions.

5.4 Future Research Directions

When asked to describe the "typical behavior-focused study on leadership and followership" on the basis of the above review, the answer would be that it is likely a laboratory study in which the authors manipulated verbal behavior of a leader (i.e., confederate or assigned role) to investigate how followers react, which outcomes are triggered, or how leadership ascriptions are influenced. Alternatively, it may be a field study in which managers participate in a leadership development intervention (i.e., training leader behavior) to allow the authors to examine (perceived) leader behavior changes or follower outcomes (e.g., commitment, satisfaction with the leader). Although such study designs can answer interesting research questions, our closer inspection of underlying conceptual models, investigated temporal scopes, different behavioral types, and methodological approaches revealed that the leadership field – at least in theory – has significant untapped potential to provide insights into the complex interplay of leadership and followership. Based on the insights offered by our review, we next identify and discuss six understudied research areas. For each of these areas, we first summarize the shortcomings of existing work and then elaborate on potential solutions and future avenues. We also provide a short summary of starting points and open questions for each future research area in Table 5.3.

Table 5.3

Understudied research questions utilizing behavioral data

Topic	Starting points / initial evidence	Open questions
Developing theories and collecting data that connect actual and perceived leader and follower behavior	• Perceived leadership style predicted team communication (i.e., follower behavior) mediated via the leader's communication behavior (Lehmann-Willenbrock et al., 2015) • Leader ratings via the *leader behavior description questionnaire* were more sensitive to leader performance cue manipulations than a more behaviorally oriented scale (Gioia & Sims, 1986) • After laboratory interactions with their followers, leaders' self-reported ratings on *leader behavior description questionnaire* and respective ratings of independent judges correlated highly, $r = .72$; $p < .001$ (Green et al., 1976)	• What are drivers of congruent vs. divergent leadership perceptions in followers as they interpret their leader's actual behavior? • Do (un)shared perceptions remain constant or fluctuate over time? • Which contextual factors facilitate convergent vs. divergent leadership perceptions? • How can leaders manage different levels of shared leadership perception on the part of their followers to ensure high performance? • How do behavior and perceptions interplay at each temporal level? • How do interactions at lower temporal levels affect perceptions at higher temporal levels (and vice versa)?
Data analysis over time and over more than one temporal level	• Most evidence on leader–follower interaction has been analyzed at the micro-level • For analysis, data are typically aggregated across the period of interaction, resulting in the loss of information on behavioral trajectories over that period of interaction • Various data collection techniques exist and are already employed to collect data at very small temporal scopes (i.e., nano-level), theoretically allowing for more fine-grained analysis to model behavioral trajectories	• What are the patterns of leader and follower behavior as they unfold over time at the different temporal scopes? • How do behavioral patterns at each of the temporal levels depend on and affect each other? • Does the effect of the predictor on the outcome vary at different temporal levels? • Are there moderation effects over temporal levels?

Analyzing interdependent behavioral patterns between leaders and followers	• Most studies in this review focused on unidirectional relationships • Two studies analyzed verbal mimicry, a form of interdependent leader–follower interaction, and showed how this phenomenon affects follower outcomes and perceptions of the overall interaction (Meinecke & Kauffeld, 2019; Shi et al., 2019) • One study analyzed leader–follower and follower–leader sequences (managers' organizational behavior and subordinates' attribution statements) and descriptively discussed interdependencies • Four publications focused on bidirectional behavioral patterns (leader–follower and follower–leader sequences) and showed how within the same contexts, both interactions partners can influence each other (Herold, 1977; Meinecke et al., 2017; Yukl et al., 1993) and how specific sequences of leader-follower interactions influence how the interactants are perceived by observers (Marchiondo et al., 2015)	• What are characteristic patterns of this interdependency at each of the different temporal scopes? • How do context variables affect the strength of the interdependency of behavioral patterns of leaders and followers? • How are the time-dependent changes in leader behavior developed by McClean et al. (2019) related to the interdependency of leader–follower interactions? • How can leadership theories explain these relationships?
Unconventional methods for data collection-	• Eye-tracking has been employed to detect gaze patterns in teams that predict emergent leadership (Beyan et al., 2018, 2019; Capozzi et al., 2019; Gerpott et al., 2018; Sanchez-Cortes et al., 2013), between leaders and followers that plays a role in coordinating musical work (Kawase, 2014), and of leaders looking at their followers that predict leaders' self-reported charisma (Maran et al., 2019) • Bluetooth and infrared sensors to detect body orientation and distance measurements (Chaffin et al., 2017; Cook et al., 2019) • Kinematic sensors to detect dependencies of movements such as interaction strength or mimicry (D'Ausilio et al., 2012; Meyer et al., 2016)	• How can the wealth of data collected by these methods be analyzed sensibly? • Self-report data are occasionally used to validate new and unconventional methods. How can this source of bias be reduced?

Developing theories and analyzing multimodal interaction patterns	• Different behavioral modalities in leader feedback affected follower productivity and general work satisfaction (LaPlante & Ambady, 2002) • Different behavioral modalities affected participants' leadership perceptions differently (Gitter et al., 1975, 1976; Stein, 1975) • Research in social signaling analyzed multimodal interaction patterns in teams to predict emergent leadership (Beyan et al., 2018, 2019; Capozzi et al., 2019; Sanchez-Cortes et al., 2013)	• How do different modalities affect each other in leader–follower interaction? • How can leadership theory building incorporate multimodal behavioral elements? • Do some behavioral modalities have more impact on leader- and followership than others? • Are some behavioral modalities more important for leader- and followership at specific stages of an interaction?
Naturalistic versus laboratory studies	• The majority of research on leader–follower interactions has been conducted in laboratory settings • Laboratory experiments allow causal inferences of specific isolated leader behavior (e.g., consideration and initiating structure, feedback, transactional leadership, charismatic leadership and displaying emotions) or follower behavior (e.g., being supportive, having voice, being assertive) • Lab experiments are a suitable tool for testing the internal validity of theories • The external validity of lab studies is often limited, and an overemphasis on manipulating behaviors in the lab bears the risk of hampering inductive or abductive theory building	To avoid limiting investigation of the open questions above to laboratory settings and encourage researchers to go into the field and beyond leader interventions studies, they may consider the following propositions: • Leverage "real-job" situations, such as high-fidelity simulation trainings in health care teams, that are less sensitive in terms of ethical considerations and in terms of potentially exposing participants' weaknesses compared to "real-job" settings and therefore may induce greater feelings of safety among participating leaders and employees. • Identify working contexts that are naturally more prone to observation, such as sport, music, or online contexts • Employ unconventional data collection tools that may pique participants' curiosity and lower resistance to participation • Identify unique opportunities to access field data (e.g., access to an organization's email communications following jurisdictional investigations) • Leverage exogenous shocks such as the consequences for work settings due to the COVID-19 crisis to gather field data

5.4.1 Developing Theories and Collecting Data that Connect Actual and Perceived Leader and Follower Behavior

5.4.1.1 Shortcomings

Behavioral measures are no silver bullet, and perceptions should still be considered. Individuals act upon their perceptions of others' behavior. Accordingly, understanding how a leader/follower perceives their counterpart's behavior and subsequently acts upon it would help to disentangle the complex mutual influence of perceptions and behavior (Gerpott et al., 2020). For example, perceptions of a person's behavior may not necessarily be congruent with the behavior they objectively exhibit or may not be equally shared amongst interaction partners (e.g., when different followers perceive a leader's behavior differently). Hence, research should combine behavioral measures with self- (and other-)reports to understand how and when behaviors and perceptions align and how such a (mis)alignment is related to the outcomes of interactions between leaders and followers. However, only a few studies have considered actual and perceived leader and follower behaviors (see Table 5.3). Accordingly, we consider conciliating the respective positions of advocates of a behavioral approach (i.e., "We don't want a science of self-reports and finger movements!"; see Baumeister et al., 2007) and supporters of survey research (i.e., "The world is socially constructed – only perceptions matter!") as one of the most promising avenues for advancing theory and practical insights into leadership and followership.

5.4.1.2 Future avenues

First, to study how leaders and followers' actual behavior is perceived by the respective other party over specific time periods, new approaches to data collection will need to be developed. The notion of "high-resolution" research designs (e.g., Klonek et al., 2019) from the team dynamics literature can provide some inspiration. The idea behind such designs is to collect multiple measurement points via high sampling rates to be able to "map out"

behavioral interactions (Schecter et al., 2018), potentially by utilizing machine learning approaches (for inspiration, see Hung et al., 2011; Jayagopi et al., 2009, or Beyan et al., 2018, 2019). However, depending on the temporal scope of a study, repeatedly asking participants to share their perceptions of behaviors that others (or themselves) have just engaged in may prove quite distracting. In that regard, a study in the field of cognitive psychology conducted by Spiers and Maguire (2008) suggests an alternative approach. The authors invited London taxi drivers into their lab to complete a navigation task in a virtual reality simulation of London. Thereafter, the participants watched a "recording" of their route through the simulation and had to describe what they had been during each stage of the trip. Verbal reports were matched with eye-gaze data obtained during task completion, which illuminated the cognitive patterns involved in wayfinding. Similarly, leaders and followers could be filmed during an interaction (i.e., an appraisal interview) and subsequently review the filmed interview on a step-by-step basis to report their thoughts (cf. Elsbach & Kramer, 2003). Such techniques can reveal the processes underlying how behavior is interpreted and then reacted to, thereby providing insights into the complex interplay of perceptions and behavior in the establishment of leader- and followership.

Second, in terms of concrete research questions, the fact that individuals interpret behaviors differently remains an unresolved puzzle. As such, it would be interesting to identify drivers of congruent versus divergent leadership perceptions, that is, under which conditions followers interpret a leader's actual behaviors in the same or different ways. Furthermore, future work could examine when these (un)shared perceptions remain constant over time or under which circumstances they fluctuate (i.e., identifying contextual factors that facilitate convergent vs. divergent leadership perceptions). For example, recent work in social psychology has identified conditions under which implicit first impressions can be updated (Ferguson et al., 2019). From a practical perspective, it would be interesting to explore how

leaders can manage different levels of shared leadership perceptions on the part of their followers to ensure high performance.

Third, examining the relationship between specific behaviors and their effects on perceptions at each of the different temporal scopes would represent a step toward understanding the complex interplay between perceptions and behavior in the context of leader- and followership. For instance, a brief interaction at the nano- or micro-level may likely affect interactants' mutual perceptions in that very moment and thereby influence how the interaction unfolds. However, the impact of that interaction on general or long-term impression formation (i.e., giga-level) would probably be very limited. Future research could thus explore how repeated patterns in leader and follower behavior at lower temporal levels affect perceptions at higher temporal levels (e.g., investigating whether interactions in critical moments are more influential). Inversely, scholars could investigate how long-term perceptions at the giga-level affect the interpretation of interactions at lower temporal levels. This suggestion brings us directly to the next overlooked area, namely analyzing behavioral data over time and across more than one temporal level.

5.4.2 Data Analysis Over Time and Over More than One Temporal Level

5.4.2.1 Shortcomings

Our classification of temporal scopes in Table S2A relies on the level of *analysis*. However, the time-theoretical levels could also be applied to describe the level(s) at which raw data are collected. In the following, we discuss the relationship between a study's level of data collection (i.e., the smallest possible temporal scope at which the data of that study could at least theoretically be analyzed) and the actual level of analysis (i.e., the temporal scope at which the data of that study are actually analyzed) and the challenges we have identified through our review.

We identify three main challenges. First, many studies included in our review gathered

data at the smallest temporal scope (i.e., nano-time) at high frequencies and, for their analyses, aggregated their data over the entire period of interest (e.g., micro- or macro-time). To illustrate, Gerpott et al. (2019) coded sense units of verbal behaviors (i.e., nano-time) in self-managed teams, but, for the analysis, aggregated all verbal behaviors occurring over the course of a meeting (i.e., micro-time) to predict emergent leadership. Albeit interesting, this design cannot answer the question of whether the timing of specific verbal behaviors within a meeting also matters with regard to being ascribed leadership. To provide another example, Chaffin et al. (2017, Study 4) investigated employees of a particular department of an organization over the course of two weeks. Participants were provided with wearables that emitted and detected Bluetooth signals at 30-second intervals to identify the co-locations of participants (i.e., data collection at the nano-level). The data were used to establish overall patterns of co-location, which in turn served as indicators of leader behavior over a period of two weeks (i.e., analysis at the macro-level aggregation). While such analytical choices can yield intriguing findings, they limit the ability to make progress in terms of modeling different patterns (shift, growth and decay, ebb and flow) of leader and follower behaviors over time (McClean et al., 2019).

The second challenge concerns the lack of temporal integration. Realistically, leadership occurs at all five temporal levels "in the wild" (i.e., leaders acting in their full situated contexts). Focusing on one temporal level is a first step toward better understanding individual elements of leader- and followership and how they may unfold in the selected temporal scope. A further important step, however, constitutes integrating several temporal levels to understand how these levels depend on and affect each other. Shi and colleagues (2019) provide a best practice example of a temporal integration over several temporal levels. The authors combined a micro-level aggregation (of data collected at the nano-level) with a giga-level analysis. The authors analyzed the language styles (i.e., the use of particular function words; nano-level data collection) of CFOs and CEOs in the Q&A sections of

conference calls (i.e., micro-level aggregation for the data analysis). Shi et al. assumed that due to the CEOs higher level of power, their language style would remain relatively constant over time, while CFOs' language style would adjust to that of the CEOs over time. Over a period of approximately 13 months (i.e., giga-level analysis), the authors found support for their hypotheses and could show that increasing levels of language style matching over time (i.e., ingratiation attempts on the part of CFOs) paid off in terms of higher compensations as well as an increased likelihood of CFOs becoming board members of their respective firms.

