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A Dynamic View on Team Relationships: Development and Consequences of Interpersonal Relationships in Teams

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Abstract

Teams have become the state-of-the art work design when it comes to tackling increasingly complex challenges in modern organizations. Throughout the last decades, scholarly work has responded to this trend with increasing interest in investigating what constitutes successful teamwork. A core insight from this research is that interpersonal relationships across teams matter and are crucial for productive team behaviors and overall effectiveness. While much scholarly work has been dedicated towards understanding both the antecedents and consequences of functional and dysfunctional aspects of team relationships, the underlying dynamics governing the impact and development of these relational features are still poorly understood. This is, however, important to address as teams themselves are considered dynamic by nature and evolving based on their mutual past and development. As such, neglecting time as an influential factor when investigating team interpersonal processes can lead to significant biases in our understanding of them. Therefore, the goal of this dissertation is to enhance our knowledge of team relationships via three empirical essays which examine the development and consequences of relationships in teams from a dynamic perspective. Thereby, this thesis relies on three different conceptual frameworks from the management literature: *Relational models theory*, *interpersonal trust development*, and *relational job design theory*.

Essay I builds on theory on interpersonal trust development to investigate the dynamic development of team trusting behavior as a manifestation of positive team relationships as well as its antecedents. To do so, behavioral data from teams in an online simulation game was examined and analyzed using mixed-effect models. The results show that team trusting behavior changes over time and that behaviors indicating aspects of trustworthiness can vary dynamically in their impact on the development of trusting behavior. Specifically, while behaviors indicating both competence and benevolence increase in relevance for team trusting behavior

over time, behaviors indicating integrity retain a consistent and high impact on team trusting behavior.

Based on relational models theory, essay II examines how different relational climates in teams impact their effectiveness over time. Utilizing both survey data and behavioral data from the same online simulation game, the results of essay II indicate that relational climates affect overall team effectiveness and that this effect materializes over time. More concretely, the findings suggest that climates encouraging either hierarchy or communality positively affect team effectiveness, while climates inducing market-like structures in teams negatively affect team effectiveness.

In a comparative analysis, essay III investigates the dynamic development of turnover in intercultural teams over time and investigates its varying relationship with team trusting behavior across cultures. Drawing on social exchange theory, this paper develops a growth model on turnover in teams and utilizes behavioral data from the same online simulation game to investigate cultural differences. The findings suggest, that turnover decreases curvilinearly in teams over time; however, this development differs both in magnitude and direction across cultures. Moreover, the results indicate a negative relationship between trust and turnover which differs in magnitude across cultures.

Apart from the essays' individual contributions to the respective research stream of the management literature, this thesis as a whole advances our knowledge of team relationships in organizations as well as the essential role of time in this aspect. The findings indicate that team relationships have a significant and measurable impact on team effectiveness but also that it takes time for this impact to substantiate. Further, the results indicate that team relationships can be affected via specific behavioral patterns but that their overall impact differs as teams develop over time. Based on these results, this dissertation provides recommendations for future research as well as implications for practitioners.

Deutsche Kurzfassung (German Abstract)

Arbeit in Teams hat sich in modernen Organisationen als dominantes Arbeitsdesign zur Lösung von komplexen Fragestellungen und Herausforderungen entwickelt. Über die letzten Jahrzehnte hinweg hat dieser Trend auch das Interesse der Wissenschaft geweckt und zu einer Vielzahl an Forschung zum Thema effizienter Teamarbeit geführt. Eine wichtige Erkenntnis dieser Forschung ist, dass interpersonelle Beziehungen in Teams essenziell für produktive Verhaltensweisen und deren Effektivität generell sind. Während sich ein Großteil der Forschung der Untersuchung von Prädiktoren und Folgen von funktionalen und dysfunktionalen Aspekten von Teambeziehungen gewidmet hat, sind die unterliegenden Dynamiken dieser Wirkungen weitestgehend unbekannt. Es ist jedoch wichtig, diese besser zu verstehen, da Teams in ihrer Natur als dynamisch definiert sind und sich auf Basis eines Wechselspiels aus gemeinsamen Erfahrungen der Gegenwart und Vergangenheit weiterentwickeln. Daher kann die Vernachlässigung des Faktors Zeit zu signifikanten Verzerrungen in unserem Verständnis von interpersonellen Prozessen führen. Aus diesem Grund ist das Ziel dieser Dissertation unser Wissen über Teambeziehungen zu erweitern. Konkret erfolgt dies mittels dreier empirischer Beiträge, welche die Entwicklung und Folgen von Beziehungen auf Teamebene aus einer dynamischen Perspektive betrachten. Dabei baut diese Dissertation auf drei verschiedene Konzepte der Managementliteratur auf: *Relational Models Theory*, *Interpersonal Trust Development* und *Relational Job Design Theory*.

Essay I baut auf Theorie über interpersonelle Vertrauensentwicklung auf um die dynamische Entwicklung von Vertrauensverhalten als Manifestierung einer positiven Teambeziehung zu untersuchen sowie dessen Prädiktoren. Dazu werden Verhaltensdaten von Teams eines einer Online-Simulation verwendet und über Mischeffekt-Modelle analysiert. Die Ergebnisse weisen eine dynamische Entwicklung von Vertrauensverhalten in Teams auf und zeigen darüber hinaus, dass Verhaltensmuster, die Vertrauenswürdigkeit implizieren, einen dynamisch

variierenden Einfluss auf das Vertrauensverhalten von Teams haben. Konkret deuten die Ergebnisse darauf hin, dass Verhaltensmuster, die Kompetenz und Wohlwollen ausdrücken, in Ihrer Relevanz auf Vertrauensverhalten über die Zeit hinweg steigen während Verhaltensmuster, die Integrität ausdrücken, eine konsistent hohe Relevanz für Vertrauensverhalten aufweisen.

Essay II greift auf die Relational Models Theorie zurück, um zu untersuchen, inwiefern verschiedene relationale Klimata in Teams Effektivität dynamisch beeinflussen. Die Ergebnisse einer Analyse von Verhaltens- und Umfragedaten aus derselben Online-Simulation deuten darauf hin, dass relationale Klimata einen signifikanten Einfluss auf die Effektivität von Teams haben und dass dieser Effekt sich über die Zeit hinweg materialisiert. Konkreter ausgedrückt zeigen die Ergebnisse, dass Klimata, welche entweder eine hierarchische oder kommunale Struktur suggerieren, einen positiven Einfluss auf Teameffektivität haben. Dagegen weisen Klimata, die marktähnliche Strukturen vermitteln, einen negativen Einfluss auf Teameffektivität aus.

In einer vergleichenden Analyse untersucht Essay III die dynamische Entwicklung von Fluktuation in interkulturellen Teams im Laufe der Zeit und erforscht deren Beziehung zu Vertrauensverhalten in verschiedenen Kulturen. Auf Grundlage der Social Exchange Theorie wird im Rahmen der Studie ein Wachstumsmodell über die Fluktuation in Teams entwickelt. Dabei werden Verhaltensdaten aus demselben Online-Simulationsspiel verwendet, um die kulturellen Unterschiede zu untersuchen. Die Ergebnisse deuten darauf hin, dass Fluktuation in Teams im Laufe der Zeit kurvenförmig abnimmt. Diese Entwicklung unterscheidet sich jedoch sowohl im Ausmaß als auch in der Richtung innerhalb der Kulturen. Darüber hinaus deuten die Ergebnisse auf einen negativen Zusammenhang zwischen Vertrauen und Fluktuation hin, der in den verschiedenen Kulturen unterschiedlich stark ausgeprägt ist.

Abseits der individuellen Beiträge der Essays zu den jeweiligen Literaturströmen erweitert diese Dissertation als Ganzes unser Wissen zum Thema Teambeziehungen in Organisationen und im Besonderen die essenzielle Rolle von Zeit in diesem Aspekt. Die Resultate zeigen, dass Teambeziehungen einen signifikanten und messbaren Einfluss auf Teameffektivität haben, gleichzeitig jedoch auch, dass die Manifestierung dieses Effektes Zeit in Anspruch nimmt. Darüber hinaus zeigen die Ergebnisse, dass Teambeziehungen über bestimmte Verhaltensmuster gefördert werden können und dass die Relevanz dieser Verhaltensmuster über die Zeit differiert. Auf Basis dieser Ergebnisse werden Empfehlungen für zukünftige Forschung dargestellt sowie Implikationen der Ergebnisse für die Praxis genannt.

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List of Abbreviations

AIC	Akaike information criterion
BIC	Bayesian information criterion
CFI	comparative fit index
Coeff.	coefficient
e.g.	exempli gratia
et al.	et alii
GmbH	Gesellschaft mit beschränkter Haftung
i.e.	id est
ICC	intraclass correlation
IMO	input-mediating mechanism-output
IPO	input-process-outcome
logLik	log likelihood ratio
MMO	massively multiplayer online game
N	number of entities in sample
p	p value
p.	page
PhD	philosophiae doctor
RMSEA	root mean square error of approximation
RQ	research question
$r_{wg(j)}$	interrater agreement index
SD	standard deviation
SRMR	standardized root mean square residual
t	t-statistic
TLI	Tucker Lewis index

USD	US dollar
vs.	versus
γ	fixed-effect regression coefficient
χ^2	chi-squared statistic
Δ	delta

1 Introduction[1]

"*Great teams have trust at the heart of their success. If you don't trust each other, you'll play safe. Trust makes it possible to aim higher. To leap further and to know someone has your back if you fall.*

– Adam Grant

This dissertation advances our knowledge of the dynamic development and consequences of team relationships. Specifically, the results in this thesis contribute to our understanding of how positive relationships can be developed and how they affect team functionality and endurance. Moreover, I analyze the crucial role of time and find evidence for its importance when investigating interpersonal team processes.