As a third challenge, only a minority of studies identified in our review *explicitly* discussed time-theoretical choices. That is, only very few studies explicitly considered time, or the passing of time, as a variable in their design (Beyan et al., 2019; Gerpott et al., 2019; Gioa & Sims, 1986; Güntner et al., 2020; Komaki & Citera, 1990, Lehmann-Willenbrock et al., 2015; Meinecke & Kauffeld, 2019; Meinecke et al., 2017; Parry & Sinha, 2005; Romanowska et al., 2013; Shi et al., 2019). The focus of extant studies on analyzing direct relationships and linear positive or negative trajectories of behaviors at the micro-time level means that such studies have not exploited the full potential of behavioral research methods to test, for example, patterns of growth and decay or ebb and flow over longer timeframes (see McClean et al., 2019 for more complex patterns of development). Greater awareness and explicit consideration of the temporal level at which research questions are targeted could help to localize relevant behaviors and behavioral patterns within specific temporal levels and over more than one temporal level (e.g., which giga-level patterns affect leader–follower interactions at the micro-level?).

5.4.2.2 Future Avenues

The first and most obvious avenue for future research would be to focus less on aggregating data collected at a lower temporal level and more on testing the degree to which certain behaviors are exhibited and patterns of leader and follower interaction over time (McClean et al., 2019). Our review identified five quantitative studies that employed lag

sequential analyses to investigate specific (unidirectional) sequences of leader–follower or follower–leader behavior (Gioia & Sims, 1986; Güntner et al., 2020; Komaki & Citera, 1990; Lehmann-Willenbrock et al., 2015; Meinecke et al., 2017). Lag sequential analysis, an approach that was developed in communication sciences, tests whether specific sequences of behavior occur at a frequency that is above (or below) of what could be expected by chance (Quera, 2018). For, instance, Lehmann-Willenbrock et al. (2015) used lag sequential analysis to show that leaders' solution-oriented statements trigger subsequent solution-oriented statements on the part of their team members and inhibit counterproductive member behaviors.

Our review points to many (missed) opportunities for exploring such leader–follower interactions because many studies included in this review already collected time-stamped data (i.e., data that would allow analyses over time). While the extant studies did not fully leverage this type of data, some authors could still explore their existing data sets using lag sequential analysis or other data analytical approaches to model trajectories over time that capture temporally embedded leader–follower phenomena (e.g., Cropanzano et al., 2017). In other words, scholars could return to their original data and re-analyze them on a lower temporal level with a focus on the unfolding of leader- and followership over time. Opportunities to do so exist whenever researchers have access to video- or audio-recorded leader–follower interactions (e.g., Burke, 1974; Maclaren et al., 2020; Papworth et al., 2009; Roberts et al., 2014; Weiss et al., 2017) or other data with time stamps, such as (written) online communication – for example, individual messages or posts (e.g., Charlier et al., 2016; Fan et al., 2014; Sosik, 1997; Yoo & Alavi, 2004).

A second avenue for future research would be integrating more than one temporal level. As described earlier in this section, future research could address whether the effect of a predictor on the outcome varies depending on the temporal level and how these relationships affect each other via moderation effects across two or more temporal levels. For example, imagine a leader displaying solution-orientation behaviors at the micro-level (i.e., in one

meeting), which may have a positive effect on the outcomes of that specific meeting. If this leader were to focus too strongly on solutions for several months, however, this might result in a lack of problem-orientation, which could result in important shortcomings in a project being overlooked. As this example illustrates, while a behavior may have positive results at the nano-level, it may result in problematic patterns at the macro- or giga-level. Similarly, patterns at higher levels (e.g., a trustful working climate) may trickle down to lower level interactions and affect their dynamics. Insights into such differences at different temporal levels would be particularly important with regard to the practical implications that could be derived from the research.

5.4.3 Analyzing Interdependent Behavioral Patterns Between Leaders and Followers

5.4.3.1 Shortcomings

Our definition of leadership as a temporal process or a sequence of discrete behaviors that evolves through interactions between leaders and followers over time emphasizes the dynamic nature of the phenomenon. *Dynamic leader–follower interactions* describe interaction patterns between a leader and their follower(s) that include more than one action–reaction pattern (e.g., not just a leader who is saying/doing something and a follower who reacts to this by saying/doing something in turn). That is, dynamic leader–follower interactions are best described as back-and-forth sequences of behaviors. Very few studies in our review aimed to account for the interdependent nature of the interaction patterns between leaders and followers. That is, studies thus far have mostly considered leader and follower behaviors as separate predictors or outcomes (see Table 2). For example, previous work on leader–follower interactions in medical teams has investigated immediate leader reactions in response to followers' voice behavior (Krenz et al., 2019) or studied how leadership training programs to strengthen supervisor support affect followers' organizational commitment,

engagement, job satisfaction, and turnover intentions (Odle-Dusseau et al., 2015). Although these results are intriguing, understanding leadership as an interactive process that occurs between leaders and followers requires scholars to move beyond unidirectional approaches and toward bidirectional processes of claiming and granting leadership and followership (cf. DeRue & Ashford, 2010). Hence, there is a pronounced lack of research insights into the back and forth between leaders and followers that could allow us to understand how reciprocal leader–follower relationships unfold over time.

5.4.3.2 Future Avenues

A few best practice examples in our review can serve as an inspiration to move further in the direction of interdependent leader–follower interactions. First, two publications applied automated linguistic analysis to investigate language style matching or verbal mimicry between leaders and followers (i.e., the degree of similarity between leaders and followers' patterns of function word usage; Meinecke & Kauffeld, 2019; Shi et al., 2019). While language style analysis does not allow conclusions regarding precise interdependent behavioral sequences (e.g., leader → follower → leader), it enables scholars to establish how leader and follower behaviors converge or diverge over time. Notably, compared to human coding approaches, this method requires relatively little investment and effort (as the analysis can be run automatically on transcribed verbal interactions; for an overview of applications, see Shaw, 2019).

Second, a study by Gioia and Sims (1986) illustrates the potential of combining quantitative and qualitative methods for understanding behavioral leader–follower and follower–leader interdependencies. In their lab, the researchers simulated an appraisal interview with experienced managers and MBA students as subordinates. The participants' verbal interactions were coded and analyzed to explore how different types of manager behavior (e.g., task information statement and request, task opinion statement) elicited

attribution statements on the part of subordinates (e.g., attribution request, attribution statement) and vice versa. The authors discuss (but do not further analyze quantitatively) how these sequences are related interdependently and form a chain consisting of manager statements—employee attribution statements—manager statements. This work illustrates how an understanding of interdependence can offer additional insights regarding the interpretation of behavioral sequences.

Moreover, four publications included in this review (Herold, 1977; Marchiondo et al., 2015; Meinecke at al., 2017; Yukl et al., 1993) examined bidirectional leader–follower patterns but did not account for interdependencies. For example, in their qualitative study, Yukl and colleagues (1993) asked leaders and followers to share critical incidents in which they enacted or reacted to social influence. Leaders and followers provided information on the directionality of influence (upward, downward, and lateral) and described influence strategies. The authors found that different influence strategies were used depending on the timing of the event (initial influence attempt vs. follow-up). These studies clearly illustrate how leader behavior influences follower behavior and vice versa, both in the field and in the laboratory. Future research should attempt to establish interdependent patterns in such sequences more rigorously.

In terms of analytical options for identifying such interdependent behavioral patterns between leaders and followers, we refer the interested reader to Lehmann-Willenbrock and Allen (2018), who summarized different methods (e.g., pattern analysis, statistical discourse analysis, visualization-based methods such as state space grids) that allow for the modeling of temporal interaction dynamics in organizational settings. Furthermore, latent growth curve models (Preacher et al., 2008), cross-lagged panel analysis (Oud, 2002), and dynamical correlations or actor–partner interdependence models for dyadic leader–follower interaction data (Hofmans et al., 2018) represent suitable options. These analytical approaches require a researcher to consider the time level when designing a study such that behavioral data can be

sampled (and potentially aggregated) at intervals and over time periods that are appropriate for the research question or leadership phenomenon of interest.

5.4.4. Unconventional Methods for Data Collection

5.4.4.1 Shortcomings

A point that drew our attention is that a large part of the reviewed research base focused on verbal behavior. Typically, such data are collected via live observations or video recordings, and specific verbal acts are coded according to a pre-selected coding scheme. While this focus is in line with the fact that leader behavior is often conceptualized as verbal behavior (e.g., Behrendt et al., 2017; Fairhurst & Connaughton, 2014; Morgeson et al., 2010; Yukl, 2012), other types of (nonverbal) behaviors are essential for leader–follower relationships (Schyns & Mohr, 2004). One reason for the predominant research focus on verbal behavior could be the strong emphasis on verbal behaviors in leadership theory. Another reason that could explain the underrepresentation of different types of nonverbal behavior in leader- and followership research is that the convention of building on established and validated data collection methods may prevent scholars from exploring tools and technologies that are already in use in other disciplines or entirely new. This is because learning about new tools and subsequently acquiring the skills and knowledge required to use and validate them typically require considerable time and effort. Furthermore, possible skepticism on the part of reviewers may discourage researchers from exploring new methods.

However, unconventional methods (i.e., those that are not the standard in the leadership field) have the potential to innovate leadership research by allowing researchers to explore leader and follower behaviors that have seldom been considered. The rise of these methods may also push scholars to think more rigorously about the concrete behaviors that are central to their research questions. Thus, the use of unconventional methods may represent a valuable strategy for inspiring the development of theory. Social signaling, a relatively novel area of study in

computer science, offers a wealth of unconventional methods for discovering new insights regarding leader–follower interaction patterns. Social signals in leader–follower interactions include vocal behavior, gaze, vocal behavior, and interpersonal distance movement cues (Vinciarelli et al., 2009). Therefore, we would like to highlight those studies that employed unconventional methods for collecting different types of nonverbal behavior (i.e., social signals).

5.4.4.2 Future Avenues

Among unconventional methods, eye-tracking seems to be particularly promising for future behavioral leader–follower research. Recording gaze movements or gaze directions via eye-trackers or cameras allows for the objective and explicit collection of a nonverbal behavior that represents an important cue in social interactions and a measure of social attention (Grossmann, 2017). From our review, we conclude that eye-trackers have been used in quite different ways. Maran and colleagues (2019) investigated whether self-reported charisma was related to participants' (i.e., leaders') gaze behavior towards their followers. Kawase (2014) examined how leaders and followers use eye contact to coordinate their work in pianist duos which represents the core function of leadership as a means to solve coordination problems. Other researchers have studied how visual attention (e.g., being looked at while speaking) determines emergent leadership in the interaction of zero-history teams (Beyan et al., 2018, 2019; Capozzi et al., 2019; Sanchez-Cortes et al., 2013). However, these prior studies are largely correlational, which reduces the possibilities for drawing causal inferences (i.e., do gazes from others increase leadership ascription, or does a leader attract more gazes?) and does not allow for the exclusion of unobserved variables (e.g., speech volume) that may drive the effect. Future researchers would thus be well advised to consider more experimental work that manipulates visual attention.

A further limitation of eye-tracking is that it requires a very controlled environment and is difficult to implement in day-to-day interactions. Thus far, this method has proven challenging to implement in the field, as illustrated by the fact that the studies reviewed here were predominantly conducted in the laboratory context. Field data on the gaze behaviors of all interaction partners in dyadic and group settings obtained via mobile eye-trackers could provide more insights into evolving gaze patterns associated with leader- and followership. Moving research out of laboratory settings, leaders and followers would no longer be dependent on eye-trackers connected to screens and computers but could walk around freely in the natural environment wearing eye-tracking glasses and small processing units. Two trends that are specifically relevant to field research are worth discussing here. First, eye-tracking glasses are becoming increasingly compact and starting to more closely resemble normal corrective glasses. These developments should make the circumstances in which interactive research is conducted more natural because people will no longer need to wear futuristic equipment on their heads. Second, eye tracking no longer has to rely on specialized infrared cameras (i.e., eye-tracking devices) connected to computer screens. Instead, due to the advances in AI technology, such tracking can now be done with laptop cameras. This means that eye tracking is easily accessible during, for example, video calls and can be employed in remote settings (at the home/office of the participating leader/follower). A study in the field of experimental and applied psychology, for instance, used head-mounted mobile eye-trackers to study attentional processes involved in the aesthetic experience of adults and children looking at paintings in the Vincent van Gogh Museum (Walker et al., 2017). Finally, while the motives behind eye movement can be theoretically derived, empirically, they remain a black box (e.g., longer looking time spent gazing may reflect a wide range of motives). On the positive side, several theoretical approaches involve gaze (social attention theory; Emery, 2000; Klein et al., 2009; visual focus of attention theory; Subramanian et al.,

2010; signaling theory; Maynard Smith & Harper, 2003), which could facilitate the integration of gaze cues into leader- and followership theories.

Another set of unconventional methods concerns Bluetooth and infrared technology, which can be used to detect interpersonal distance between individuals. Infrared sensors can only detect distances within a relatively limited range (1.5 m; Chaffin et al., 2017) but are useful for determining whether individuals are oriented towards each other or not. Cook and colleagues (2019) conducted a laboratory study to examine whether the level of face-to-face contact during a bridge-building task moderated changes in leadership perception before and after this interaction. Two further interesting research areas for this method would be LMX and transformational leadership. For example, scholars could investigate how the level of average interpersonal distance impacts the relationship quality or trust between leaders and followers. One may expect an inverted U-curve where extreme levels of high and low interpersonal distance negatively impact these constructs, whereas an appropriate level of interpersonal distance may evoke positive effects. Discrete objective data on interpersonal distance could be obtained to refine these leadership theories.

In contrast, Bluetooth provides data over much wider distances (up to 10 m; Chaffin et al., 2017) and therefore can be used to establish movement patterns within a particular area (e.g., on campus, in a particular building). For example, Bluetooth technology can provide data on who moves across buildings at which frequencies and with whom they cross paths. These movement data may enable establishing network profiles that provide interesting insights for a range of research fields, including leader distance (e.g., Antonakis & Atwater, 2002), social network perspectives on LMX (Goodwin et al., 2009), or the role of networking itself in leadership development (e.g., Bartol & Zhang, 2007; Burbaugh & Kaufman, 2017).

Bluetooth or infrared sensors are relatively small and can be incorporated into a card or device that a person would attach to their clothing. It is also possible to integrated additional sensors (e.g., microphones) within such badges to collect different types of data

simultaneously (e.g., microphones to record vocal behavior, which would allow analyzing tone and pitch; Beyan et al., 2018). Thereby, rich data can be collected relatively easily and non-invasively in a variety of contexts (provided that privacy terms have been agreed on beforehand). In that regard, considering that many countries have begun to employ tracking apps in the fight against the COVID-19 pandemic, organizations and their members may have become more open to participating in research programs involving Bluetooth applications.

A third type of unconventional method concerns kinematic sensors that can track movement. Thereby, researchers can capture the coordination of movement between leaders and followers. This data collection method is particularly interesting for researchers investigating leader and follower behavior in music and sports, as well as in extreme team contexts such as surgery, emergency response, or the military. In these fields, the physical coordination of team members who are moving through a specific space (i.e., a concert hall, an operating room, a crime site, a burning building, or a battlefield) is a key responsibility of leaders. To offer examples from our review, D'Ausilio and colleagues (2012) used kinematic sensors in a music orchestra context to study the immediate relationship between the movement of the conductor's baton and the violinists' bows. This is an excellent illustration of studying how leader behavior may directly influence follower behavior. Moreover, Meyer and colleagues (2016) provided laboratory participants with t-shirts equipped with motion sensors to measure behavioral mimicry. The authors examined whether participants' (i.e., followers') mimicry of body movements mediated the effects of confederates' leadership style (participative vs. directive) on team decision quality and evaluations of the leader. Using this kind of research as an inspiration, researchers could also investigate whether followers' mimicry behavior affects how their leaders perceive them. Moreover, scholars could use kinematic sensors to explore how synchrony in movement among leaders and followers evolves over the course of a meeting and whether this correlates with levels of conflict or solution-finding.

Notably, whereas eye-tracking, Bluetooth, infrared, and kinematic sensors require face-to-face interactions, the increase in the number of remote work settings prompted by the COVID-19 pandemic highlight the need to investigate virtual leader–follower interactions. In virtual settings, vocal expressions and paralinguistics play a particularly important role compared to other nonverbal cues, and we expect to see more unconventional methods evolving that allow exploring leader–follower interactions in virtual or hybrid work settings. Along these lines, leadership research could also leverage the opportunities afforded by developments in virtual reality. Such technology enables presenting vignettes as fully immersive scenarios where participants are able to experience their environment via visual, auditory, and sometimes even tactile and olfactory stimuli (Blascovich et al., 2002). Virtual reality technology allows for precise manipulation of multiple agents (i.e., leaders and/or followers) to study causal antecedents and outcomes of specific behavioral patterns, such as the mimicry or synchrony displayed among leaders and followers. Our review identified one study that instructed participants to assume the role of a leader to conduct a meeting with their followers in an immersive virtual reality setting (Hoyt & Blascovich, 2010). The followers were avatars created by the authors, as this allowed them to control confederates' behavior and demographic characteristics, as well as to save resources. Virtual reality technology offers a host of opportunities for experimentally manipulating avatar appearance, group size, and so forth and investigating how such changes affect interdependent leader–follower interaction dynamics.

To conclude, the unconventional methods outlined above open up new possibilities for investigating behavioral dynamics among leaders and followers. It should be noted, however, that all of these methods tend to produce very large amounts of data, and researchers need to make sensible use of this wealth of data as well as ensure that their conceptual research models map onto these measures. Ideally, such research would be conducted in interdisciplinary collaboration with computer scientists (Lehmann-Willenbrock et al., 2017).

5.4.5 Developing Theories and Analyzing Multimodal Interaction Patterns

5.4.5.1 Shortcomings

Analysis of multimodal behaviors refers to the simultaneous consideration of several modalities of behavior, such as voice pitch, speaking duration, looking at others, or being looked at. Thus far, multimodal analysis has rarely been used in leadership research and is currently not part of any leadership theory that we are aware of. Our review identified four articles that specifically manipulated different modalities (Gitter et al., 1975, 1976; LaPlante & Ambady, 2002; Stein, 1975). For instance, LaPlante and Ambady (2002) manipulated leader feedback in terms of verbal content (positive vs. negative) and nonverbal tone (positive vs. negative). They found that participants' productivity and general work satisfaction were affected differently across conditions. The other three studies presented stimuli with recordings of leader–follower interactions across different modalities and combinations of modalities (e.g., only visual but muted material, audio tracks, audio tracks filtered such that the semantics were obliterated but the tone and pitch of voices were conserved). The authors found that cues across different modalities affect participants' leadership perceptions. In summary, these controlled experiments indicate that different behavioral modalities play an important role in the leadership process, and more systematic research is needed to understand how different modalities interact with each other. We also identified a handful of articles from the domain of social signal processing that considered multimodal interaction patterns in teams and showcase the potential of their application to the context of leadership (Beyan et al., 2018, 2019; Capozzi et al., 2019; Sanchez-Cortes et al., 2013). For example, Sanchez-Cortez and colleagues (2013) used machine learning to detect socially meaningful behavioral patterns that distinguish leadership behavior (i.e., emergent leadership) and leadership-related constructs (i.e., dominance).

5.4.5.2 Future Avenues

As a first step, theory building needs to incorporate multimodal behavioral elements. DeRue and Ashford's (2010) model of the leadership identity construction *process* can serve as an example. This model builds on the idea that to develop a leadership identity (i.e., become a leader), an individual (Person A) initiates a leadership claim (e.g., by structuring a discussion or offering a solution). Their counterpart (Person B) may then either grant Person A their claim (e.g., by accepting the solution) or reject it (e.g., by criticizing the idea). Person A's next response or initiative will, at least in part, depend on person B's reaction. Thus, DeRue and Ashford (2010) highlight the role of the process (i.e., an interaction between Persons A and B) that takes place until a leadership identity is actually established. Note that granting leadership is a way of assuming followership, but it does not necessarily have to result in followership. According to the theory, two individuals could both claim leadership and grant it to each other, resulting in a co-leadership situation.

Linking DeRue and Ashford's theory to multimodal interaction patterns makes the model more complex but potentially more concrete. The example of claiming and granting leadership described above focuses on verbal interaction. However, a leadership claim can also occur through nonverbal or paraverbal behavior (e.g., by occupying more space, pulling relevant objects toward oneself, or speaking in a loud voice). The subsequent granting or rejecting behavior could be conveyed in the same modality as the prior claiming behavior, but it might also involve a different modality. For instance, in response to a verbal claim such as an assertively formulated suggestion as to how to proceed, a nonverbal shrinking of one's body posture could be interpreted as a much stronger signal of followership than a verbal "okay." It would be interesting to determine whether some modalities have a stronger influence on the claiming and granting process than others or whether certain modalities are more important at specific stages of the leadership identity construction process (e.g., beginning, midway, or end).

5.4.6 Naturalistic versus Laboratory Studies

5.4.6.1 Shortcomings

The majority (69.6%) of studies included in our review investigated behaviors in lab contexts. Lab experiments allow for high control and are helpful when for investigating the causal effects of specific and isolated behaviors. Indeed, the reviewed studies offer glimpses into a variety of leader and follower behaviors that were investigated via experimental manipulations in the laboratory context. These studies investigated the role of follower behaviors such as being (non)supportive (Gallo & McClintock, 1962), having voice (Krenz et al., 2019), or being assertive (Korsgaard et al., 1998, Study 1), as well as leader behaviors such as consideration and initiating structure behavior (Gilmore et al., 1979), feedback (e.g., LaPlante & Ambady, 2002; Li et al., 2014), transformational leadership (e.g., Kovjanic et al., 2013), transactional leadership (e.g., Jaussi & Dionne, 2004), charismatic leadership (e.g., Antonakis et al., 2011, Study 2; Jacquart & Antonakis, 2015; Study 2), and leader emotions (e.g., Olsen et al., 2020; Shao et al., 2019, Study 1). Whereas lab experiments are a suitable tool for testing the internal validity of theories, their external validity (i.e., generalizability to the "real" world) is often limited. Many laboratory studies are still rather artificial and could benefit from following best practice recommendations for increasing realism (e.g., designing video vignettes, promoting greater similarity between the experimental and field settings, utilizing virtual reality technology; Aguinis & Bradley, 2014). Furthermore, focusing research on the manipulation of behaviors in the lab also bears the risk of hampering inductive or abductive theory building. Placing a stronger emphasis on exploratory work may help researchers to discover leader- and followership phenomena that have not previously been considered (Antonakis, 2017).

5.4.6.2 Future Avenues

Collecting data in the field rather than in the laboratory is often challenging. We propose five suggestions for addressing this problem. First, contexts that are close to "real-

job" situations, such as high-fidelity simulation trainings for health care teams (e.g., Kolbe et al., 2014; Weiss et al., 2017) or team interactions within leader training contexts (e.g., Yoo & Alavi, 2004), offer field settings that are less sensitive in terms of ethical considerations (e.g., surgery on real patients) and in terms of potentially exposing participants' weaknesses or mistakes (e.g., dysfunctional leader behavior) in comparison to "real-job" settings. Therefore, these settings may induce greater feelings of safety among participating leaders and employees. Second, working contexts that are naturally more prone to observation, such as sport contexts (e.g., Tropp & Landers, 1979), musical performances (e.g., Kawase, 2014), or online communities (e.g., Panteli, 2016; Paskewitz & Beck, 2018), can provide fresh insights regarding leader–follower interactions. Third, unconventional data collection methods such as the ones described above may pique participants' curiosity and lower resistance to participation. Fourth, researchers should attempt to identify unique opportunities to access field data. For example, we identified one study in our review that analyzed a large corpus of email communications belonging to a company that had been forced to make these data available following jurisdictional investigations into the company's collapse (Reyt & Wiesenfeld, 2015, Study 1; Toubiana & Zietsma, 2017). Such real communication data are extremely valuable when attempting to obtain insights into actual leader–follower interactions in the field. Fifth, and relatedly, exogenous shocks occurring to an organization and to the existing leader–follower interactions within that organization can also provide a viable research context in which to gather field data. For example, experiences with changes in work settings due to the COVID-19 crisis may have positive side effects for leadership research. Many leaders (and the rest of the workforce) have been forced to switch to online modes and engage with technological settings that allow researchers to access actual interactions without interfering with participants' work (e.g., by analyzing recordings of video calls). This entails that new challenges arise in terms of remote leadership and followership when leader–follower interactions mainly take place in virtual settings. The need to cope with these

developments in organizational practice may increase the willingness of organizational decision-makers to participate in research, which will in turn create new opportunities for leadership scholars.

5.5 Conclusion

Our systematic review integrates insights and distills a future research agenda from studies that have objectively observed, manipulated, or trained leader and/or follower behavior. First, we provided an integrative overview of the underlying questions that have been addressed in previous behavior-based leadership research by extracting the examined conceptual models and thereby also categorizing extant studies according to their temporal scopes. This analysis revealed that leadership research is indeed extremely leader-focused, with the two predominant research foci being the usage of leader behavior as a predictor (mainly studied at the micro-time level) or training leader behavior as an independent variable (mainly studied at the giga-time level). We conclude that future research could benefit from developing theories and collecting data that link perceptions of leader and/or follower behavior with actual leader and/or follower behavior, performing data analyses over time and over more than one temporal level, and analyzing interdependent behavioral patterns between leaders and followers. In terms of the preferred types of behaviors studied in extant research, we found that both lab and field research largely focused on verbal behavior, with lab research mostly manipulating this behavioral type and field research being prone to observations. Overall, the number of lab studies largely outnumber the number of field studies. We utilized the insights from this overview to identify three future research directions intended to encourage researchers to move the field forward: leveraging unconventional methods for data collection, developing theories of and empirical insights into multimodal leader-follower interaction patterns, and devoting more efforts to studying leader- and followership in the field.

We hope that the insights obtained through this review encourage scholars to explore new approaches to studying leader and follower behavior. They can seek inspiration from

prior studies in which the authors meticulously manipulated and observed behaviors, and our review can serve as a point of reference in this regard. In addition, recent advancements in technology open numerous additional avenues for behavior-focused research, and we discussed several unconventional data collection methods that can innovate research on interdependent leader–follower behavior. Our hope is that the insights from our review will ultimately help to advance leader- and followership theories by encouraging scholars to thoroughly define and refine their constructs in such a way that they can be operationalized in the form of concrete behaviors.

CHAPTER 6: GENERAL DISCUSSION

The aim of the four studies comprising this dissertation was to investigate the time-dependent processes of dynamic and stable characteristics of emergent phenomena in organizations. Specifically, this dissertation shed light how gender, as a stable team member characteristic, is involved in the team processes of humor and leadership emergence and how temporal scopes can advance scholarly understanding of these emergent phenomena.

In Chapter 2, we conducted a cross-disciplinary literature review on the role of gender in meetings. Specifically, we considered meeting research examining real interactions via observational methods. Through the analysis of research, we identified six gender-related variables — individual gender, sex role orientation, gender composition, gender salience, contextual factors such as task type and organizational settings, and the construction of gender as a social concept — that represent critical factors for understanding the role of gender in an interactive meeting context. With this chapter, the scattered findings of extant research are made amenable to researchers studying meetings and gender. One main insight of this review is the complexity inherent in gender as a construct to be studied in dynamic team interaction contexts. In this regard, we identified current methodological challenges in this field and developed recommendations that future work may address to overcome these. This chapter lays the basis on which the subsequent studies build on.

Chapter 3 followed one of the recommendations developed in Chapter 2 and leveraged gender being a classic control variable to re-examine a data base on meeting science. Specifically, we investigated the moderating role of gender for the relationship between humor and meeting satisfaction. We examined how gender and humor, as an emergent phenomenon, influence meeting experiences. We re-analyzed a subsample of the database with US working adults across different industries (N = 662). The findings lent support to our hypotheses and showed that perceived positive and interactive humor positively predicted perceived meeting satisfaction. This relationship was moderated by gender such that women benefited more from high perceptions of positive and interactive humor in terms of their

meeting satisfaction, compared to men (β = .14, p = .010, Cohen's f^2 = .01). Thus, this study provided evidence for how men and women differ in their use of perceived humor during a meeting when evaluating their experiences of that meeting. It highlighted the importance of gender differences in relying on perceptual experiences of team processes (i.e., emergent phenomena).