1.1 Motivation

Over the last decades, teams have become the dominant work design of modern organizations with the goal to tackle increasingly complex and cross-functional challenges. For instance, Ernst & Young Global Limited (2013) found that more than 90% of organizations consider teams to be important drivers of organizational performance and are working towards improving their efficiency further. Consequently, it is not surprising that a plethora of scholarly work has been dedicated to understanding the structure, processes, and contextual factors of work teams (e.g., Cohen & Bailey, 1997; Cronin et al., 2011; Marks et al., 2001; Mathieu et al., 2014, 2019). Teams are typically defined in the literature as a "collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems (for example, business units or corporations), and who manage their relationships across organizational boundaries" (Cohen & Bailey, 1997, p. 241). A core insight from recent

[1] This section is partly based on Uhlemann, Drescher, & Korsgaard (2020).

research is that interpersonal relationships within teams are crucial for a) the functionality of the team itself as well as b) the experience of work for employees (Grant, 2007; LePine et al., 2008; Mathieu et al., 2019). As for the former, studies on social capital indicate, for instance, that interpersonal relationships facilitate resource exchange, motivations, innovation, and team effectiveness (see Adler & Kwon, 2002, for a comprehensive overview). Regarding the latter, a growing body of scholarly work suggests that interpersonal relationships are crucial for experiencing work as meaningful and important (Barry & Crant, 2000; Bradbury et al., 2000; Gersick et al., 2000; W. A. Kahn, 1990; Wrzesniewski et al., 2003), which – according to a General Social Survey – represents the job feature most valued by Americans (i.e., above promotions, remuneration, job security, and working hours) (Cascio, 2003).

In this literature stream, organizational trust has received particular attention as a fundamental characteristic of work relationships and is even considered one of the most frequently studied concepts in organizational literature today (De Jong et al., 2016, 2017; Fulmer & Gelfand, 2012; Korsgaard et al., 2018). Extant research has covered trust as well as its development and outcomes on an individual level (e.g., Colquitt et al., 2007; Mayer et al., 1995; Schoorman et al., 2007), team level (e.g., De Jong et al., 2016; Meyerson et al., 1996; Simons & Peterson, 2000), and organizational level (e.g., Cao & Lumineau, 2015; Miles & Snow, 1992). On the team level in particular, recent studies have accumulated a wealth of insights and a general agreement on the benefits of a trusting relationship on relevant outcomes, such as cooperation, turnover, positive attitudes, innovativeness, and performance (see Fulmer & Gelfand, 2012, for a comprehensive overview).

In a similar pursuit, scholars have increasingly turned towards Fiske's (1992) relational models theory to explain how relationships affect interactions between individuals (see Mossholder et al., 2011). Although originally introduced in an anthropological context, relational models theory was applied and developed in a multitude of disciplines, such as social

psychology, sociology, and management research (Fiske, 1991, 1992; Haslam, 2004). At its core, relational models theory provides a comprehensive taxonomy of four relational concepts (i.e., communal sharing, authority ranking, equality matching, and market pricing) to which all social interactions can be referenced to. They determine how individuals perceive, evaluate, and construct their relationships with others. As such, relational models theory allows to qualify relationships and provides a useful framework for investigating the development and outcomes of specific types of relationships. Recently, Mossholder et al. (2011) theorized in their seminal paper that these relational models are manifest in organizations as climates that affect attitudes, behaviors, and interactions among employees. In line with this, scholarly work has – both theoretically and empirically – examined the impact of relational models on various beneficial behaviors in organizations, such as prosocial behavior (Stofberg et al., 2019), proactivity (Batistič et al., 2016), knowledge sharing (Boer et al., 2011), helping behaviors (Mossholder et al., 2011), and ethical behaviors (Keck et al., 2020).

A core component of research on teams and their respective relationships is that they are dynamic in nature (Cronin et al., 2011). They evolve over time and through different phases as they get to know each other better (e.g., McGrath, 1991; Morgan et al., 1993; Tuckman, 1965) with roles and membership in the team changing constantly (Mathieu et al., 2014). As a collective of multiple individuals, team members' attitudes, behaviors, norms, and cognitions are also consistently shaped and altered by fellow members (Delice et al., 2019; Kozlowski & Chao, 2018). In line with this proposition, team-related constructs such as their relationships have to be addressed in a more time-sensitive manner to adequately investigate them as neglecting these dynamics may have unintentional consequences in terms of misinterpretations of the data (Cronin et al., 2011; Mathieu et al., 2014). For instance, the current state of a team's trust may be the result of a rise in performance in one team, while being the consequence of a decline in performance in another (e.g., G. Chen et al., 2011). As dynamic entities, team members in-

corporate past interactions, attitudes, and outcomes in their perceptions of the team in the present and, thus, are affected by the development of these aspects of the team (Cronin et al., 2011). A team may, for instance, perceive an increase in performance over the last interactions causing it to establish higher competency perceptions, which, in turn, lead to higher levels of trust in the team (Mayer et al., 1995; Schoorman et al., 2007). Ignoring the impact of these dynamics in our example may cause researchers to significantly underestimate or overestimate, respectively, a specific state when predicting the performance of the team.

However, despite the ongoing "era of teams" (Delice et al., 2019, p. 2) in the organizational literature, team research has not given sufficient attention to the dynamic nature and subsequent temporal issues that arise from them (e.g., Delice et al., 2019; Ilgen et al., 2005; Kozlowski & Bell, 2003). Therefore, scholars even term it "the most neglected critical issue in this area" (Kozlowski & Bell, 2003, p. 58). Whereas recent theoretical team models increasingly capture and incorporate team dynamics (e.g., Mathieu et al., 2017), empirical studies remain particularly scant.

This dissertation addresses these research gaps by providing three empirical essays. These essays share their focus on the dynamic analysis of team relationships but do so from different perspectives. The first essay addresses the development of team relationships by investigating the dynamic impact of team trustworthy behavior on team trusting behavior as an indicator of the teams' relationships. The second essay examines the dynamic relationship between relational climates, representing four different archetypes of relationships, and their functionality in the context of interdependent teams. The third essay investigates the dynamic development of turnover as a consequence of trusting behavior and provides an intercultural comparison. In the following subsection, I derive the research questions underlying each essay and outline the respective relevance for each research area.

1.2 Relevance and Research Questions

1.2.1 Trust Development in Teams

Trust is a crucial aspect for work relationships and is among the most studied concepts in organizational research (De Jong et al., 2017). Its importance for the functionality of teams has been shown by extant research and is confirmed by various meta-analyses covering multiple positive work outcomes such as organizational citizenship behavior or performance (Colquitt et al., 2007; De Jong et al., 2016). Trust and trusting behavior – that is, the proximal behavioral manifestation of trust – are driven in part by perceptions of the trustee's ability, benevolence, and integrity (Mayer, Davis, & Schoorman, 1995). Similarly, perceptions of team trustworthiness can lead to overall trust in the team (Serva et al., 2005). These three trustworthiness factors (i.e., ability, integrity, benevolence) are largely accepted in the literature and their impact on trust has been confirmed meta-analytically (Colquitt et al., 2007) and across multiple levels of analysis (e.g., Aubert & Kelsey, 2003; Jarvenpaa et al., 1998; Serva et al., 2005; van der Werff & Buckley, 2017). Theories of trust typically assume that trust is a dynamic process and changes over time (Korsgaard, 2018). For instance, stage models of trust assume that the nature, extent, and determinants of trust change over the course of the relationship (e.g., Lewicki & Bunker, 1996). In line with this, recent meta-analytic work by Vanneste et al. (2013) found relationship length to have a small but significant positive impact on trust in exchange relationships. In addition, while longitudinal research on trustworthiness has mainly focused on inferences of single events (Korsgaard et al., 2018), the dynamics underlying the relationship between trustworthiness cues and trust remain poorly understood. In their theoretical model, Lewicki and Bunker (1996) suggest, for instance, that trustworthy behavior of the trusted party only serves as a valid predictor of trust once the trustor has accumulated enough information over multiple interactions or observations, respectively. In the same vein, Mayer et al. (1995) note in their seminal paper that the relationship between trustworthiness and trust depends on whether the trustor had the chance to acquire information about the trustee's characteristics.

Empirical work on the relative importance of trustworthiness factors partially supports this. For instance, Drescher et al. (2011) find that ability is particularly relevant in medium stages of the team, whereas Levin and Cross (2004) find benevolence to be most relevant in later stages, respectively. In contrast, recent scholarly work challenges this perspective by suggesting that trustworthiness perceptions form and are utilized as determinants of trust early on in the relationship (Holtz, 2015; van der Werff & Buckley, 2017). Therefore, our understanding of the dynamic relationship of trustworthiness cues with trust – that is, *when* trustworthiness cues are relevant for the development of trust – remains insufficient. The lack of understanding is also reflected in the few longitudinal studies on the dynamic relationship between trustworthiness perceptions and trust (Aubert & Kelsey, 2003; Jarvenpaa et al., 1998; Serva et al., 2005; van der Werff & Buckley, 2017). While they point towards a fluctuating relevance of trustworthiness cues, they do not agree on a specific pattern and are not directly comparable– due to a low number of observation points and varying intervals between observations.

Scholarly work needs to address this research gap for at least two reasons. First, organizations tend to increasingly rely on team-based work designs to tackle cross-functional and complex challenges (Devine et al., 1999; Fulmer & Gelfand, 2012). Scholarly work found that for teams to function properly a good relationship and, more specifically, a high level of team trust is a vital ingredient (De Jong et al., 2016). Thus, further understanding of the development of trust on the team level is important for organizational teams to cooperate effectively. Second, teams are increasingly utilized to collaborate on a project basis and get resolved quickly afterwards, thus, collaborating oftentimes only for a very limited time (Webber, 2002). This rapid formation and dissolution makes further distinguishment between short-term and long-term effects of trustworthiness cues particularly important to effectively build trust even when teams do not have sufficient time to get to know each other in depth. Therefore, the first goal of this dissertation is to investigate the following research question:

RQ 1: How does team trusting behavior develop in teams over time? How does the dynamic relationship between team trustworthy behavior (i.e., competent behavior, integrity behavior, benevolent behavior) and team trusting behavior change over time?

1.2.2 Relational Climates and Effectiveness in Interdependent Teams

Modern organizations increasingly utilize interdependent project teams because of their high adaptive capabilities and their broad knowledge set. While being useful for complex and innovative problem-solving, a high interdependency in teams comes with its own unique challenges that can make effective collaboration difficult. Interdependency is described in the literature as the degree to which team members have to interact and rely on each other to complete their tasks and achieve their mutual goals. As such, tasks and goals are typically shared by multiple members of the team and cannot be achieved by one specific individual alone (Van de Ven & Ferry, 1980). Extant scholarly work notes that interpersonal relationships are a crucial component in achieving tasks that require cooperation (Grant, 2007; LePine et al., 2008; Mathieu et al., 2019). In this literature stream, Fiske's (1992) relational models theory has received increasing attention due to its validated four-factor structure as well as its superior reflection of relationships as compared to alternative taxonomies (e.g., Foa & Foa, 1974; Maccrimmon & Messick, 1976) (Haslam, 2004). In essence, this framework postulates that individuals utilize a set of four cognitive schemata or relational models (i.e., communal sharing, authority ranking, equality matching, market pricing) to organize social interactions. More concretely, it states that people utilize these four relational models "to plan and to generate their own action, to understand, remember, and anticipate others' action, to coordinate the joint production of collective action and institutions, and to evaluate their own and others' actions" (Haslam, 2004, p. 3). The relational models, thus, serve as "building blocks from which very rich and complex relationships are formed" (Sheppard & Tuchinsky, 1996, p. 365). Recently,

Mossholder et al. (2011) advanced this view by integrating relational models theory (Fiske, 1992) with climate theory (Kuenzi & Schminke, 2009) to theorize the manifestation of relational models as climates in teams and organizations.

Both theoretical and empirical work support the usefulness of relational models theory for team research by predicting beneficial outcomes, such as ethical behavior (Keck et al., 2020), knowledge sharing (Boer et al., 2011), prosocial behavior (Stofberg et al., 2019), and proactivity (Bridoux & Stoelhorst, 2016). However, although these implied behaviors point towards differences in the relational climates' functionality for teams, it remains largely unknown how they affect overall team performance. In their comprehensive review, Mathieu et al. (2017) highlight the importance of time for emergent states such as team climates to manifest in performance as their impact on team processes may differ over time.

Addressing this research gap is important for two reasons. First, scholars have lamented the scarcity of longitudinal research on the impact of team emergent states on team effectiveness. For instance, Mathieu et al. (2019, p. 29) note that "[f]uture research should continue to examine the growing body of emergent states as not all have been fully covered, especially regarding their relationship with time". Whereas theoretical work has stated for years that team outcomes should be considered from a dynamic perspective (Cronin et al., 2011), many empirical studies still fail to incorporate this. Second, while relationships are considered crucial for team functioning (Grant, 2007), we know surprisingly little about the actual context under which specific relationships are effective in teams. As their functional advantage likely differs based on contextual factors, such as costs of collecting information or task specificity, it is important to get a deeper understanding of the interplay between team context, relationship, and performance (Fiske, 1992). Hence, the second goal of this thesis is to examine the following research question in the context of interdependent teams:

RQ 2: How do the four fundamental relational climates influence performance of interdependent teams over time?

1.2.3 Turnover Development and Team Trusting Behavior

Even after more than a century of research, turnover remains a crucial topic for both practitioners and scholars (Bolt et al., 2022; Hom et al., 2017). With competition for skilled employees rising (WEF, 2020) and high costs of turnover (Han et al., 2016; Holtom et al., 2005), it is not surprising that a plethora of research has covered both antecedents and consequences of employee turnover throughout the last century (Memon et al., 2018). However, surprisingly little is known about both the temporal and contextual factors affecting turnover development. More specifically, we do not yet understand how turnover in teams develops over time dynamically and what role culture plays in this dynamic development.

This is surprising given that existing team research has stressed for years that research should focus more on contextual factors as well as a more dynamic perspective when investigating team processes and outcomes (Hom et al., 2017; Lee et al., 2014; Mathieu et al., 2017). First, with regard to a dynamic perspective, research suggests that by not considering time, the predictive power of specific predictors may be over- or underestimated significantly. For instance, G. Chen et al. (2011) and Liu et al. (2012) show that the momentum of one's job satisfaction – that is, whether it is increasing or decreasing at the time of measurement – has important predictive power over and beyond the actual level of job satisfaction when predicting turnover. Similarly, current team models indicate that team outcomes and processes are dynamically affecting each other, leading to feedback loops and reinforcing cycles over time (Mathieu et al., 2017). Second, regarding cultural factors, scholarly work has noted that national culture is one of the "most neglected antecedents" in turnover research (Maertz, 2004, p. 105). This is, however, problematic given that it is quite common that single companies are working and collaborating on multiple continents at once (Ramesh & Gelfand, 2010).

As for the antecedents of turnover, scholarly work has found – and meta-analytically confirmed – trust to be a crucial predictor of turnover (Dirks & Ferrin, 2002). However, the role

of culture in this relationship is not yet well understood despite several findings pointing towards a neglected moderating effect. For example, Costigan et al. (2013) find trust in co-workers to be more strongly related with turnover in collectivistic countries, thus, indicating a moderating effect for cultural values. In a similar vein, D. C. Thomas & Au (2002) find cultures to react differently to low job satisfaction. Consequently, by neglecting culture as a moderating factor, research may under- or overestimate trust as a predictor of turnover in different cultures (Majeed & Jamshed, 2021). Therefore, the third goal of this thesis is to answer the following two research questions:

RQ3: How does turnover develop over time in teams and how does this development differ in different cultures?

RQ4: How does team trusting behavior affect turnover in teams and how does this effect differ in different cultures?

1.3 Theoretical Background

This dissertation draws from three research streams in the management literature, which have received increasing attention over the last decades in team research. While the essays are mainly based on theory on interpersonal trust development and relational models theory, the thesis as a whole draws from scholarly work on the impact of interpersonal relationships on employee behavior. Overall, this thesis investigates the development and consequences of team relationships in an organizational context. To do so, I utilize conceptual frameworks originating from both sociology (i.e., relational models theory) and organizational psychology (i.e., interpersonal trust) as a theoretical basis. In the following section, I briefly outline each conceptual framework.

1.3.1 Relational Job Design Theory

Extant scholarly work has shown that interpersonal relationships as well as the context providing opportunities to establish them are essential for employees (Grant, 2007; LePine et al., 2008; Marks et al., 2001). In his seminal paper on relational job design theory, Grant (2007) adds to this by theorizing that relationships with beneficiaries at work increase the motivation to help others. This is important in the context of team research because we know that intrinsic motivation and related processes are essential to effective team functioning (De Jong et al., 2016; LePine et al., 2008; Marks et al., 2001). In the following section, I briefly summarize the key points of relational job design theory and describe how, according to Grant (2007), relationships impact employees' perception of and effectiveness at their workplace. In short, he argues that individuals have a fundamental desire to make a prosocial difference in other people's lives. Hereby, motivation can be described as a set of psychological processes, which energize, direct, and sustain action (Mitchell & Daniels, 2003). When prosocially motivated, employees have "an inner desire to make an effort" (Dowling & Sayles, 1978, p. 16) towards others and, thus, are encouraged to engage in beneficial behaviors, such as helping and additional effort at work (Grant, 2007). In turn, Grant (2007) states that an employee's prosocial motivation is affected by both the relational architecture of the job itself (i.e., job impact on beneficiaries and contact with beneficiaries) as well as social information. In the following part, these antecedents of prosocial motivation will be briefly explained.

Job impact on beneficiaries describes "the degree to which a job provides opportunities for employees to affect the lives of beneficiaries" (Grant, 2007, p. 397). According to Grant (2007), four dimensions describe the potential impact of a job on beneficiaries: Magnitude, scope, frequency, and focus of impact. First, a job's magnitude of impact can be described as the extent or duration to which others are affected by the job. For instance, the job of a firefighter likely scores high on this dimension because of the potential lives saved in this job. Second, the scope of a job's impact describes the number of beneficiaries affected by the job.

For example, software developers may score high on this dimension as millions of people use their products. Third, frequency of job impact describes how often the job allows one to have an impact on others. Physiotherapists, for example, are in contact with multiple clients per day and, thus, have multiple daily opportunities to have an impact on others. Lastly, focus of impact characterizes whether the job aims towards creating value or preventing loss. Research suggests that jobs which focus on preventing a loss (e.g., lawyers preventing clients from a lost trial) are most rewarding (Baumeister et al., 2001). If a job scores high on all four of these dimensions, employees are theorized to perceive their actions at work as impactful for the lives of others.

Contact with beneficiaries is defined as "the degree to which a job is relationally structured to provide opportunities for employees to interact and communicate with people affected by their work" (Grant, 2007, p. 398). This can range from brief contact via mail to intense, personal interactions on a daily basis (Gutek et al., 1999). Grant (2007) mentions five dimensions of contact with beneficiaries: Frequency of contact, duration of contact, physical proximity of contact, depth of contact (mutual expression of cognitions, emotions, and identities), and breadth of contact. First, frequency of contact describes how often one interacts with beneficiaries. Hereby, the job of a cashier may score high due to their fast-paced customer contact. Second, the duration of contact describes the extent of time an interaction lasts. While this may score high for a massage therapist or physiotherapist, the before-mentioned job of a cashier likely scores low on this dimension. Physical proximity is the third dimension and describes the degree of interpersonal space within interactions. Remote working development teams, for instance, will score low while psychotherapists who see their clients in person likely score high. In the fourth dimension, depth of contact, psychologists would score high since they typically develop a deep connection with their clients. Lastly, breadth of contact describes the range of beneficiaries one has contact with. For example, a school janitor will interact with students, teachers, parents, and other staff and, thus, likely scores high.