A significant limitation of Chapter 3 lied in its reliance on cross-sectional survey data. To address this shortcoming in Chapter 4, we investigated a distinct emergent phenomenon, leadership emergence, through an observational laboratory study of three-person zero-history teams working on an interdependent task. A confederate (either male or female) was integrated into each team, consistently exhibiting emergent leader behavior to ensure comparable levels of leader behavior among focal male and female team members. We studied and analyzed their fine-grained interaction patterns with regard to leadership emergence and gender. The findings showed that leadership claims by one team member evoked subsequent granting behavior in another team member above the level of chance, reflecting a leadership structure at the interactional level. The more individuals' claims were granted (counterclaimed) by others, the higher (lower) their levels of ascribed emergent leadership. Moreover, claims uttered by male or female confederates were equally likely to be granted by other team members. However, leadership claims by female confederates elicited more counterclaims, that is challenging behavior. This chapter provided insights into the behavioral patterns driving leadership emergence, highlighting micro-temporal contingencies within this specific process. Additionally, it identified gender-related differences in behavioral interaction patterns, offering a crucial understanding of how stable team member characteristics may interact with dynamic elements in emergent phenomena.

Chapter 4 illustrated the potential enhancements in the leadership literature by adopting established conceptual and methodological approaches from team research. Along this vein, Chapter 5 reviewed investigated conceptual research models in leadership research,

temporal scopes of analysis, and the associated techniques for capturing leader and follower behavior to encourage scholars to explore novel approaches. We examined which types of leader and/or follower behaviors (i.e., verbal behavior, text-based behavior, choice behavior, gaze, facial expressions, gestures, voice tone and pitch, movement cues, unspecified nonverbal behavior) have been studied, how they have been studied (i.e., using which methodological approaches), and in which study context (i.e., laboratory or field). From there, we derived six future research directions, emphasizing the connection between actual and perceived behaviors, nuanced consideration of temporal granularity, exploration of interdependent behavioral patterns, use of unconventional research methods, adoption of multimodal behavior analyses, and a call for more field research. This comprehensive overview addressed conceptual gaps in behavioral leadership and followership research, providing scholars with a methodological toolbox and guidelines for designing behavioral studies in this field, and establishing starting points for future research. Integrating across these for chapters the following section derives theoretical and practical implications. The limitations of this dissertation will be discussed and concrete ideas for future research will be presented.

6.1 Theoretical Implications

Integrating insights form the four studies of this dissertation, I derive three main theoretical implications, culminating in a unifying framework. Connecting Chapters 3 and 4, I begin with discussing the role of perception and behavior for emergent phenomena advocating for a better understanding of socio-cognitive processes involve in behavioral interactions. Linking Chapters 2, 4 and 5, I discuss the close link of perceptual-behavioral processes and time, in particular temporal scopes. Based on this discussion and insights form the chapters, I develop starting points for specifying the tempo-behavioral dynamics of emergent phenomena considering contextual factors. Finally, building on these implications, I elucidate how stable and dynamic elements interplay as emergent phenomena unfold and how

important the consideration of temporal scopes is for conceptualizing an element as "stable". These theoretical implications result in an overarching framework in which I integrate each chapter.

6.1.1 Perception & Behavior

In both Chapter 3 and 4, perception played a fundamental role, however, each of them sheds light on a different way in which perception may be involved in emergent phenomena. Chapter 3 highlights how gender can affect how strongly team members rely on their perceptions of the emergent phenomenon humor when evaluating their overall experience of interaction process (i.e., the meeting). Unfortunately, Chapter 3 with its cross-sectional design is limited to infer further implications of this gender effect. Nonetheless, given that meeting satisfaction has a strong affective component (Rogelberg et al., 2010), I would postulate that male and female meeting attendees' affect could also be influenced differently by their perceptions as the meeting is still ongoing. Since affect and meeting behaviors are closely interrelated (Lei & Lehmann-Willenbrock, 2015), relying on process-perceptions differently may also shape the following interactions of that same process differently. This would represent an effect of gender-related team process perceptions within the meeting, that is at a smaller temporal scope. This hypothesis, however, would have to be investigated further by future work.

Moreover, if humor perceptions result in different levels of meeting satisfaction depending on gender, this is likely to have downstream effects on future meetings. Previous work has shown that meeting satisfaction is positively related to relevant workplace attitudes including employee empowerment and emotional exhaustion (Allen et al., 2016; Lehmann-Willenbrock et al., 2016). Thus, if gender is involved in influencing meeting satisfaction, more distal outcomes related to meeting satisfaction may also be affected by gender. Moreover, referring back to the idea that outputs of a team process (e.g., meeting satisfaction)

may feed into future team processes as inputs (Ilgen et al., 2005), one may postulate that past meeting experiences shaped by gender may also influence current meetings and the team processes unfolding in these meetings via this mechanism. Taken together, theoretical implications of Chapter 3 suggest that gender-related differences in relying on specific team process perceptions may translate into behavioral actions and thereby potentially shape the subsequent team process.

Chapter 4 sheds light on a different aspect of perception. The study suggests that team members' individual gender provides a social cue to their fellow team members. Based on research in experimental social psychology, we may assume that this cue triggers memories containing social information (e.g., social stereotypes) via person perception (e.g., Bargh & Chartrand, 1999; Bargh & Ferguson, 2000). This socio-cognitive activation process can unknowingly affect individual's behavior (Ferguson et al., 2004). Thus, in this study, gender-related differences may be introduced into team interaction patterns via the perceptions and evaluations of other individuals as they utter specific statements and thereby may shape team processes. Compared to Chapter 3, one could argue that the perceptions reflected in team members' different behavioral responses to male versus female emergent leaders are captured in a more fine-grained way. Whereas in Chapter 3 humor perceptions relate to the entire meeting and can be considered as more "global" (as in an impression that represents the entire experience of one meeting), in Chapter 4, they are related to specific utterances during the interaction and can be considered as more "local" (as in an impression that impacts one behavior at a time).

Other scholars have integrated such socio-cognitive components into theoretical models that aim at explaining team and leadership processes (e.g., Sims & Weinberg, 2022). For example, Van Dijk and colleagues (2017) proposed an integrative, temporal model of microdynamics in diverse teams with three levels (i.e., individual target member, perceiving members, and emergent team level). According to their model, a target team member first

undergoes self-categorization and, simultaneously, is socially categorized by his or her fellow team members. The latter affects how he or she perceives her fellow team members' behavior towards him or her. These perceptions in conjunction with her own self-categorization impact her behavior. Her behavior predicts her performance as well as a re-attribution process of her fellow team members concerning her social categorization. This may again influence her perceptions of her team members' behavior towards him or her, which again will affect her behavior.

Thus, Van Dijk and colleagues (2017) offer a theoretical explanation for how socio-cognitive aspects, behavior, perceptions of behavior, and performance unfold over time. However, their model does not account for the actual behavior of the fellow team members – neither towards the target individual nor behavior that may occur between the other team members (the target individual's perceptions of the latter are not accounted for either). Furthermore, the model suggests that a linear relationship of the socio-cognitive aspects and behavior unfold over a specific team phase which ends with a performance outcome. Behavior will only affect the socio-cognitive aspects (i.e., re-attribution and re-categorization of team members) in the next team phase. This approach assumes that socio-cognitive aspects represent an input factor for behavior, but once that parameter has been defined the behavior occurs without further cognitive or other (e.g., interactional) influences.

Behavior, however, does not exist in a social vacuum but rather occurs in social interactions (e.g., Bonito & Sanders, 2010). To better understand the reciprocal relationship of interpersonal perceptions and behavior, it may be insightful to learn about the rate of change of social re-categorization. What are the shortest time windows in which re-evaluation of a known person may occur? Work on spontaneous trait inferences form social psychology has provided evidence that individuals spontaneously infer personality traits form other's brief behavioral displays (Bott et al, 2022). This could imply that team members' may quickly infer information from just a brief interaction sequence from their fellow team members. Research

on first impressions of target individuals has documented that these can be rapidly updated under certain conditions and that these updates predict behavioral intentions towards the target individual (Ferguson et al., 2019; Heilman et al., 2019). However, to the best of my knowledge, there is no work investigating whether individuals continue to spontaneously infer or update existing inferences of familiar persons (e.g., fellow team members). Thus, future work could look into the rate of change of impression formation and social re-categorization to understand how each of these factors affects behavioral dynamics, and vice versa, over time. This could inform why or under which conditions team members may adjust their interaction behavior. For example, the leadership claims of a female team member may have been challenged for the first half of the interaction until she shares information of sufficient relevance to update an impression of her as particularly competent (see Ferguson et al., 2019). This may result in less challenging behavior to her leadership claims and potentially result in more granting responses.

6.1.2 Emergent Phenomena in Teams Unfolding Over Time

Chapter 4 and 5 illustrate the importance of considering temporal contingencies and dimensions to advance theory on emergent phenomena in teams. This insight aligns with previous arguments regarding the importance of incorporating time in team and leadership studies (e.g., Castillo & Trinh, 2018; Cronin et al., 2011; Leenders et al., 2019; Marks et al., 2001; McClean et al., 2019; Shamir, 2011). However, in my opinion one of the main contributions of my dissertation is to document how closely perceptual-behavioral processes and time are interrelated. Interaction by its nature implies the passing of time, and defining the temporal scope of an emergent phenomenon requires a very concrete idea of the discrete behaviors and interaction patterns involved in this process. Theoretical specificity regarding these two aspects is largely lacking in conceptual models (Leenders et al., 2016). As a result, constructs are often too vague to guide the definition of specific behavioral markers

(Antonakis et al., 2016; Fischer et al., 2021; Kozlowski, 2022; Kozlowski & Chao, 2018). Therefore, I propose that accurate modeling of time cannot be separated from defining behavioral markers of an interactional construct such as leadership or team processes.

To illustrate this point, the empirical insights described in Chapter 4 underscore the importance of distinguishing the observable behaviors (i.e., interaction patterns) that would characterize the emergent process – which we termed leadership emergence – and the perceptual outcome of that process – which we termed emergent leadership. We validated the behavioral markers of leadership emergence against participants' perceptions of emergent leadership ratings. The validation of the behavioral interaction process establishes a dependency with the perceptual impressions resulting from that process. As a consequence, behavioral and perceptual processes are confounded. A conceptually and methodologically stronger alternative would have been to define a threshold of claim→grant sequences that indicates leadership emergence. This would have required to set the observed behavior in relation to the time elapsed.

However, defining a minimum amount of brief interactions, such as the claim→grant sequences necessary for identifying leadership emergence (or any other emergent phenomenon in teams) is challenging. Previous leadership work has framed these sequences as the building blocks of leadership (DeRue, 2011; DeRue & Ashford, 2010). This notion implies that one such sequence per se does not constitute leadership. Rather, it is the recurrence of these sequences over time that will result in leadership emergence (DeRue, 2011; DeRue & Ashford, 2010). However, a previous vignette study showed that participants inferred leadership ascriptions from just one such claim→grant sequence (Marchiondo et al., 2015). Similarly, other research has employed video snippets of interactions of just a few seconds and collected participants' leadership ascriptions (e.g., Ito et al., 2018; Olsen et al., 2020; Ronay et al., 2019; Talley & Temple, 2015). This suggests that participants are able to ascribe leadership based on a fraction of an interaction.

This raises the question whether leadership ascriptions after fractions of the interaction also occur in real interactions, when team members are not explicitly asked to report their leadership ascriptions. At what point in time do participants start becoming aware of a leadership structure unfolding in their team? Equally important is the question whether it is this point in time – as team members become aware of it – that determines the emergence of leadership. This again would create a dependency between the identification of the respective team process and team members' perceptions of that process. On the one hand, one could argue that if team members do not become aware of a leadership structure emerging in their team (i.e., it is not *ostensive* to the team), the underlying interaction patterns are not further relevant to define the emerging structure. On the other hand, if these interaction patterns result in effective collaboration and help the team to perform better they do have a real impact on the team. There is debate about both positions in the literature (Waller et al., 2016). Given that team members' perceptions and their awareness of the team processes may not necessarily converge (Bonito & Keyon, 2019; LeDoux et al., 2012), I argue that it is important to distinguish between behavioral markers of the respective team processes and their perceptual outcomes. As elaborated in section 6.1.1, both are intimately interlinked and both mechanisms as well as their interplay need to be understood to be able to draw the full picture of team processes (i.e., emergent phenomena).

Based on the work on behavioral dynamics and temporal scopes mainly covered in Chapters 4 and 5, in the following I propose starting points to promote theory development towards specifying behavioral and temporal mechanisms of emergent phenomena. This approach involves an in-depth analysis of one concrete situation in which the phenomenon of interest becomes apparent. From there, researchers could work towards specifying the phenomenon of interest in terms of its behavioral and temporal characteristics. Note that this approach may also involve exploring data. Here, I would like to emphasize again the intricate link between theory and data which is connected by a careful selection of appropriate data

collection methods and/or careful consideration of previously collected data (van Maanen et al., 2007). To guide the in-depth analysis of the specific situation, here, I provide two sets steps and questions that could guide this approach. Table 6.1 includes four steps that focus more on the temporal perspective. Table 6.2 includes eleven research questions focusing more on the behavioral perspective. Note that the tables are structured differently reflecting different perspectives underlying these considerations.

Starting with the temporal considerations (Table 6.1), in Step 1, researchers may identify a concrete situation that reflects a behavioral manifestation of the phenomenon of interest. In the subsequent steps, this situation is then inspected in detail. In Step 2, they may define the temporal boundaries of this situation. This step forces scholars to think about very concrete indicators that mark the beginning and end of the situation and define its duration. This step may already reveal whether this situation accurately represents the whole phenomenon or whether it is a current episode of a larger phenomenon (also see Step 3).

In Step 3, researchers analyze the temporal context to understand whether the specific situation they selected is self-contained and accurately represents the entire phenomenon of interest or whether it is part of a larger process. Should the former be the case, it is likely that the phenomenon of interest unfolds within a smaller temporal scope. It could be a process that occurs spontaneously and is (largely) independent of previous interactions. For example, the patterns of leadership emergence identified in Chapter 4 occurred in zero-history teams with no significant interaction history. It could also be an episode that, in conjunction, with other similar episodes gives rise to a larger phenomenon. For example, there could be situations of communicative misunderstandings within a meeting that result in negative affect just after the meetings. If these instances build up over time, it may impact team affect more deeply and result in a general tension in the team that persists over longer periods of time.