Finally, Grant (2007) mentions social information as a complementary factor affecting employee behavior. This concept includes a variety of aspects which have been shown to impact employee reactions including social, organizational, and occupational context factors (e.g., Salancik & Pfeffer, 1978; Taber & Taylor, 1990; Tetlock, 1985; Thomas & Griffin, 1983). Specifically, he argues that social information is acquired by employees via established norms, ideologies, and principles surrounding their work environment (e.g., Thompson & Bunderson, 2003) but also via observation and interaction with the respective beneficiaries themselves (Grant, 2007). This accumulated information shapes the way employees perceive and evaluate the behaviors, beliefs, and emotions of beneficiaries (Grant, 2007). As such, the accumulation and processing of social information about beneficiaries resemble the development of emergent states, such as trust or relational climates, on the team level (Kozlowski & Klein, 2000), which are closely intertwined with individuals' interpretation of observations and interactions (Mathieu et al., 2017, 2019).

These three factors are theorized to interrelate in their effect on prosocial motivation via the perception of affective commitment (i.e., contact with beneficiaries and social information) and the perception of impact on beneficiaries (i.e., job impact on beneficiaries and contact with beneficiaries), which, in turn, affects behavioral outcomes, such as helping and applied effort (Grant, 2007). Overall, Grant's (2007) relational job design theory provides a comprehensive conceptualization of how both the job itself, as well as the social context of employees, contributes to the engagement in functional behaviors and, subsequently, the effectiveness of teams.

1.3.2 Interpersonal Trust Development

Trust is conceptualized as a psychological state or attitude which can reside on multiple different levels, such as the individual level (e.g., Colquitt et al., 2007; McAllister, 1995), the team level (e.g., Meyerson et al., 1996; Simons & Peterson, 2000), and the organizational level

(e.g., Miles & Snow, 1992). Although research has come up with a variety of definitions, they commonly agree on two core components of trust. According to them, trust constitutes the (1) willingness to be vulnerable towards others based upon (2) positive expectations about the other party's behavior (Mayer et al., 1995; Rousseau et al., 1998; Schoorman et al., 2007). On the team level, trust is considered a perception that is collectively shared by all team members (Costa & Anderson, 2011). Early theoretical work by Mayer, Davis, and Schoorman (1995) on trust emphasizes that trust is based to a large extent on – and, thus, also distinct from – the trustor's perception of the trusted party's trustworthiness, which consists of three characteristics (i.e., ability, benevolence, integrity). Flores & Solomon (1998) highlight this distinction by noting that "[i]n the ideal case, one trusts someone because she is trustworthy, and one's trustworthiness inspires trust" (p. 209). The first trustworthiness factor, ability, refers to the trustee's perceived capability to have an influence and accomplish a specific task important to the trustor (Mayer et al., 1995). Second, benevolence describes the extent to which goodwill and positive intentions towards the trustor are prescribed to the trustee. Third, integrity outlines the perception that the trustee adheres to a fixed set of principles which the trustor deems acceptable. This three-factor conceptualization is commonly accepted in the literature and has been largely supported by empirical work (e.g., Aubert & Kelsey, 2003; Colquitt et al., 2007; Jarvenpaa et al., 1998; Mayer & Gavin, 2005; Serva et al., 2005; van der Werff & Buckley, 2017). In addition, Mayer et al. (1995) highlight the distinction between trust as an intention or psychological state and trust as an actual behavior. Whereas the former describes trust as a mere willingness to make oneself vulnerable, the latter refers to the manifestation of this intention in behavior and, thus, reflects risk-taking behaviors (Mayer et al., 1995).

Researchers generally agree that trust changes and is dynamic by nature (Korsgaard, 2018; Korsgaard et al., 2018; Lewicki & Bunker, 1996; Mayer et al., 1995). On the team level, trust is considered an emergent phenomenon whose development is considered a time-consuming process (Kozlowski & Klein, 2000). Multilevel theory suggests that emergent phenomena

such as team trust originate from individual perceptions of team members and manifest as a shared collective team perception as team members observe and interact with each other over multiple iterations (K. J. Klein et al., 2000).

In line with the dynamic nature of trust, scholars have come up with a variety of different models throughout the last 25 years which address this notion. As a whole, this literature provides theoretical insights into the formation, dissolution, and repair of trust (Fulmer & Gelfand, 2013). Stage models of trust theorize that the nature of trust changes over time through three phases as trustor and trustee increasingly get to know each other (Lewicki & Bunker, 1995, 1996; Shapiro et al., 1992). In the first stage, calculus-based trust (Lewicki & Bunker, 1995) or deterrence-based trust (Shapiro et al., 1992) is established. In this early stage, trust is mainly based on the reputational loss that comes along with a violation of trust which generally outweighs the potential benefits of exploiting the trustor. As such, individuals are mainly motivated to comply and act trustworthy out of fear of the consequences if they do not as well as the potential rewards of preserving it (Lewicki & Bunker, 1995). In the second stage, knowledge-based trust, trust is based on the knowledge about the trusted party accumulated through multiple observations and interactions (Lewicki & Bunker, 1995). More specifically, individuals are theorized to make sense of reoccurring observations about the trusted party by attributing them as their stable characteristics. For instance, when finding a person to consistently engage in benevolent behavior throughout multiple occasions, the trusting party is likely to attach the characteristic of benevolence to that individual. In turn, the knowledge about this person's benevolence is likely to induce higher levels of trust. Thus, moving from calculus-based trust to knowledge-based trust involves a shift of focus from situational consequences of trust violation or restoration to individual characteristics of the trusted party. In the last stage, identification-based trust, individuals are theorized to fully internalize the trusted party's needs and desires such that they identify with each other and act for one another (Lewicki & Bunker, 1995). As

such, individuals in an identification-based trust relationship are fully aware of the other's preferences and treat them as if they were their own. Consequently, progressing from knowledge-based trust to identification-based trust corresponds to a shift from basing one's decision to trust on the other's characteristics to incorporating the other's needs, preferences, and thoughts into one's own choices and behaviors.

Theory suggests that the process of moving through these different forms of trust is a time-consuming process which occurs as trustor and trustee increasingly interact and observe each other. It is, however, important to note that knowledge-based trust or identification-based trust will not develop in all relationships. Instead, some relationships may never advance past a calculus-based trust stage – either because a more complex relationship is unnecessary or unwanted (e.g., between distant colleagues) or because a trust violation has occurred in the past (Lewicki et al., 2006).

In a similar vein, McAllister (1995) posits that trust has two distinct bases, which he refers to as cognition-based trust (i.e., based on perceptions of reliability and dependability) and affect-based trust (i.e., based on mutual care and concern). In his study on interpersonal trust in organizations, he finds that cognition-based trust develops before affect-based trust (McAllister, 1995). As such, his findings partially resemble stage models of trust. Specifically, cognition-based trust is often compared to knowledge-based trust due to their mutual basis on information acquired about the trusted party. In turn, affect-based trust corresponds with identification-based trust since both involve a deep concern about the respective other (Korsgaard et al., 2018).

More recent models on the dynamic development of trust highlight trust spirals based on reciprocated trust (Korsgaard, 2018; Korsgaard et al., 2018; Serva et al., 2005). Basing on social exchange theory (Blau, 1964), this theory describes trust not as a state or trait of a relationship but rather as a dynamic process between two parties (Serva et al., 2005). This dynamic

process constitutes of repeated cycles of trust, which foster cooperative exchanges, which, in turn, foster the development of trust over the course of multiple interactions. This implies that the development of a trusting relationship is a self-reinforcing cycle which is fueled by escalating exchanges and cooperation (Korsgaard et al., 2018). This conceptualization is in line with earlier theoretical work by Mayer et al. (1995), which notes a feedback loop between the outcomes of trust and adaptations in the perception of the trusted party's trustworthiness.

Overall, theoretical models of interpersonal trust highlight the necessity of a dynamic perspective in order to both understand the level of trust but also to understand the factors contributing to the successful development of a trusting relationship.

1.3.3 Relational Model Theory and Relational Climates

Relational models theory proposes that all social interactions are organized and can effectively be categorized into (combinations of) just four elementary relational schemata governing our social life (Fiske, 1991, 1992). While this theory has its origins in field research by Fiske on social relationships in a West African tribal culture, it has ever since reached great interest in a variety of different disciplines including sociology, anthropology, psychology, and management (Fiske, 1992; Haslam, 2004). Specifically, in the management literature, relational models theory has proven exceptionally useful in research on teams and organizations. For instance, it has been found predictive for knowledge sharing (Boer et al., 2011; Foss et al., 2015; Szirtes, 2012), leadership (Giessner & van Quaquebeke, 2010; Keck et al., 2020; Mossholder et al., 2011; Wellman, 2017), psychological safety (Byrne et al., 2017), engagement (Batistič et al., 2016), cooperation (Bridoux & Stoelhorst, 2016), and trust (Blatt, 2009; Sheppard & Sherman, 1998) in both teams and organizations. As a consequence, relational model theory is a widely accepted taxonomy for relationships in teams and is even considered superior to other common relational taxonomies (Haslam, 2004). At the center of relational models theory lies the idea that people utilize a set of four cognitive schemata or relational models, respectively,

to plan, organize, anticipate, evaluate, and understand their own and other's behavior in a dyad or group (Fiske, 1991, 1992; Haslam, 2004). These relational models can be understood as a specific set of norms and unwritten rules according to which individuals, teams, or organizations organize their relationships around. Individuals are theorized to evaluate and judge all social interactions based on the perceived set of norms in this relationship such that behavior which contradicts the current cognitive schema is considered inappropriate and immoral (Fiske, 1991) and is likely accompanied by emotional reactions, such as the perception of guilt, anger, shame, or disgust (Rai & Fiske, 2011). Fiske (1991, 1992) identified a total of four relational models: Communal sharing, authority ranking, equality matching, and market pricing. In the following section, these will be briefly explained.

The first relational model, communal sharing, describes an equivalence relationship marked by respect and mutual concern for each other as well as strong collective identification with one another (Fiske, 1992; Haslam, 2004). Members of a communal sharing relationship typically treat each other as equals and share their resources and information with other members without taking note of individual contributions (Fiske, 1991, 1992). In so doing, they tend to disregard individual differences and rather focus on the commonalities which make them a collective. In this relationship, people are mostly motivated to support each other by the experience of empathy toward other members' needs, desires, and expectations (Blatt, 2009; Fiske, 1992). This relationship model is typically prevalent in families as well as kinship or clan-like structures, where members tend to be close to each other and share a common goal, circumstance, or origin (Fiske, 1992; Mossholder et al., 2011).

The second relational model, authority ranking, bases on the assumption of status and rank differences between individuals (Fiske, 1991, 1992). Individuals in this relationship model are clearly and transparently ranked on a single line such that each individual is aware of who

is superior and who is inferior to them at all times (Fiske, 1991, 1992). Higher-ranking individuals in this system receive significant privileges in the group, such as control over resources and decision-making power (Haslam, 2004). Typically, they also do less unpleasant work and, instead, delegate laborious tasks to their subordinates (Fiske, 1992). In turn, lower-ranking individuals are entitled to protection by their superiors (Fiske, 1992). It is important to note that an authority ranking model does not imply a suppressing system. Rather, these asymmetric relationships are perceived as legitimate by inferior individuals based on superior experience or traits of higher-ranking individuals (Fiske, 1991, 1992). Consequently, inferior individuals typically perceive the hierarchical system as fair and would readily defend their superiors if necessary (Tyler, 2006). This relationship model is most commonly found between generations in families as well as in organizational contexts.

Equality matching is the third relational model and is characterized by a loose form of reciprocity (Fiske, 1991, 1992; Sheppard & Sherman, 1998). Individuals under this relationships model interact with each other based on a "tit-for-tat" principle where resources and information are provided based on the expectation that the favor is reciprocated (Fiske, 1991, 1992). As such, the primary concern of individuals under an equality matching model revolves around retaining balance in the relationship (Fiske, 1991, 1992). To assure this equality, individuals tend to monitor each other's contribution and adjust their effort towards the group respectively (Fiske, 1992). Consequently, it is common under this relational model to take turns for group tasks, establish democratic voting systems, or rotate specific tasks to assure equality (Fiske, 1991, 1992). Loose friends, neighbors, and colleagues often find themselves in an equality matching relationship.

The last relational model, market pricing, is considered the newest relationship type and evolved based on the necessity to organize our modern societal life (Haslam, 2004). It centers

around the usage of agreed-on rates, prices, and ratios to quantify the value of exchanged resources and information and get reimbursed directly within the exchange (Fiske, 1991, 1992). Thus, whereas equality matching involves a match of qualitatively similar favors, exchanges in market pricing models require an elaborate determination of the (market) value of the transferred good or information as well as respective payment (Fiske, 1991, 1992). Consequently, individuals under this relational model are mainly motivated to engage in exchanges through external means – that is, if they perceive the trade as beneficial for themselves (Fiske, 1992; Mossholder et al., 2011; Murnighan, 1994). Therefore, Blau (1964) referred to this type of relationship as *strictly economic exchange* and even coined it as an expression of asocial and selfish individualism. In practice, this relationship model occurs mostly between business partners or in purchasing processes in general.

It is important to note that these relational models rarely occur in their pure form between multiple individuals. Instead, they are theorized to apply situationally, in combinations, and to weaker or stronger degrees. For instance, a work team may decide to vote for a leader (i.e., authority ranking) based on a democratic voting system (i.e., equality matching). Similarly, a group of friends may decide to share food during lunch (i.e., communal sharing) while splitting the bill evenly in the end (i.e., equality matching). Therefore, the four relational models are considered the "building blocks from which very rich and complex relationships are formed" (Sheppard & Tuchinsky, 1996, p. 365), thus, highlighting that relationships involve the application of multiple situational relational models. In terms of its overall structure, scholarly work has validated the four model structure and suggest it to be sufficient to account for all types of relationships (Fiske, 1992; Haslam, 2004; Haslam & Fiske, 1999; Vodosek, 2000). However, it can not be excluded that future research identifies relational characteristics which are unexplained by relational models theory.

In their seminal paper, Mossholder et al. (2011) theorized that relational models can manifest in organizations as organizational climates by integrating relational models theory (Fiske, 1992) and climate theory (Kuenzi & Schminke, 2009). According to Mossholder et al. (2011), these relational climates can be described as "shared employee perceptions and appraisals of policies, practices, and behaviors affecting interpersonal relationships in a given context" (p. 36). Being emergent phenomena themselves (Kozlowski & Klein, 2000), relational climates are considered to originate in a bottom-up manner from employee perceptions about their relationship with other organizational members, which slowly emerge as a shared perception of the team via sensemaking processes over time (Kozlowski & Klein, 2000; Mossholder et al., 2011). As employees continuously interact under specific relational climates, they collectively interpret each other's behavior and norms, which shapes expectations for their interpersonal relationships (Mossholder et al., 2011). Notably, this process is typically not actively managed but rather evolves based on individual interactions interrelating with additional contextual factors in the organization, such as HR configurations (Batistič et al., 2016; Mossholder et al., 2011). As a whole, relational climates constitute an important organizational context which affects norms, behaviors, and attitudes within an organization (Batistič et al., 2016).

1.4 Methodological Approach

1.4.1 Research Setting

Examining the dynamic development and consequences of team relationships requires collecting objective, quantitative, and longitudinal data with multiple data points for each team. In addition, as the establishment of emergent states, such as team relational climates and team trust, is a time-consuming process (Kozlowski & Klein, 2000), the setting must also provide a sufficient long-term perspective for teams with adequate life span and psychological involvement of its members. Collecting such data can bear considerable difficulties. While laboratory

studies may allow for the required large-scale quantitative data collections, they typically involve relatively short-lived simulations with little psychological investment in the team (Hambley et al., 2007; Staples & Zhao, 2006). Similarly, field studies may provide unobtrusive and objective data, but are relatively small in scale and/or scope (Kankanhalli et al., 2006).

Therefore, I chose a virtual simulation game as an alternative research setting for investigating the dynamics of team relationships in this dissertation. Researchers suggested this innovative type of research setting to be a promising new direction for social sciences (Bainbridge, 2007; Castronova & Falk, 2009) and particularly for research on team dynamics (G. Chen et al., 2009; Dimotakis et al., 2012). Virtual simulations allow for collecting large-scale and unobtrusive data on participants' behavior over long periods of time. Also, virtual games have been proposed to be highly engaging and psychologically meaningful to participants. and, thus, may be a more suitable setting than, for instance, laboratory settings for studying longitudinal relationships (Yee, 2006).

For this thesis, I utilized behavioral data from an online game called *Travian* (www.travian.com), which is a complex, psychologically demanding, and interdependent Massively Multiplayer Online Game (MMO) running for 24 hours a day for roughly 12 months per game round. Participants in this game build up and manage their own landmark and compete to be the first to finish a final monument on this landmark. To do so, participants need vast amounts of resources which can be either produced or raided from other players. Both raiding from others and protecting one's own resources require building up a military force. Thus, a key element of this game is acquiring and managing resources as well as investing them intelligently into infrastructure, production, protection, raiding, and, eventually, building up the final monument. Notably, the final monument can typically not be built by one single player as they can neither provide the necessary amounts of resources nor defend it properly from competitors. Therefore, teams or *alliances* (as they are called in-game) of up to 60 players can band together in this

game. These teams bundle and coordinate their resources and work towards their shared goal of building the final monument in one of their members' bases before the competing teams are able to. As such, teams in these virtual simulations correspond to current definitions of teams in the literature (e.g., Cohen & Bailey, 1997).

1.4.2 Data Collection

All three essays in this dissertation make use of a raw dataset from the *Travian* environment, which has been collected as part of a larger research project on leadership and teams (e.g., Assmann et al., 2010; Drescher et al., 2011, 2014; J. Gallenkamp et al., 2012; Korsgaard et al., 2010) in cooperation with the game provider *Travian Games GmbH*. This raw data consisted of daily backups from game servers all around the world comprising information on all interactions and behaviors within the game (e.g., resource transactions and investments, raids on other participants, team membership changes). For this dissertation, I derived an international sample from servers in 22 different countries including Australia, Brazil, Chile, Denmark, Finland, France, Germany, Hungary, Indonesia, Iran, Israel, Italy, Japan, Netherlands, Poland, Portugal, Russia, Serbia, Spain, Turkey, the United Arab Emirates, and the United States of America. The number of participants per server ranged from 27,837 to 189,454 with an average of 86,454.27. Of these participants, an average 3,460.85 players were active per server and day. Each server lasted for roughly one year with an average of 376 days per server and game round, thus, indicating an adequate long-term perspective for each team. Table 1.1 gives a short summary of each server utilized within this dissertation.