Understanding the exact temporal context in Step 3, entails careful consideration of the phenomenon of interest. There is an important conceptual distinction between a “self-

contained" situation and a situation that represents an episode of a process that evolves over a longer period of time. Theoretical orientation guiding this decision may be found in episodic and developmental theories (Klonek et al., 2019). Episodic theories (Marks et al., 2002) explain processes within distinct time intervals that are defined by achieving a specific goal. They may be further dissected into sections or subepisodes (Marks et al., 2002). Developmental theories extend their viewpoint, outlining how teams evolve or progress through various qualitative stages, elucidating the alterations in team phenomena across longer timeframes (e.g., Tuckman & Jensen, 1977). A result of such an analytical procedure could be that researchers would be able to clearly define temporal dimensions of the phenomenon of interest or develop new constructs that reflect the different temporal dimensions more accurately.

In Step 4, scholars could revise their thought process to examine the role of contextual factors that may alter the identified results. As the studies reviewed in Chapter 2 illustrate, contextual cues may impact team interactions and thereby emergent phenomena. Context factors may operate differently within different temporal scopes and thereby affect interaction patterns in complex ways. Some context factors may be relatively stable, meaning that they only change over long periods of time (e.g., organizational culture). Other context factors may change more frequently (e.g., task demands in project teams). Some context factors can change quite dynamically over much shorter periods of time (e.g., discussion topic). Importantly, context factors may also interact with each other. For example, a change in the discussion topic could make a specific team composition more salient (e.g., gender) and thus, although the composition has not changed it may still affect the interaction differently than before the discussion topic change.

Table 6.1

Four steps to critically examine the temporal dimensions of emergent phenomena

Step	Guiding Questions
1. Identify a concrete situation	• In which setting or context does the phenomenon of interest manifest?
2. Define the temporal boundaries of this situation	• What concrete (possibly behavioral) markers denote the beginning and end of the situation? • What is the duration of the situation?
3. Analyze the temporal context (present, past, and future) in which this situation is embedded	Examine the present: • Can this situation occur spontaneously? • Can this situation occur independently of previous interactions? • Can this situation have a clear outcome? • Does this situation accurately represent the entire phenomenon or is it a segment of a broader temporal context involving a longer interaction history that still needs to be defined? Examine the past: • If the situation is part of a broader temporal context how can we characterize this longer interaction history? • Can we identify clear temporal boundaries of this broader temporal context (or interaction history)? • Or is the situation rather one element of a sequential order of similar, self-contained situations that form a "chain of events" and build up over time? Examine the future: • What are specific behavioral consequences of this situation? • How far do these consequences reach into the future (i.e., when exactly do they occur)? • Can they be considered part of the current situation, forming a larger "interaction future" (analogous to the interaction history)? → Can we identify clear temporal boundaries of the broader temporal context (or interaction future)? → Or is the situation rather one element of a sequential order of similar, self-contained situations that form a "chain of events" and build up over time?
4. Define contextual factors that may alter the answers found in steps 1-3	• How do individual characteristics and intraindividual processes operate within the specific temporal context? • How does the group composition operate within the specific temporal context? • How do the task type and structure operate within the temporal context? • How does the organizational context (e.g., culture) operate within the specific temporal context? • How do different contextual factors operate in conjunction within a specific temporal context?

Turning to the behavioral considerations of a specific emergent phenomenon of interest, Table 6.2 presents eleven questions that could be addressed to guide the identification of relevant discrete behaviors and behavioral interaction patterns. Working through these questions could contribute to concretizing extant theoretical models of emergent phenomena. It could provide additional insights to Table 6.1 that help to decide whether some phenomena are restricted to occur at one specific temporal scope, whether they are volatile, or whether they require a longer interaction history to emerge at all. This would add insights to better understand the nature of that phenomenon. I expect five main potential learning outcomes of an analytical process based on Table 6.1.

First, unique behavioral markers (discrete behaviors and/or interaction patterns) may be identified that characterize the phenomenon of interest. One challenge associated with this step is what classifies as a discrete behavior. To observational research based on analyzing and annotating video recordings, this question is not new. Determining how to unitize the interaction is one of the key decisions in this research area (Brauner et al., 2018). One approach that could provide orientation is to think of behaviors as *social signals* (Burgoon et al., 2017): The communicative acts forming the basic units of team interactions, occur across different nonverbal and paraverbal modalities (e.g., tone, pitch, gaze, gestures; Vinciarelli & Esposito, 2018). Each unimodal communicative act (e.g., gaze) represents a *social signal* (Vinciarelli et al., 2009). The computer science field of social signal processing has started to investigate how these cues combine across modalities in group interaction settings (Burgoon et al., 2017). Social signal processing researchers build algorithms capable of predicting the behavioral labels of interactions that humans would have assigned (Lehmann-Willenbrock & Hung, 2023). Given the wealth of social signals that occur during team interactions, working with such algorithms can alleviate the time efforts involved with analyzing team interactions with a high resolution (Lehmann-Willenbrock et al., 2017b). Thus, team research could

strongly benefit from such work to fully understand the interaction dynamics underlying emergent phenomena (Lehmann-Willenbrock et al., 2017b).

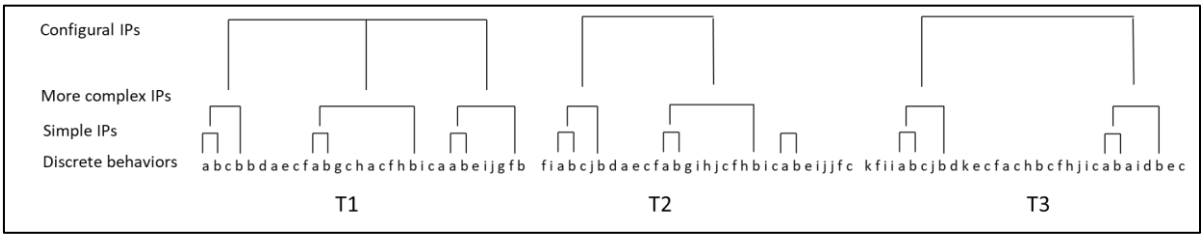
At the same time, there are two challenges associated with a social signaling approach. First, machine learning algorithms can compute near-to-continuous information at much higher resolution (primarily determined by the recording technology, e.g., frames per second) than typically used in interaction research (Vinciarelli et al., 2009). This again prompts the question whether we may use insights from data at such high resolutions that human perception would not be able to distinguish it in real-time for understanding team dynamics. Second, considering question 3 in Table 6.2, if specific behaviors are only meaningful (to team processes) if they occur across a specific combination of modalities (e.g., semantics, pitch, and facial expression), that would classify social signals as components of discrete behavior but not as useful discrete behavior itself. Both of these challenges point to the need for more work in order to enable informed decisions about appropriate research designs.

Second, behavioral markers (discrete behaviors and/or interaction patterns) may be identified that are less specific and characterize several emergent phenomena. For example, interruptions have been conceptualized as a behavioral indicator for the emergent phenomenon of collective (or shared) attention (Williams Wooley et al., 2023) as well as for power displays (Karakowsky et al., 2004). This could suggest that either additional factors are necessary for a specific emergent construct to emerge, or that the behavioral markers are not precisely enough defined. The latter should be followed by a revision of the conceptualizations of the team processes and possibly result in more exact behavioral definitions. It could also give rise to questions that examine potential relationship between those constructs that are based on the same or at least on a subset of identical behavioral markers. It would also be interesting to see which behavioral markers are relevant as two (or more) team processes play out at the same time.

Third, a better understanding of the temporal dimension of interaction patterns could be informative for defining the *temporal structure* of emergent phenomena. With the term temporal structure, I refer to the hierarchical composition of interaction patterns (Figure 6.1). Some patterns may be simple and just be composed of a sequence of two behaviors, such as the claim→grant patterns in Chapter 4. Such sequences could also aggregate into more complex interaction patterns. These, in turn, could form patterns at a higher level, termed configural interaction patterns in Figure 6.1, and this could aggregate to even higher temporal scopes (e.g., across T1-T3; Figure 6.1). With a clear temporal structure, it may also be easier to develop concrete constructs that capture interaction patterns at each of these levels and that explain their dynamics. One important question in this context would be which of these patterns can be perceived by team members as a pattern. For example, were the participants of the study in Chapter 4 aware of the frequency of claim→grant sequences? Most likely not. Maybe a diffuse awareness of some team members being acknowledged more than others could have surfaced. To better understand at what point interpersonal perceptions come into play within this temporal structure, more insights on the dynamics of cognitive processes during team interactions are necessary.

Figure 6.1

Schematic representation of the temporal structure of a team process



Note. IP = interaction pattern. T1-T3 denote distinct interactions, for example different meetings.

A clearer understanding of the temporal structure could also help to clarify questions like "what exactly is the difference between the elements or building blocks that give rise to an emergent phenomenon and the phenomenon itself from a behavioral perspective"? or "how much time needs to elapse and how many interactions need to occur so that we can identify an emergent phenomenon (i.e., when can we start observing emergence)?". A clear temporal structure may also help to distinguish between more, probably fine-grained, "mechanistic interaction patterns" that *per se* do not represent a team process and larger interaction patterns that represent a team process.

Fourth, the rate of change in interaction patterns may reflect (in)stability of emergent phenomena. This could inform rhythms of change and potentially reveal larger scale patterns of rhythm. Different task types, for instance, which may require work approaches with varying teamwork phases, could result in different interaction patterns (Hoogeboom & Wilderom, 2019; Marks et al., 2002). For instance, McClean and colleagues (2019) defined three types of rhythms for leadership behavior: *shifts* represents discontinuous, linear change, *growth and decay* comprises linear development over time, finally *ebb and flow* pertains to fluid, potentially chaotic and nonlinear change.

Fifth, scholars may understand how context-sensitive all of the above learnings are. So far, I have emphasized the interaction context, where team members' behavior is the prime driver of interaction dynamics. But extensive work in team research, in parts reviewed in Chapter 2, has corroborated the importance of team composition, task type and structure, formal leadership, and the larger organizational context (Aries, 1976; Karakowsky et al., 2004; Lehmann-Willenbrock & Chiu, 2018; Lehmann-Willenbrock et al., 2017a; Smith-Lovin & Brody, 1989). The interplay of context factors and effective interaction patterns may be complex. Research, including team interaction research, shows that context factors can significantly shape and alter investigated relationships (Shelly & Troyer, 2001; Waller et al., 2002). For example, Hoogebom and Wildreroom (2019) provided evidence that the task

contexts (i.e., routine vs. non-routine tasks) interacted with team interaction patterns, moderating their effect on team effectiveness. Likewise, several studies investigated the effect of group composition, especially gender composition on team interaction patterns (e.g., Smith-Lovin & Brody, 1989; Williams Wooley et al., 2023). For example, Karakowsky and colleagues (2004) conducted a study with 36 mixed gender groups and investigated verbal interruptions. They found higher levels of interruption patterns in both men and women in male-dominated groups compared to female-dominated groups. Thus, context factors need to be carefully considered in emergent phenomena in teams and organizations.

Table 6.2

Guiding questions for the integration of behavior and time in theorizing on specific phenomena of interest (POI) in team and leadership research

Guiding Research Questions	Possible Outcomes	Potential Learnings
1. Are there discrete behaviors uniquely associated with the POI?	Yes, see 2.	• Identify unique discrete behavioral markers for the POI.
	No, they are also associated with other phenomena.	• This could help to critically revise existing constructs with regard to concept redundancy (e.g., Banks et al., 2018). • It could also reveal that some discrete behavioral markers are more universal and involved in several emergent phenomena.
	No, there are no discrete behaviors associated with the POI, see 5.	• This could help to critically revise the phenomenon with regard to its behavioral specificity. What does it tell us about the nature of the phenomenon, if no discrete behaviors are associated with it? • There could still be interaction patterns associated with the POI (see 5).
2. Does the strength of association with the POI vary with context (i.e., over time)?	Yes, see 3.	• Identify relevant contextual factors and temporal contingencies that affect the relationship between the discrete behavior and the POI.
	No, it is constant across contexts.	• Identify stable discrete behavioral markers for the POI.
3. If multiple discrete behaviors are associated with the phenomenon, do they co-occur and only have a meaningful impact jointly?	Yes, see 4.	• Identify unique multimodal behavioral markers for the POI.
	No, they do not necessarily co-occur and they are associated	• Identify alternative behavioral markers that could represent different routes to give rise to the POI.

	independently of each other with the POI.	
4. Is the meaning of the co-occurrence dependent on the context (i.e., does it change over time)?	Yes, see 5.	• Identify relevant contextual factors and temporal contingencies that affect the relationship between the different discrete behaviors.
	No, they co-occur constantly across contexts.	• Identify stable combinations of multimodal behavioral markers for the POI.
5. Are there interaction patterns that are uniquely associated with the POI?	Yes, see 6.	• Identify interaction patterns that are unique markers for the POI.
	No, they are also associated with other phenomena.	• This could help to critically revise existing constructs with regard to concept redundancy (e.g., Banks et al., 2018). • It could also reveal that some interaction patterns are more universal and involved in several emergent phenomena.
	No, there are no interaction patterns associated with the POI.	• This could help to critically revise the phenomenon with regard to its behavioral specificity. What does it tell us about the nature of the phenomenon, if there are no discrete behaviors nor any interaction patterns associated with it? • It could be that the POI is at such a large temporal scale, that it is more challenging to identify concrete behavioral expressions. Still, it is important to re-analyze the construct and explore potential behavioral markers.
6. Is the association of the interaction patterns with the POI dependent on the context (i.e., does it change over time)?	Yes, see 7.	• Identify relevant contextual factors and temporal contingencies that affect the relationship between the interaction pattern and the POI.