Table 1.1: Overview of Utilized Travian Servers in the Empirical Essays

No.	Country	Number of players	Number of teams	Duration (in days)	Average number of active players (per day)
1	Australia	29,484	1,354	336	1,513.40
2	Brazil	133,647	5,940	433	5,030.74

3	Chile	107,921	4,282	358	5,726.75
4	Denmark	28,955	1,391	343	1,644.68
5	Finland	34,637	2,894	364	2,469.92
6	France	121,305	8,208	383	10,347.60
7	Germany	82,569	5,463	357	8,276.34
8	Hungary	66,745	2,848	371	5,384.82
9	Indonesia	62,454	2,114	372	6,176.36
10	Iran	113,253	11,124	378	10,253.03
11	Israel	51,489	3,213	378	2,133.02
12	Italy	114,727	6,613	433	8,194.50
13	Japan	41,319	3,779	348	5,328.67
14	Netherlands	38,284	2,991	372	3,192.85
15	Poland	86,340	7,379	348	6,429.05
16	Portugal	64,371	4,056	382	5,766.75
17	Russia	151,613	9,779	357	14,986.84
18	Serbia	27,837	2,787	356	388.90
19	Spain	69,210	4,708	355	6,433.69
20	Turkey	189,454	9,665	424	8,403.91
21	United Arab Emirates	146,651	12,441	445	10,076.64
22	United States of America	139,729	2,541	368	412.61

Next, all daily backups were integrated and aggregated for each team, hence, resulting in a longitudinal team level dataset that is suitable for investigating the dynamics of team relationships in an unobtrusive and objective manner. Overall, this generated a total of 6,013,173

observations on various interactions (level 1) from 98,896 teams (level 2) in 22 countries (level 3), which were further processed and selected for each essay.

In addition to the behavioral data, essay II also makes use of survey data to examine, among others, perceptions of relational climates in teams. To do so, participants from six of the 22 servers were invited to participate in an online survey via an in-game message roughly at the 75% duration mark of each server round and merged with the respective teams' behavioral data from the *Travian* environment.

1.4.3 Analytic Approach

Investigating longitudinal data bears a variety of analytic challenges and complexities, which traditional analytical methodologies are unable to address (Aguinis et al., 2013; Bliese & Ployhart, 2002). Observing the same entity (e.g., individual, team, country) multiple times likely results in some degree of relatedness between the different measurement occasions. A team will, for example, likely have similar perceptions of their team trust today when compared to tomorrow. Moreover, it is also common that measurement occasions closer to each other likely correlate stronger than those more distant. That is, a team's perception of team trust today is likely to be more similar to tomorrow's response as compared to next week's response. Finally, differences between the entities may systematically get either smaller or larger over time. Teams may, for instance, start all at a relatively low level of team trust but as they get to know each other and learn about each other's (distinct) trustworthiness may develop very distinct levels of trust in each other. These correlations violate the statistical assumption of non-independence between data points of traditional analytical procedures such as ordinary least square regression and can cause serious biases in interpretation of the data (Kenny & Judd, 1986).

Therefore, longitudinal research requires a different methodology which takes into account its unique data characteristics. To address this, I rely on growth modeling techniques throughout this dissertation (Aguinis et al., 2013; Bliese & Ployhart, 2002). While originating

from developmental psychology (hence, *growth* modeling), this type of analysis has received increasing interest in organizational literature due to its substantive advantages when facing nested data (Aguinis et al., 2013). Specifically, I apply multilevel analyses (i.e., random coefficient models, random effects, mixed-effect models, see Bates & Pinheiro, 2000; Bryk & Raudenbush, 1992) in a basic regression framework following the procedure suggested by Bliese and Ployhart (2002) to investigate the essays' research questions.

1.5 Main Results and Contributions to the Literature

Essay I. Essay I investigates the development of trusting behavior throughout a team's lifecycle as well as the dynamic impact of team trustworthy behavior (i.e., competent behavior, integrity behavior, benevolent behavior) on team trusting behavior over time. The findings show that team trusting behavior develops curvilinearly in the sample – that is, it rises initially as the team gets to know each other and slightly drops near the end of the observation period. In addition, essay I finds that the impact of both team competent behavior and team benevolent behavior on team trusting behavior increases over time whereas team integrity behavior indicates a stable and high effect on team trusting behavior.

Thereby, essay I contributes to current literature on trust development in teams as well as the team development literature. First, it responds to calls from current research to examine the importance and dynamics of trust cues in a team context as well as their relative importance (Dietz, 2011; Li, 2012b; Schoorman et al., 2007). Second, this essay contributes to a more fine-grained understanding of current theories on the dynamics of trust development by collecting and investigating longitudinal data, which allows testing for more complex curvilinear relationships of trust cues with trust over time. Third, it adds to the trust literature by measuring the impact of trustworthy behavior on actual trusting behavior instead of trust as a psychological state (Mayer et al., 1995), thus, contrasting existing longitudinal research on the relationship of

trustworthiness cues with trust (Aubert & Kelsey, 2003; Jarvenpaa et al., 1998; Serva et al., 2005; van der Werff & Buckley, 2017).

Essay II. Essay II sets out to explore the functionality of relational climates (Mossholder et al., 2011) in the context of interdependent teams. In so doing, a model based on relational models theory (Fiske, 1992), climate theory (Kuenzi & Schminke, 2009), and the dynamic team model by Mathieu et al. (2017) is developed to suggest a varying impact of team level relational climates on team performance growth. The results suggest that an authority ranking climate as well as a communal sharing climate have a positive impact on team performance growth. In turn, a market pricing climate is found to have a negative effect on team performance growth, while equality matching is found to not significantly affect team performance.

Hence, essay II contributes to relational models literature, climate literature, and team interdependency literature in three important ways. First, it advances understanding of team emergent states by examining the impact of relational climates on team effectiveness. Whereas past literature on relational models primarily focused on explaining behavioral outcomes, such as proactive behavior (Batistič et al., 2016), prosocial behavior (Stofberg et al., 2019), and knowledge sharing (Boer et al., 2011), our knowledge of their actual functionality is still very scant. In so doing, it also responds to current calls by Kuenzi and Schminke (2009) for investigating multiple distinct climates in work group settings simultaneously. Second, essay II contributes to team interdependency literature by investigating the impact of team relationships as a contextual factor for team effectiveness. Third, examining the impact of team climates on effectiveness over time, adds to a deeper understanding of current theoretical models highlighting the interrelatedness and dynamic interplay of team-related factors over time (Mathieu et al., 2017, 2019).

Essay III. Essay III examines the development of turnover as well as its relationship with team trusting behavior in various cultures. Drawing on social exchange theory, a three

level multilevel model is established using data from 1,766 teams in 22 countries over 28 weeks. The findings suggest a curvilinear negative development of turnover over time, which significantly varies across cultures in size and direction. In addition, the data indicates a significant negative trusting behavior–turnover relationship, which differs in size across cultures.

In doing so, essay III contributes to the literature in three important ways: First, it contributes to the turnover literature. Research in this area has highlighted the importance of dynamics in the understanding of employee turnover. Still, so far there are only a few longitudinal studies covering turnover. Essay III advances this literature by analyzing turnover behavior over a period of 28 weeks. Further, it adds to this literature by collecting and analyzing data on actual turnover behavior instead of using turnover intention as a proxy for turnover, which is the case for only a minority of studies in the turnover literature (Bolt et al., 2022). Second, this paper advances knowledge of the relevance of culture on turnover. Scholarly work in this literature stream emphasizes that team processes and dynamics differ across cultures (Abelson, 1981; Cropanzano & Mitchell, 2005) but still lacks a comprehensive overview of the dynamics involved in turnover development across cultures. This paper adds to this by examining and comparing the development of turnover in 22 countries over a period of 28 weeks. Lastly, this paper extends current knowledge of the trust-turnover relationship. Research generally agrees on the negative relationship of trust with turnover (Dirks & Ferrin, 2002); however, research on the cultural differences in this relationship is sparse (Majeed & Jamshed, 2021). This essay adds to this literature by analyzing and comparing country-specific effect sizes for the trusting behavior–turnover relationship and comparing them across cultures.

Overall contributions. Throughout all essays, three different aspects of relationships in teams are considered as well as their antecedents and consequences, respectively: First, essay I examines the development of team trust within teams and their antecedents. Second, essay II investigates relational climates among team members and their impact on team effectiveness.

Lastly, essay III analyzes the development of turnover in teams as well as its relationship with team trusting behavior. In summary, the dissertation advances our understanding of team interpersonal processes in two meaningful ways.

First, by investigating the development of relationships in long-term teams over a longer period of time with multiple data points per team (i.e., essay I: 27 weeks, weekly measures; essay II: 8 weeks, weekly measures; essay III: 27 weeks, weekly measures), it adds to a more nuanced and time-sensitive understanding of dynamics occurring throughout the process of team development. According to current literature, teams themselves are dynamic entities that are subject to various changes throughout their life cycle (Cronin et al., 2011; Mathieu et al., 2014). However, although research indicates the dynamic nature of teams, a large portion of scholarly work on teams still relies on cross-sectional or not truly longitudinal research designs (Kozlowski et al., 2013). The essays of this dissertation contribute to this by distinguishing between short-term and long-term influences and consequences of team relationships, respectively, and, thus, accentuate the importance of a dynamic perspective on teams.

Second, from a practical perspective, this dissertation suggests that organizations should consider and actively manage relationships among their teams. Organizations are increasingly relying on project teams as well as interactive work designs (de Carvalho et al., 2015). This may facilitate tackling complex and cross-functional problem-solving but also requires a deeper level of cooperation and understanding between team members (e.g., Van de Ven & Ferry, 1980). The findings of this dissertation add to this by providing concrete evidence on both the consequences and development factors of team relationships, thus, providing organizations relevant insights on how to manage their teams more effectively.

1.6 Thesis Structure and Summary of the Three Empirical Essays

Following this introduction, Chapter 2 to 4 present the three essays which address the research questions stated above. Chapter 2 focuses on the development of team trust and its

relationship with team trustworthy behavior. Chapter 3 examines the influence of team relational climates on overall team effectiveness. Chapter 4 investigates turnover development and its relationship with team trust. Finally, chapter 5 provides an overall discussion of the main results of the essays and limitations and presents an agenda for future research. Table 1.2 summarizes the three empirical essays.

Table 1.2: Summary of the Essays

	When Thoughts Turn into Action: The Dynamic Relationship of Trustworthy Behavior with Trusting Behavior (Chapter 2)	Exploring the Functionality of Fundamental Interpersonal Climates: How Relational Climates Shape Team Performance Over Time (Chapter 3)	Exploring the Impact of Team Trusting Behavior on Team Turnover: A Cross-Cultural Comparative Analysis (Chapter 4)
Research Goals	1) Investigate the development of team trusting behavior over time. 2) Test the relationship dynamics between trustworthy behavior (i.e., competent behavior, integrity behavior, benevolent behavior) with team trusting behavior over time.	1) Investigate whether relational models manifest on the team level as relational climates. 2) Investigate the dynamic relationships between relational climates (i.e., communal sharing, authority ranking, equality matching, market pricing) and team effectiveness.	1) Investigate the development of turnover over time and across cultures. 2) Investigate the relationship between team trusting behavior with turnover across cultures.
Theoretical Background	Interpersonal trust; attribution theory	Relational models theory, climate theory	Social exchange theory
Research Design	Archival data from an online simulation	Archival data from an online simulation & field survey study	Archival data from an online simulation
Analytical Approach	Multilevel regression analyses	Multilevel regression analyses	Multilevel regression analyses
Main Findings	• Team trust develops in a curvilinear manner such that it first increases and then decreases as teams come close to the end of their life cycle. • Team trustworthy behavior positively affects team trusting behavior with team competent and benevolent behavior increasing in effect size over time.	• Relational climates vary in their functionality for the context of interdependent climates. • Authority ranking and communal sharing climates positively affect team performance growth, whereas market pricing negatively affects team performance growth.	• Turnover develops in a curvilinear manner such that it first decreases and then stagnates to the end of their life cycle. This development differs both in size and direction across cultures. • Team trusting behavior negatively affects turnover. This relationship differs in magnitude across cultures.
Contributions to Literature	Trust literature; team development literature	Relational models literature; team development literature; climate literature	Turnover literature; trust literature

2 Essay I: When Thoughts Turn into Action: The Dynamic Relationship of Trustworthy Behavior with Trusting Behavior

Abstract

In this study, we examine the dynamic relationship of trustworthiness cues with trusting behavior in teams. We posit that teams have to learn to interpret behavioral cues as stable dispositions and weigh this information differently for their decision to trust as teams develop. Utilizing longitudinal data on 785 teams from an online simulation over 27 weeks, we demonstrate that trustworthy behavior has a nonlinear relationship with trusting behavior over time. Our findings contribute to literature on trust development and advance understanding of its predictors.

Note: This chapter is based on a conference submission co-authored by Marcus A. Drescher and M. Audrey Korsgaard. Therefore, the plural instead of the singular is used throughout this chapter. Author contributions to this paper are summarized in Appendix D.

Conference presentation (see also Appendix A):

Uhlemann, K. F, Drescher, M. A., & Korsgaard, M. A. (2020). When Thoughts Turn Into Action: The Dynamic Relationship of Trustworthy Behavior with Trusting Behavior. *Academy of Management Annual Meeting Proceedings*, 2020.

2.1 Introduction

Trust is a vital component for any work relationship and is one of the most frequently studied concepts in organizational research (De Jong et al., 2017). Specifically on the team level, various meta-analyses have confirmed the relationship of trust with positive work outcomes, such as performance or citizenship behavior (Colquitt et al., 2007; De Jong et al., 2016; De Jong & Elfring, 2010). Early theoretical work by Mayer, Davis, and Schoorman (1995) on trust emphasizes that trust (i.e., the willingness to accept vulnerability based on positive expectations; Mayer et al., 1995; Rousseau et al., 1998) and, subsequently, trusting behavior (i.e., actions reflecting trusting intentions; Breuer et al., 2019; Mayer et al., 1995) develops based on the other party's trustworthy behavior via the formation of trustworthiness perceptions – that is, their perceived ability, benevolence, and integrity. This three-factor conceptualization of trustworthiness is largely accepted in the literature and its relevance for the development of trust has been validated meta-analytically (Colquitt et al., 2007) and both in an interpersonal and team context (Jarvenpaa et al., 1998; Mayer & Gavin, 2005; Serva et al., 2005). As an emergent phenomenon, team trust evolves from interactions among individual team members and takes time to manifest on the team level (Kozlowski & Klein, 2000). Teams themselves are found to be dynamic and subject to various changes over their lifespan as well, which gives relationship length and time a pivotal role in the process of trust development in teams (Cronin et al., 2011; Mathieu et al., 2014). Consistent with this view, the relationship between relationship length and trust has been found positive but small in recent meta-analyses (Dirks & Ferrin, 2002; Vanneste et al., 2013). Theories of trust development typically assume that the determinants of trusting behavior change over time as the relationship matures (Lewicki & Bunker, 1995, 1996; Rousseau et al., 1998). For instance, Lewicki and Bunker (1995) argue that the trustee's trustworthiness only serves as a determinant of trust once the trustor has accumulated sufficient knowledge about the trustee via past interactions or observations. Similarly, Mayer et al. (1995) argue that the relative importance of the three trustworthiness factors depends on

whether the trustor had the opportunity to gain insights about the trustee's respective characteristics. This is, on the one hand, consistent with empirical work by Levin and Cross (2004) and Drescher et al. (2011) who find that benevolence is particularly relevant in established teams with strong ties and ability in teams which are neither too young nor too old, respectively. On the other hand, this view has been challenged by previous empirical work in a face-to-face setting, which finds people to form and rely on trustworthiness perceptions very early in the relationship (Holtz, 2015; van der Werff & Buckley, 2017). Thus, empirical research has not conclusively answered the question of which trustworthiness cues are more relevant in earlier or later stages of the relationship – strengthening the need for further scholarly work on the determinants of trust over time. In addition, the great majority of research still reflects a cross-sectional or not truly longitudinal approach when investigating dynamic theories on the development of trust in teams (Costa et al., 2018). We, therefore, know little about how the development of trust evolves and varies within teams over time. This is surprising as Mayer et al. (1995) stated already in the 90s the importance of a dynamic perspective for the relevance of the trustworthiness cues in their model. This lack of understanding is also reflected in the inconsistent results of the few exceptions which investigated trustworthiness perceptions and their relevance for team trusting in a longitudinal design (Aubert & Kelsey, 2003; Jarvenpaa et al., 1998; Serva et al., 2005; van der Werff & Buckley, 2017). Recently, van der Werff and Buckley (2017) investigated the importance of both presumptive trust cues (i.e., role-based trust, rule-based trust, identification) and personal trust cues (i.e., ability, benevolence, integrity) on two dimensions of team trust in a sample of new employees during socialization. In their survey-based longitudinal study, they find a stable and significant relationship of both benevolence and ability with team trust across all four measurement points but find integrity to significantly correlate at only one point in time. These results point to a fluctuating relevance of trustworthiness cues across time but diverge from previous longitudinal findings. The reasons why the process of

trust development in teams requires further clarification are twofold. First, modern organizations tend to become flatter and more team-centered, hence, making team level research increasingly relevant for applications in daily business (Devine et al., 1999; Fulmer & Gelfand, 2012). Second, teams tend to become more and more cross-functional with members typically involved in various teams and collaborating only for a very limited time (Webber, 2002). The subsequent necessity for rapid formation and dissolution of teams emphasizes the importance of understanding what shapes trust in earlier and later stages of the team lifecycle.

To address this research need, we focus on the development of trusting behavior in teams over time and aim to provide a clearer picture of the relationship of trust with trustworthiness cues identified by Mayer et al. (1995). We do so by utilizing behavioral data from the online simulation game *Travian*. This team-based massively multiplayer online game offers the unique opportunity to investigate the trusting behavior of participants in virtual teams in a longitudinal design. Specifically, we develop a model with the three trustworthiness cues (i.e., competent behavior, benevolent behavior, integrity behavior) influencing trusting behavior on the team level over time and test it in the *Travian* setting. Thereby, we contribute to the following research streams within trust research: First, we add to current literature on the development of trust in teams. Theoretical work in this field has advocated that trust takes different forms that develop and emerge over time (Kramer & Lewicki, 2010; Lewicki & Bunker, 1995, 1996). Regarding the development of team trust, the literature is also consistent in the view that trust requires time to develop from an individual level and manifest on the team level (Costa et al., 2018). However, most research still reflects a cross-sectional or not truly longitudinal approach for testing theories on trust development which is not appropriate for the dynamic processes they involve (Pitariu & Ployhart, 2010). Our study, therefore, contributes to a more fine-grained understanding of the development of trust in teams by examining longitudinal data on team trusting. In addition, we contribute to this stream by measuring actual trusting behavior instead of the intention to trust. Longitudinal research on the development of trust in teams has so far

exclusively investigated trust as a psychological state (Aubert & Kelsey, 2003; Jarvenpaa et al., 1998; Serva et al., 2005; van der Werff & Buckley, 2017), which is different from a manifestation of trust in behavior (Mayer et al., 1995). Second, we contribute to literature on the antecedents of trust. Prior research has accumulated a plethora of different determinants of trust (Dirks & Ferrin, 2002) whereby trustee characteristics such as the trustworthiness cues by Mayer et al. (1995) have received particular attention (Costa et al., 2018). Recent scholarly work, however, stresses the question of the relative importance of trust cues given a specific time or context (Dietz, 2011; Li, 2012a). We add to this literature stream by investigating the role and importance of trustworthy behavior for the development of team trusting behavior. Utilizing longitudinal data also provides us with the unique opportunity to investigate more complex curvilinear relationships over time. The identification of these is an important step forward to understanding the dynamics of trust development (Lewicki et al., 2006).