	No, it is independent of the context.	• Identify interaction patterns that are stable markers for the POI.
7. Are the interaction patterns based on the discrete behaviors identified in 1. and 3.?	Yes, see 8 and 9.	• Identify interaction patterns that are composed of discrete behaviors, all of which are unique to the POI and therefore highly specific. • It would be important to analyze whether one of the two types of data (discrete behaviors vs. interaction patterns) is a better predictor of the POI.
	No, the interaction patterns are based on discrete behaviors which by themselves are not associated with the POI.	• The POI is deeply rooted in team interactions. • The critical feature lies at the structural level of interactions (e.g., speaker turn patterns).
8. What is the time window required for the interaction pattern to be meaningful (i.e., how much time or other behavioral acts can occur between the two or more behaviors of interest?)		• Define a minimum temporal scope over which the POI unfolds. • Inform the frequency of data collection for an appropriate resolution of the phenomenon. • The answer to this question may not be straightforward. However, researchers need to define this parameter, because software packages that detect interaction patterns require this information (e.g., Fournier-Viger et al., 2017; Magnussen, 2018; Quera, 2018). • This may entail exploring the data first, and ideally guided by theoretical considerations.
9. What is the minimal number of discrete behaviors or interaction patterns (necessary condition) to occur to be meaningful for the POI?		• If independent of temporal contingencies, this may inform about the consequential weight of the behavior. For example, a supervisor may react mildly and forgiving towards a severe mistake committed by an employee. Or a supervisor may act in a highly abusive way once. In both cases, a single occurrence of a behavior may be so meaningful that is impactful over longer periods of time. • A helpful analytical tool for this kind of question is necessary condition analysis (Dul, 2018)

10. Is there a specific time window during which this minimal number of discrete behaviors or interaction patterns needs to recur (i.e., is the rate of recurrence relevant)?	Yes, see 11.	• Define a stable temporal window for the POI to emerge.
	No, there are several time windows (i.e., different rates of recurrence) that are meaningfully associated with the POI.	• The POI emerges across different temporal scopes. • Critically, revise the phenomenon to decide whether these different temporal patterns 1) represent large enough difference to warrant defining two (or more) distinct constructs, or 2) whether they are just the result of interdependencies with contextual factors that modify the temporal patterns but not the POI.
	No, it does not matter how much time passes by (i.e., the rate of recurrence is not relevant).	• See discussion under 9.
11. Does the rate of recurrence change with context (i.e., over time)?	Yes.	• Identify relevant contextual factors and temporal contingencies that affect the relationship between the rate of recurrence of the interaction patterns and the POI. • Inform frequency of data collection for an appropriate resolution of the phenomenon as it changes with context.
	No, it remains constant.	• Identify a stable rate of recurrence required for the POI to emerge. • Inform frequency of data collection for an appropriate resolution of the phenomenon.

Note. POI = phenomenon of interest

6.1.3 The Interplay of Stable and Dynamic Elements

Typically, context factors are treated as specific stable qualities of the "background" in which the variables of interest are embedded in (Cronin et al., 2011). From this perspective one important question is how (relatively) stable elements, i.e., context factors, and dynamic elements, i.e., team interactions or leadership, interplay as an emergent phenomenon unfolds. At the same time, scholars acknowledge that context factors may change with time (e.g., Hoogeboom & Wiledrom, 2019; Waller et al., 2002). To illustrate, the discussion topic may change in the middle of a team meeting which may activate specific social categories (e.g., gender). The salience of that category may interact with the existing team composition (e.g., gender composition). Thus, in the middle of an ongoing team interaction, the stable context factor team composition may impact the team interaction differently than just a few minutes ago. Furthermore, zooming out temporally, over time, gender composition may change as some members may leave the team and new members may join. Similarly, task demands may change with time (e.g., with higher or lower time pressure at some times of the year; Waller et al., 2002). Accordingly, context factors that may seem stable at first sight, particularly in laboratory settings where much of the team interaction research has been conducted, are in fact dynamic as well.

One interesting, additional aspect here are characteristics pertaining to the individual that have been traditionally understood as stable and unambiguous. Recent work on gender and personality, however, questions this approach (Joel et al., 2014; Lindqvist et al., 2019; Wagner et al., 2020). Research on the stability and change of personality has shown that the way how individuals think, feel, and act can develop with time (Bleidorn et al., 2019). Moreover, how exactly personality traits and which specific facets of personalities interact with other contextual factors and play out in a given situation may also underly dynamic variability (Wagner et al., 2020). Similarly, the gender of an individual may be more or less

important for the interaction depending on the situational context. First, contextual factors may prime and increase the salience of this category (Karakowsky & McBey, 2001; Karakosky et al., 2004; Pearsall et al., 2008), other factors may be stronger and potentially override gender effects (Johnson, 1994; Okamoto & Smith-Lovin, 2001; Wittenbaum, 1998), lending gender effects a context-dependent, dynamic character. Second, individuals may fluctuate with regard to how relevant their gender identity is to them in a given moment (Bosson & Michniewicz, 2013). Third, gender identity itself may be subject to change and be more fluid than unambiguously "male" or "female" (Fontanella et al., 2014; Joel et al., 2014). In short, depending on the research question, presumably stable characteristics or context factors may have to be approached from a dynamic perspective. Here again, the temporal scope can provide orientation. Defining at what rate or rhythm contextual factors can change is an important parameter to be considered in theorizing specific team processes.

To integrate the above discussed implications in a unifying framework, I draw on the multilayer conceptual framework of workplace gossip (Begemann et al., 2023). Inspired by this model, Figure 6.2.A presents the 3D framework of temporal dynamics of emergent social interaction phenomena. This conceptual framework involves three dimensions. The contextual-layer dimension includes five hierarchically ordered contextual layers. This means that contextual features of a given layer are embedded within the contextual features of the next layer: The first layer, the interaction context represents the most immediate layer. This layer includes behavioral interactions and the mode or setting in which they occur (e.g., face-to-face meeting, informal chat on the corridor, video call, chat etc.). Second, the individual context may add individual differences, social categories, skills, experiences etc. These may shape the type of behaviors the individual engages in and how they react to other interaction partners. Third, the dyadic context focuses on qualities that characterize dyadic relationships such as how long two individuals have been working together or their mutual levels of liking. Fourth, the team context involves qualities that pertain to the specific team including the task,

team composition, or formal team leadership. Fifth, the organizational context as a final layer comprises factors such as the organizational culture or reward structures. Note that all of these layers may interact in complex ways, as denoted by the cross-hatched background at the left and right of Figure 6.2.A.

As an additional level of complexity denoted by the grey shadings in Figure 6.2.A, at all contextual layers – except for the pure interaction context – perceptions of individuals and shared perceptions of dyads, teams, and entire organizations may also shape the specific interaction context. Importantly, all of the qualities and characteristics described by these layers may change over time (time-dimension). Additionally, research questions may approach a given phenomenon at different levels of temporal granularity (temporal resolution-dimension). Also note that no specific outcome is included in this framework. The outcome will strongly depend on the research question at hand and may be included at multiple points within the framework (e.g., shared perceptions of the team interaction shared across the team; a specific behavioral pattern manifesting over a specific time period; a performance outcome at a specific point in time).

6.1.4 Embedding Chapters 2-5 Into the 3D Framework Temporal and Contextual Dynamics of Emergent Social Interaction Phenomena

The studies of this dissertation are embedded in the framework in the following way (Figure 6.2.B-E). Chapter 2 (Figure 6.2.B) provides an overview of a range of gender-related factors at different contextual levels and how they affect team interactions at different temporal resolutions within one meeting, often times in laboratory contexts (thus localized at T1). Chapter 3 (Figure 6.2.C) examined individuals humor perceptions of their last meeting, hence localized at the T2 to represent a meeting embedded in an interaction history. The context is limited to the individual and the temporal resolution is one measure for the entire meeting. Chapter 4 (Figure 6.2.D) investigated zero-history teams, thus localized at T1, and

considered individual-level characteristics, interaction patterns between two-team members and aggregated to the team level as well as individuals' leadership perceptions of fellow team members. The contextual layers extend to the team context and the temporal resolution covers both very fine-grained sequences of behavior as well as more global perceptions of the whole interaction period. Chapter 5 (Figure 6.2.E) focused on conceptual models to investigate leader and follower behavior as well as methods to capture leader and follower behavior over time. Although the chapter also reviewed studies in team contexts, the conceptual models in Table 5.2 do not distinguish between dyadic and team contexts and are framed in a dyadic perspective.

Figure 6.2.A

3D framework of the temporal and contextual dynamics of emergent social interaction phenomena

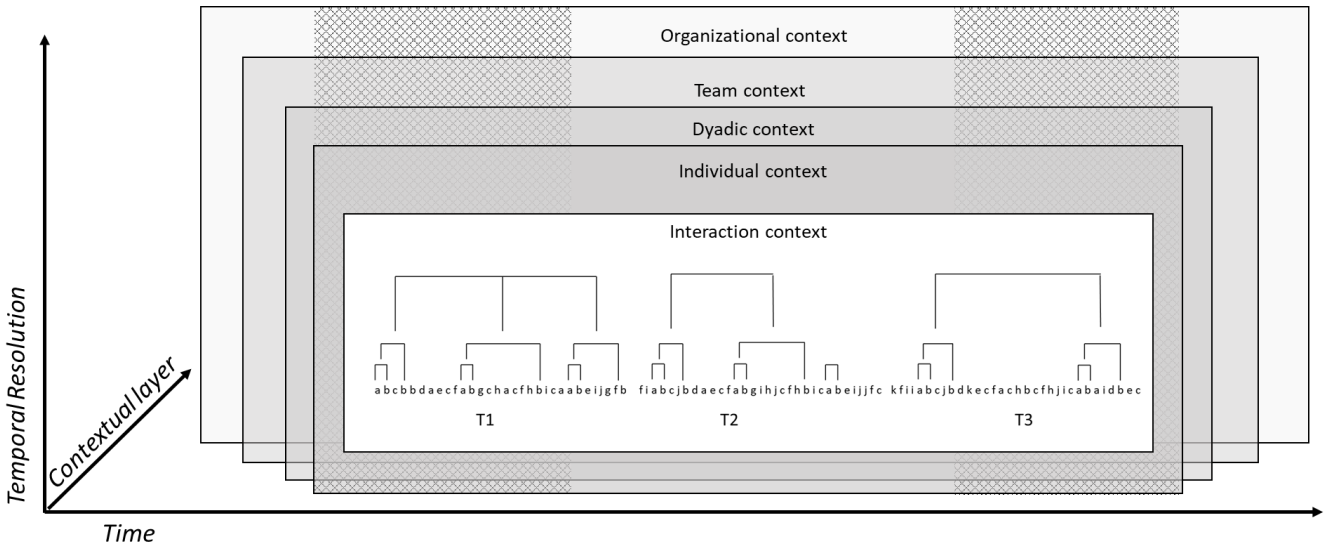


Figure 6.2.B

Embedding Chapter 2 with the 3D framework of the temporal and contextual dynamics of emergent social interaction phenomena

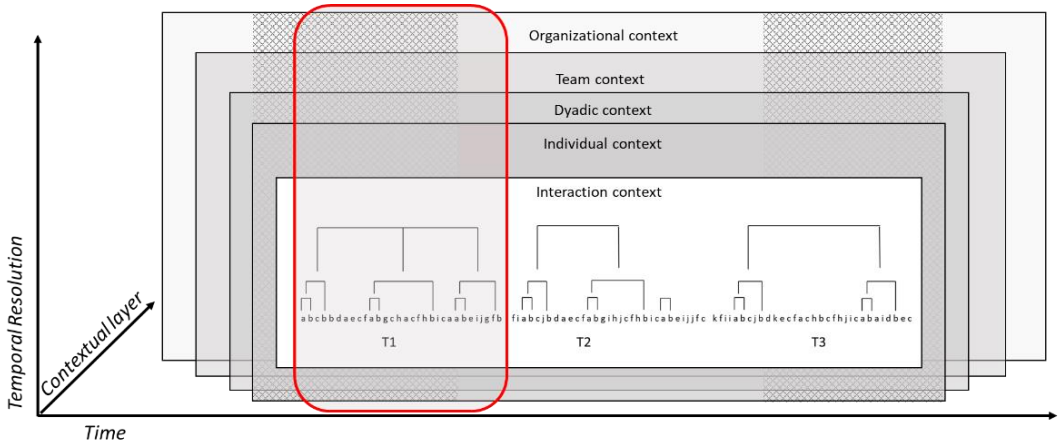


Figure 6.2.C

Embedding Chapter 3 in the 3D framework of the temporal and contextual dynamics of emergent social interaction phenomena

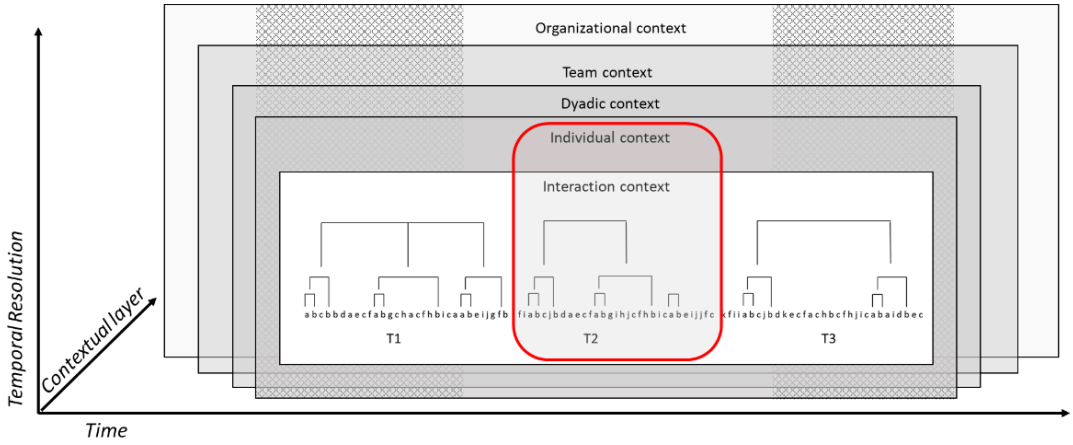


Figure 6.2.D

Embedding Chapter 4 in the 3D framework of the temporal and contextual dynamics of emergent social interaction phenomena

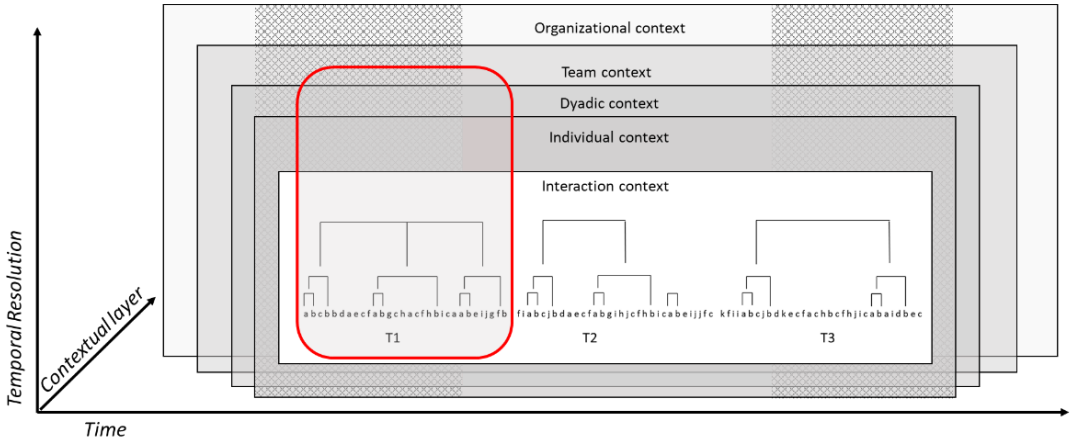
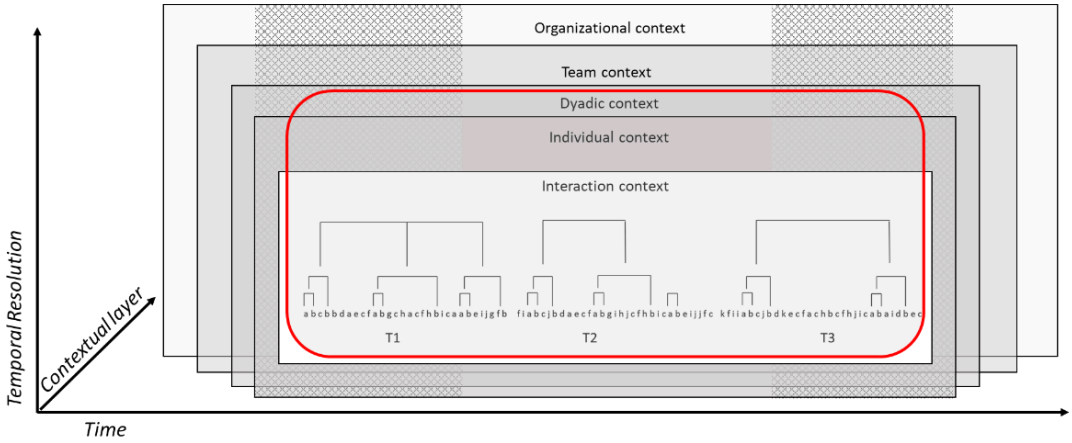


Figure 6.2.E

Embedding Chapter 5 in the 3D framework of the temporal and contextual dynamics of emergent social interaction phenomena



6.2 Limitations and Future Directions

In addition to the specific limitations discussed for each study in the respective chapters, I will highlight four key limitations of this dissertation that can pave the way for future research, namely (1) the conceptualization and measurement of gender, (2) the focus on only positive constructs, (3) no consideration of the influence of the broader organizational context, and, (4) no consideration of longitudinal effects at broader temporal scopes. In addition, I propose four concrete research projects that build on different aspects discussed in the theoretical implications and limitations. Specifically, I propose a longitudinal, multimodal replication of Chapter 4, a taxonomy of interaction patterns of leadership at different temporal scopes, an exploration of micro-temporal patterns of leadership configurations in teams, and a study investigating how interaction time in on-site settings (co-located teams) versus remote settings (virtual teams) relates to team members' convergence of team cohesion patterns.

6.2.1 Conceptualization and Measurement of Gender

A first limitation of this dissertation concerns the conceptualization of gender as a binary category and operationalization using a single-item approach. Single-item operationalizations have been criticized for being too imprecise to capture a particular aspect of gender (e.g., Lindqvist et al., 2020). For example, in Chapter 3, we asked participants with which gender from a predefined choice between "male", "female", "nonbinary", and "other" they identified with. Our hypotheses, however, were not about gender identification but social roles and primarily focused on how others viewed and categorized the individual. Although widely applied in organizational research, this approach leads to a disconnect of theory and evidence (collected via inappropriate methods) that hampers theoretical advancement.

A single-item approach to gender also assumes that most individuals can be classified into unambiguous groups (Joel et al., 2014). Work on gender identity and gender expression has documented a great diversity of experiences and realities that remains obscured with

single-item approaches (Alfrey et al., 2017; Burchiellaro, 2020; Jones, 2020; Huffman et al., 2021; Thanem, 2011). Often, the argument is brought forward that this group of people is comparably small and that most research participants identify themselves and are identified within the organizational record as either man or woman (e.g., Paustian-Underdahl et al., 2014). Although practical, this approach is ethically questionable, given that those individuals falling outside the binary are exposed to higher risks of discrimination and its psychological consequences – in particular at the workplace (Bouman et al., 2017; Brewster et al., 2014; García Johnson, & Otto, 2019).

Turning to the large majority of individuals who identify as either man and woman and are recorded as such, work on androgyny in the 1970s suggests that gender identities may be more complex carrying both masculine and feminine components (Bem, 1974). More recently, Joel and colleagues (2014) conducted a study on gender identity of "normative" individuals (N = 2,155) and showed that more than 35% felt in parts as the "other" gender. This raises serious questions on theoretical approaches, such as the ones used in this dissertation (e.g., Eagly, 1987; Eagly & Karau, 2002), that do not account for this complexity.

Moreover, gender intersects with other diversity-categories, such as race, resulting in markedly different realities for individuals (Bauer et al., 2021; Bowleg & Bauer, 2016; Crenshaw, 1989). Ignoring that gender intimately intertwines with other identities and social categories results in an incomplete picture of how gender affects the whole population (Dennissen et al., 2020; Settles et al., 2019; Shields, 2008). At the same time, to the best of my knowledge, theoretical models that do account for this complexity and that can be applied to derive hypotheses in the context of team research are lacking. Scholars have criticized the discipline of psychology for relying too heavily on theory and methods that rely on labeling individuals according to unambiguous categories (e.g., Settles et al., 2020; Shields, 2008). These approaches would limit researchers to study the complexities behind gender and its intersections. Here, I see an interesting parallel to research on team dynamics: Despite a long-

lasting awareness in both research fields for the limitations of their approaches (Deaux, 1984; McGrath; 1986), the dominance of existing theoretical frameworks and methodological approaches restricts researchers' creativity in developing new approaches that may be more inclusive and thus more precise to capture the existing complexities.

6.2.2 Focus on Positive Constructs

A second limitation pertains to the nature of the emergent phenomena that were investigated in this dissertation. Both positive humor (Chapter 3) and leadership emergence (Chapter 4) represent constructive phenomena that positively impact team performance. However, just as interaction dynamics can give rise to desirable team processes, they may also foster dysfunctional team processes. Previous work identified interaction patterns that were associated with reduced perceived information sharing (Hoogeboom & Wilderom, 2019), passive group mood (Lehmann-Willenbrock et al., 2011), lower team adaptiveness (Lei et al., 2016), and lower team performance (Kolbe et al., 2014; Ziljstra et al., 2012). Although these studies investigated negative consequences of specific interaction patterns, just as this dissertation, they did not examine the interaction patterns giving rise to explicitly dysfunctional processes such as relationship conflict (e.g., De Dreu & Weingart, 2003), or a hostile team climate (e.g., Cech et al., 2021). Understanding the underlying interaction dynamics of dysfunctional processes is equally important as understanding how teams can improve their performance. Avoiding dysfunctional processes that impair team performance is important to maintain team effectiveness (De Dreu & Weingart, 2003). Moreover, dysfunctional processes may negatively affect individual outcomes such as well-being, motivation, or job satisfaction (Lübstorf & Lehmann-Willenbrock, 2020).

6.2.3 Influence of the Broader Organizational Context

A third limitation is not accounting for the organizational context (i.e., the fifth, contextual layer as depicted in Figure 6.2.A). Although Chapter 2 identified the organizational

context as one of the sources that can increase gender salience and impact team interactions, the two empirical studies in this dissertation did not take the organizational context into account. No boundary conditions were included that could potentially limit the positive effect of humor (Chapter 3) and leadership emergence (Chapter 4). For example, there may be circumstances such as high time pressure when a joking atmosphere, even if benign and collective, may compromise effective team collaboration (Rosing et al., 2021). In a similar way, the gender effects on interaction patterns underlying leadership emergence may interact with other gender cues issuing from the context. As discussed in the theoretical implications, a gender-orientation of the task (e.g., Karakowsky & McBey, 2001; Karakowsky et al., 2004, Pearsall et al., 2008), the gender composition of the group (e.g., Aries, 1976; Smith-Lovin & Brody, 1989), or the organizational context (Kozlowski & Ilgen, 2005) may affect these patterns. The larger organizational context is rich in cues and influence factors that may also shape the interactions unfolding in these teams (Cronin et al., 2011; Kozlowski & Klein, 2000). Thus, future research should consider investigating the context factors playing into the interaction dynamics involved in the phenomena of positive, interactive humor and leadership emergence.

6.2.4 Longitudinal Effects at Broader Temporal Scopes

Chapters 2, 3, and 4 involved reviewing or conducting studies in a meeting-setting. That is, the duration of the considered interactions was roughly an hour or less (nano- and micro-temporal scopes, see Chapter 5). Studying these dynamics is important. They can be viewed as symptomatic for the larger organization (Lehmann-Willenbrock et al., 2018). For example, research showed how the interactions during one meeting predicted organizational outcomes 2.5 years later (Kauffeld & Lehmann-Willenbrock, 2012). Still, some emergent phenomena take more time than just one meeting to unfold and evolve, such as team well-being (Klasmeier & Lehmann-Willenbrock, 2023). Accordingly, larger temporal scopes with

an appropriate data resolution (i.e., data collection frequency) would have to be considered as well to allow a comprehensive understanding of emergent phenomena (Klonek et al., 2019).

6.2.5 A Longitudinal Multi-Modal Replication of Chapter 4

Future work could focus more on the integration of multimodality in team interactions. As discussed in section 6.1.3, the communicative acts communicative acts that constitute team interactions occur across different modalities (e.g., tone, pitch, gaze, gestures; Vincialrelli et al., 2009). For leadership emergence, there is initial evidence that underlines the potential of this approach (Schmid Mast & Hall, 2017). For example, studies have explored how different cues (gaze, tone/pitch, and movement cues) predict leadership ascriptions (e.g., Beyan et al., 2018; 2019; Capozzi et al., 2019). There is also some work that has investigated the combination of different modalities, such as speech and gaze patterns (Foulsham et al., 2010; Sanchez-Cortes et al., 2013) or gestures and gaze (Gerpott et al., 2018). Nonetheless, more work is required to provide a conceptual foundation that explains the interplay of different modalities involved in emergent phenomena in teams and organizations. Regarding the field of leadership emergence, one interesting question would be whether team members switch to different modalities if their claims to leadership in one modality fail. Given that women received more counterclaims (Chapter 4), this may explain potential gender differences in the use of different modalities.

To address these ideas, I propose a two-step, interdisciplinary project in collaboration with social signal processing researchers. The first step would focus on identifying multi-modal patterns of claiming and granting in the laboratory employing four-person zero-history teams following a similar study protocol from Chapter 4. The teams' gender composition would be manipulated across five conditions (all-male, female token, balanced, male token, all-female). Teams would be tasked with an interactive, interdependent task of average complexity lasting for 60 minutes to ensure enough interaction instances that may require

changes of claiming-strategies. This interaction would be video-recorded. The audiovisual data would then be coded following the procedure described in Chapter 4. Additionally, applying methods from social signal processing other social signals would be extracted (e.g., gaze, gestures, pitch). A machine-learning algorithm would have to be developed that identified sequences of multimodal signals reflecting patterns of claim→grant and claim→claim (rejecting the claim) patterns (cf. Beyan et al., 2019).

The identified patterns would then be inspected in depth. First, the identified sequences would be analyzed qualitatively to identify any underlying conceptual structures in which they could be clustered into. This step would benefit from previous work in organizational psychology on nonverbal behavior and leadership (e.g., Carney et al., 2005; Hall & Friedman, 1999; Maricchiolo et al., 2011; Talley & Temple, 2015). But also, developmental psychology has generated important insights into the relationship between pointing-gestures and joint attention, for example via gaze, as one basic nonverbal mechanism of social influence (Leung & Rheingold, 1981; Liszkowski, 2005; Liszkowski et al., 2006; Matthews et al., 2012). Second, the sequences (or clusters of sequences) would be examined for gender differences. Third, the sequences would be examined in their temporal context to identify potential changes of claiming-strategies after experiencing (a certain amount of) rejections.

To validate these patterns in the field. For that purpose, I would recruit newly formed teams and record their team meetings at three points in time (T1 = as early as possible; T2 = T1 + 4 weeks; T3 = T2 + 3 months; T4 = T3 + 6 months). The data from T1 would be used to validate the findings from step 1. The remaining meetings would be analyzed to investigate any differences that may emerge over longer periods of time (i.e., more mature team) and potentially different contexts (different task demands, different team composition) within one team. This data would offer comprehensive and in-depth insights on the multimodal interaction patterns associated with leadership emergence and their evolution over time.

6.2.6 Developing a Taxonomy of Leadership Processes at Different Temporal Scales

Scholars have repeatedly advocated for increasing theoretical specificity with regard to behavior and time in the leadership field (e.g., Banks et al., in press; Castillo & Trinh, 2018; McClean et al., 2019; Shamir, 2011). Other fields have started to embark upon this venture (e.g., Begemann et al., 2023; Klonek et al., 2019), proving the benefit that this entails for better understanding the dynamics of the respective constructs. In their conceptual framework of workplace gossip, Begemann and colleagues (2023), for example, distinguish between gossip events (i.e., the smallest unit or though unit in which gossip may occur, typically a single statement), gossip episodes (i.e., sequences of gossip events that occur during one conversation), gossip conversations (i.e., the conversational context in which gossip events and episodes occur), and accumulated gossip (i.e., gossip that accumulates over longer periods of time). This precise distinction of gossip behavior allows for much more precise theorizing and predictions relating to this phenomenon.

Addressing the call for more precision in leadership theorizing, I propose to build on the starting points developed in section 6.1.2 of the theoretical implications and develop a taxonomy of leadership processes at different temporal scopes. Data gathered from the study in section 6.3.1 would be particularly relevant to identify more nuanced leading-following patterns. But also other studies focusing on discrete behaviors such as emotional displays (e.g., Schwarzmüller et al., 2017; 2018) or the studies reviewed in Chapter 5 may provide an important empirical basis to start answering the questions from Tables 6.1 and 6.2. This approach could result in a taxonomy of leading-following patterns at different temporal scopes. One important caveat for this endeavor would be to carefully consider behavioral markers that would indicate power, dominance, or status. These are all constructs that are different from but related to leadership (Blader & Chen, 2014; DeRue, 2011; Keltner et al., 2003). Thus, it would be particularly important to carefully identify behavioral markers that

are unique to each of these constructs and clarify whether some markers are potentially less specific and indicative of some of these other three constructs.

This taxonomy would contribute to concretizing extant theoretical models. It could complement them with more concrete definitions of the involved behavioral dynamics. It could also help to specify the temporal dimensions. More specific temporal dimensions may entail understanding whether some leadership and followership phenomena are restricted to occur at one specific temporal scope, whether they are volatile, or whether they require a longer interaction history to emerge at all. Thus, the taxonomy may enhance the precision of existing and newly developed theories and would help to better understand the nature of a specific phenomenon of interest.

6.2.7 In Search of Patterns: Exploring Micro-Temporal Configurations of Leadership Emergence in Teams

To further understand how leadership emergence arises in teams and evolves over the team's lifetime, one future avenue is to explore how leadership is distributed across the team (i.e., *dispersion;* DeRue, 2011; also see Chapter 4). According to process-perspectives of leadership emergence (e.g., DeRue & Ashford, 2010; Fischer, Dietz, & Antonakis, 2017; Uhl-Bien, 2006), leadership is not necessarily a quality that resides within one individual but rather represents a configuration of social influence, that is leadership, across team members that may change with time and context (Cox, Madison, & Eva, 2022; DeRue, 2011). Yet, most studies approaching shared or distributed leadership in teams take a macro perspective, examining development over longer periods of time (e.g., Zhu et al., 2018). Thus, investigating whether teams' configuration of social influence may also fluctuate within one meeting could inform how stable such leadership configurations are. This could also enable to identify behavioral patterns that may underlie specific configurations of social influence. Importantly, such insights may help to find an answer to the unresolved question of the

specific processes through which leadership emergence positively impacts desired team outcomes (Badura et al., 2022; Marks, Matthieu, & Zaccaro, 2001).

Therefore, I propose to investigate configurations of leadership emergence at micro-temporal intervals (i.e., two minutes) within zero-history team meetings and the underlying interaction patterns associated with these configurations. The first step would entail to rate individuals' levels of leadership per two-minute interval of the meeting. In step two, these scores would provide the basis for calculating latent profiles per two-minute interval (Henry & Muthén, 2010). This could allow to classify configurations of social influence. With concrete latent profiles at hand, each two-minute interval of the meeting could be assigned one specific profile. This may also enable to examine how much variance in the types of social configuration occurs within single team meetings. In the third step, the behavioral interaction unfolding within the two-minute intervals assigned to the different profiles could be inspected more closely. This may reveal whether specific interaction patterns predict specific configurations of social influence.

6.2.8 Reconciling Perception and Behavior in Emergent Phenomena in Teams

One aspect only briefly touched upon in the theoretical implications but nonetheless important is the role of team members' converging perceptions of the team process. Often team research uses measures of convergence to justify the aggregation of team members' individual scores on a construct to a team-level measure (Bonito & Keyton, 2019). While a closer examination of this procedure is warranted in its own right (see Bonito & Keyton, 2019), the primary focus here is on the observation that team members do not necessarily converge in their perceptions of the common team experience (LeDoux et al., 2012). Future research could embark upon investigating how behavioral interactions are related to team members' converging (or diverging) perceptions of team processes.

One starting point to investigate this research question could be team cohesion. Team cohesion represents the shared attraction of team members that acts as a bonding force holding the team together and that is driven by social- and task-oriented factors (Casey-Campbell & Martens, 2009). In the context of increased flexibilization of work contexts (e.g., remote work, virtual, and hybrid teams), actively promoting team commitment and bonding, for example via team cohesion, gains relevance for organizations (Wageman et al., 2012). Although team cohesion is one of the most studied team processes (e.g., Beal et al., 2003; Salas et al., 2015), there remain unresolved questions and new challenges associated with new work settings, such as remote work, arise (Grossman et al., 2022).

This moves the role of team members' interaction mode (virtual vs. face-to-face) and the level of interaction time into focus (Gilson et al., 2015). According to media richness theory, the mode of the interaction channel (e.g., face-to-face, video-call, phone call, chat) may affect the interaction (Daft & Lengel, 1986). The level of interaction time determines the opportunities for teams to develop cohesion (Lehmann-Willenbrock & Hung, 2023). Given the current changes in work settings (Schwarzmüller et al., 2018), understanding how cohesion is affected by these two factors gains relevance. One mechanism that may mediate the effect of interaction time on cohesion is humor. Positive humor has been documented as one of the predictors of team cohesion (Romero & Pescosolido, 2008; Ziv, 2010). As outlined in Chapter 3, despite knowing that humor in groups evolves over time (Fine & Soucey, 2005), temporal insights into humor and its impact on cohesion are limited. Another limitation discussed in Chapter 3 is lacking evidence on the effects of negative humor, also in regard to its effects on cohesion (Vazquez & Bell, 2023).

Given that humor is a communicative team process (Lynch, 2002), it may be affected by the modality of interaction (virtual vs. face-to-face; Daft & Lengel, 1986). Therefore, future work could investigate whether team members converge in their perceptions of positive and negative humor episodes over a certain period (e.g., two weeks) and whether these

convergence patterns map onto team members interaction time in face-to-face settings (via co-location patterns on site; Chaffin et al., 2017) versus virtual settings (via synchronous use of communicative software), and how this relationship evolves over the observed period. Such insights could be set in relation to convergence in team cohesion to investigate which role convergence of humor perceptions in the team, interaction time, and interaction mode play for this team process.

To pursue this research aim, one could draw on a diary design employed by Meier & Gross (2015) including event-based and fixed-time data sampling (but integrate into an App-design). Over a period of two weeks, team members take a short record for each humorous interaction during the work day answering a few items that assess the nature of the humor (e.g., a joke by one individual vs. a humor episode with various team members engaging in humor production; positive vs. negative humor; self-participation vs. observer; formal context vs. informal context) immediately after the event. The app would automatically log the time (manual corrections would be possible to ensure precision). In the morning survey (fixed-time), could control for participants mood and the evening survey could asses participants perceptions of team cohesion. Additionally, for the period of data collection, participants would carry a wearable sensor with Bluetooth and infrared to measure co-location with other team members (Chaffin et al., 2017).

6.3 Practical Implications

This dissertation has at least three implications for practitioners. First, increasing theoretical specificity in terms of time and behavior has the potential to inform interventions and development programs with more actionable advice and guidelines (Meinecke et al., 2019; Van Quakebeke & Felps, 2018). Team and leadership development can thus benefit from concrete behaviors and behavioral patterns that have proven effective for specific purposes. For example, leaders may learn that uttering more solution-oriented statements also evokes more solution-oriented statements in their team members which increases their

satisfaction with the meeting (Lehmann-Willenbrock et al., 2015). Thus, to increase meeting satisfaction of a specific meeting this is one possible, effective strategy. However, in the long-term problems may still have to be addressed, discussed, and analyzed which may reduce the opportunity for uttering a high number of solution-oriented statements in every single meeting. Developing an awareness of these dynamics can help supervisors and managers to lead their teams more effectively.

Second, this dissertation offers starting points for working towards more readily available fine-grained team interaction data, for example, via machine learning algorithms. Such technology may be integrated into team training and development programs. For instance, it may be employed to increases opportunities for team feedback. In combination with appropriate visualizing tools (e.g., state-space-grids; Meinecke et al., 2019), teams may get prompt and objective feedback on their interaction patterns. Thereby, teams would have the chance to learn about interaction patterns that lead to more or less effective outcomes. This could help teams to develop their communicative skills and increase their awareness of patterns that result in more or less effective work (i.e., team processes).

Third, though only binary gender categories were considered, the implications of this dissertation on the topic of gender in workplace contexts are relevant to practitioners well. Across Chapters 2–4, this dissertation demonstrated that gender can shape important aspects of organizational life. Accordingly, practitioners would benefit from better understanding different experiences across gender (e.g., humor and meetings satisfaction) to support their team members appropriately. Organizations would also benefit from working towards removing the barriers their non-male members may experience (e.g., facing more challenging behavior from others). Discriminatory experiences have a long list of negative consequences – for the individual but also for the organization (García Johnson, & Otto, 2019). Thus, to benefit from their full potential organizations should ensure that all their members can flourish equally.

6.4 General Conclusion

In this dissertation, I set out to investigate the time-dependent processes of emergent phenomena in organizations and how dynamic and stable elements interplay in this context. More precisely, this research illuminated the role of gender, a relatively stable team member characteristic, in shaping the emergent phenomena of humor and leadership emergence in team contexts. Additionally, it delved into the question how temporal perspectives, in particular regarding the temporal scope, contribute to a deeper scholarly comprehension of the emergent phenomena. One of the central contributions of this dissertation lies in detailing the intricate connection between perceptual-behavioral processes and time. Given the inherent temporality of interaction, discerning the temporal scope of an emergent phenomenon necessitates a precise understanding of the specific behaviors and interaction patterns entailed in this process. Hopefully, the guiding steps and questions developed from the theoretical implications as well as the comprehensive overview on methodological options to capture interaction behavior pave the way for future theorizing and research on the underlying processes of emergent phenomena. Thereby, this dissertation may contribute to understanding organizations as dynamic systems and how organizational behavior unfolds in this realm.

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APPENDIX

APPENDIX A: AUTHOR CONTRIBUTION STATEMENT

Study 1: Hemshorn de Sanchez & Meinecke, 2020

I was involved in conceptualizing and planning the study. Further, I conducted the literature search and review. I was involved in analyzing and interpreting the results. Moreover, I drafted and revised the manuscript based on the feedback that my co-author and the editors of the book provided.

Study 2: Hemshorn de Sanchez, Allen, & Lehmann-Willenbrock, 2022

I was involved in planning the re-analysis of the data on meeting science. With feedback from my coauthors, I developed the theoretical rationale and hypotheses. I prepared and analyzed the data, and interpreted the results. With feedback from my co-authors, I prepared the manuscript, revised it in response to the reviewer comments, and wrote the response letters.

Study 3: Hemshorn de Sanchez, Mangels, Degner, & Lehmann-Willenbrock, submitted

I was involved in developing the methodology, coordinating the data collection, and preparing the data of this study. I was responsible for training and coordinating the coding team of the video data as well as the preparation of this data. I analyzed and interpreted the results. In addition, I developed the manuscript drafts with feedback from my co-authors and I took the lead in the revision of the manuscript based on reviewer comments.

Study 4: Hemshorn de Sanchez, Gerpott, & Lehmann-Willenbrock, 2022

I was involved in conceptualizing and planning the study. Likewise, I conducted large parts of the literature search and review of the literature. I was involved in analyzing and interpreting the results of this review. I organized and visualized these results. With input from my co-authors, I prepared the draft of the manuscript. With feedback from my co-authors, I revised it based on reviewer comments, and wrote the response letters.

I confirm that all authors have approved the author contribution statement.

Hamburg, 14. Dezember 2023 _____

Clara Sofie Hemshorn de Sanchez

APPENDIX B: EIDESSTATTLICHE ERKLÄRUNG

Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

FAKULTÄT
FÜR PSYCHOLOGIE UND
BEWEGUNGSWISSENSCHAFT
Institut für Bewegungswissenschaft
Institut für Psychologie

Eidesstattliche Erklärung nach *(bitte Zutreffendes ankreuzen)*

☐ **§ 7 (4) der Promotionsordnung des Instituts für Bewegungswissenschaft der Universität Hamburg vom 18.08.2010**

☒ **§ 9 (1c und 1d) der Promotionsordnung des Instituts für Psychologie der Universität Hamburg vom 20.08.2003**

Hiermit erkläre ich an Eides statt,

1. dass die von mir vorgelegte Dissertation nicht Gegenstand eines anderen Prüfungsverfahrens gewesen oder in einem solchen Verfahren als ungenügend beurteilt worden ist.
2. dass ich die von mir vorgelegte Dissertation selbst verfasst, keine anderen als die angegebenen Quellen und Hilfsmittel benutzt und keine kommerzielle Promotionsberatung in Anspruch genommen habe. Die wörtlich oder inhaltlich übernommenen Stellen habe ich als solche kenntlich gemacht.

Hamburg, 14. Dezember 2023
Ort, Datum


Unterschrift

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APPENDIX C: ERKLÄRUNG 4.1C & 5.4D

Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

FAKULTÄT
FÜR PSYCHOLOGIE UND
BEWEGUNGSWISSENSCHAFT
Institut für Bewegungswissenschaft
Institut für Psychologie

Erklärung gemäß *(bitte Zutreffendes ankreuzen)*

☐ **§ 4 (1c) der Promotionsordnung des Instituts für Bewegungswissenschaft der Universität Hamburg vom 18.08.2010**

☒ **§ 5 (4d) der Promotionsordnung des Instituts für Psychologie der Universität Hamburg vom 20.08.2003**

Hiermit erkläre ich,

Clara S. Hemshorn de Sanchez (Vorname, Nachname),

dass ich mich an einer anderen Universität oder Fakultät noch keiner Doktorprüfung unterzogen oder mich um Zulassung zu einer Doktorprüfung bemüht habe.

Hamburg, 14. Dezemeber 2023
Ort, Datum

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