2.2 Theory

2.2.1 Interpersonal Trust, Team Trust, and Team Trusting Behavior

Current definitions of interpersonal trust comprise mainly two parts: First, "the willingness to be vulnerable" – that is, the intention to accept uncertainty – and, second, "positive expectations of others" (Fulmer & Gelfand, 2012). Positive expectations describe the belief that the trustee's actions will be beneficial or at least not harmful despite the possibility of being disappointed (Gambetta, 1988; Luhmann, 1988). As such, we follow the definition by Rousseau et al. (1998) which describes trust as "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another" (p. 395). The trusting parties based on this definition are not bound to a specific organizational level. Instead, both trustor and trustee may be conceptualized at all organizational levels including relations within and between organizational levels (Fulmer & Gelfand, 2012). While research on the individual level conceptualizes trust as an individual phenomenon, trust at the team level

is considered a collectively shared perception (Costa & Anderson, 2011). Thus, for team trust, we refer to common conceptualizations of trust as a shared construct by all team members (Langfred, 2004; Simons & Peterson, 2000). In doing so, we follow the definition by De Jong and Elfring (2010), who define team trust as "generalized shared perceptions of trust that team members have in their fellow teammates" (p. 536). In their integrative model of organizational trust, Mayer et al. (1995) emphasize trusting behavior as a conceptually different but proximal behavioral outcome of trust in a specific context. Whereas trust refers to the psychological state – or the intention to trust – trusting behavior reflects the actual risk-taking in the relationship (Mayer et al., 1995). According to theoretical work by Edmondson (2002), trusting behaviors can be specified as behaviors for which outcomes are uncertain, such as sharing and seeking feedback, asking questions, admitting mistakes, or seeking help. Following Breuer, Hüffmeier, & Hertel (2019), we define team trusting behavior as "team members' actions reflecting the shared willingness of the team members to be vulnerable to the actions of other team members" (p. 9). Recent work from organizational scholars has focused on behavioral trust in mainly two dimensions (Gillespie, 2003): Disclosure of information to others and reliance on others. For our study, we specifically focus on the latter aspect of behavioral trust.

2.2.2 The Development of Team Trusting Behavior Over Time

Scholars suggest that the development of team trust and, thus, also team trusting behavior is a dynamic and continuous process (Korsgaard, 2018; Korsgaard et al., 2015; Serva et al., 2005). Multilevel theory proposes that team trust is an emergent phenomenon (De Jong & Elfring, 2010). As such, it is commonly theorized to originate in individual perceptions of trust and emerges as a shared characteristic on the team level over time (K. J. Klein et al., 2000). This shift from the individual to the team level evolves based on dynamic interactions among team members (Drescher et al., 2014; Kozlowski et al., 2013). Thus, emergence of team trust is considered a time-consuming process over time. In line with this, Möllering (2013) argues

that trust development should be conceptualized as an ongoing and continuous process. He states that the development of trust is based on both social and mental processes. The former comprises signaling, negotiating, contracting, cooperating, reciprocating, and investing between team members throughout the relationship (Adobor, 2005; Costa et al., 2018; Wright & Ehnert, 2010). The latter builds on the idea that individuals develop subjective perceptions of the trusted party's trustworthiness, which need to be processed and interpreted in order to evaluate the appropriate extent to trust (Mayer et al., 1995; Schoorman et al., 2007). Therefore, he concludes that "trust is not momentary and static but continuous and dynamic in the most fundamental sense" (Möllering, 2013, p. 290).

Theoretical and empirical work on this notion suggests that team trusting behavior increases as teams age. Trust spiral theory, which draws from social exchange theory (Blau, 1964), proposes that trust increases through repeated cycles of cooperative behavior leading to trust and trust leading to cooperative behavior over the course of the relationship (i.e., virtuous cycles; Korsgaard, 2018). Similarly, Ferrin, Bligh, and Kohles (2008) developed a model of trustworthiness-cooperation spirals. They posit that "the actor's perceptions of the partner's trustworthiness cause the actor to behave cooperatively toward the partner; the partner then observes the actor's cooperation, and consequently perceives the actor as more trustworthy" (p. 164). This causes the partner to behave more cooperatively as well, which, in turn, increases the actor's perception of the partner's trustworthiness. Consequently, according to these models, trusting behavior should increase gradually as teams continue to interact and cooperate over time.

In their integrative model, Mayer et al. (1995) describe a similar dynamic through their feedback loops but take a slightly more open perspective. They suggest that the outcome of trusting behavior towards the trusted party indirectly influences trust via perceptions of the trusted party's trustworthiness. If taking the risk of trusting turns into a favorable outcome, the

trustor is theorized to favorably adjust his perception of the trusted party's trustworthiness (Mayer et al., 1995). If, for instance, a supervisor delegates an important task (i.e., trusting behavior) to his employee and the task is fulfilled adequately, the supervisor's trust in his employee may rise due to an upward adjustment of the employee's perceived trustworthiness. In turn, this may stimulate the supervisor to delegate even more important tasks to his employee in the future (Mayer et al., 1995). Thus, in contrast to the models above, the development of trust is not limited to cooperation or exchange interactions but to general evaluations of the outcomes of trusting behavior. Notably, all of these models acknowledge the possibility of downward spirals, when trusting behavior led to a negative outcome, leading trustworthiness perceptions to be adjusted downwards (i.e., vicious cycles; Korsgaard, 2018). However, both theory and research tend to find upward trends and a general bias towards trusting. Initial trust theory posits that trust may exist even among strangers based on contextual cues, social categorization, reputation, and role expectations (Mcknight et al., 1998; Meyerson et al., 1996). This initial trust is likely to initiate virtuous trust cycles (van der Werff & Buckley, 2017). Meta-analysis results on trust games also suggest that roughly half of the participants trust strangers with money without any guarantee of return (Berg et al., 1995). The positive trend in trust development is also supported by recent empirical studies. (Ferrin et al., 2008; Halbesleben & Wheeler, 2015; Levin et al., 2006; van der Werff & Buckley, 2017). Moreover, a recent meta-analysis found a modest positive correlation between relationship length and trust, thus, suggesting that parties in older relationships trust each other more (Vanneste et al., 2013). Consequently, we assume that team trusting behavior increases over time caused by an increase in team trust.

Scholars suggest that trust in organizational settings can reach an "optimal" level and that more trust is not necessarily better. Much of the literature on the bidimensional approach on trust (i.e., trust and distrust as distinct constructs) posits that too much trust creates a "blindness" which can lead to exploitation by the trusted party (Deutsch, 1958; Elangovan & Shapiro,

1998; Kramer, 1996; Wicks et al., 1999). They note that a certain amount of "prudent paranoia" is healthy for a relationship and that conditions are best when there is a moderate amount of both distrust and trust (Kramer, 1996; Luhmann, 1979). For instance, highly trusted employees are likely to be under monitored, which may give opportunity for exploit in the shape of deviant behavior such as employee theft (Granovetter & Swedberg, 2019). Moreover, in the context of self-managed teams, too much trust coupled with high autonomy has been found inefficient due to a reluctance to peer monitor (Langfred, 2004). Based on these results, we expect that team trust and, subsequently, team trusting behavior increases curvilinearly, such that it reaches an optimal level and stagnates over time (Lewicki et al., 2006). Hypothesis 1 summarizes this.

> *Hypothesis 1. Team trusting behavior increases curvilinearly over time – that is, in early team phases it increases and stabilizes in later phases.*

2.2.3 Team Trustworthy Behavior Predicting Team Trusting Behavior

In their model, Mayer et al. (1995) theorize that an important driver for the decision to trust and, thus, to engage in trusting behavior is perceptions about the trusted party's trustworthiness. According to these authors, individuals evaluate the trusted party's trustworthiness based on three key characteristics – namely, their ability, integrity, and benevolence. Ability is defined as the set of task-related skills, capabilities, and competencies which enables one to perform a specific job or task (Mayer et al., 1995). As such, ability captures whether the trusted party is perceived to be capable of acting in an appropriate manner in the first place. Colquitt, Scott, & LePine (2007) denoted this trustworthiness factor to be the "can-do" component of trustworthiness. Benevolence describes the extent to which the trusted party is believed to want to do good for the trustor, apart from a profit motive. This component of trustworthiness is closely related to loyalty, openness, caring, and supportiveness and suggests a specific emotional attachment to the trustor (Colquitt et al., 2007; Mayer et al., 1995). Benevolence, thus, refers to perceptions of the trusted party's goodwill or positive orientation towards the trustor

(Mayer et al., 1995). Integrity is construed as the perception that the trusted party adheres to a set of principles that is considered fair and moral by the trustor (Mayer et al., 1995). One is, thus, perceived high in integrity when two conditions are met: First, the trustee has to be consistent in his or her behavior and comply with a fixed set of guidelines (i.e., personal integrity; see Mcfall, 1987). Second, this set of principles has to be deemed acceptable in terms of ethics by the trustor (i.e., moral integrity; see McFall, 1987). Consequently, integrity is related to perceptions about the trusted party's consistency, promise fulfillment, fairness, and justice (Colquitt et al., 2007; Mayer et al., 1995). Meta-analytic evidence suggests that all three trustworthiness factors (i.e., ability, benevolence, integrity) are important to the decision to trust as they relate significantly and uniquely with trust (Colquitt et al., 2007). Recent theoretical work posits that such trust-related attributions can also be carried by teams and, subsequently, affect the way individuals feel and behave towards members of this team (Cuddy et al., 2011).

Theory suggests that these trustworthiness perceptions are shaped by evaluations of the trusted party's behavior (i.e., trustworthy behavior) (Tomlinson & Mayer, 2009). Weiner's (1986) Attribution theory contends that individuals have an urge to make sense of behavior by making attributions about its cause. Based on these attributions, they are theorized to achieve a better understanding of the world and make more efficient decisions in the future. Specifically, he argues that individuals observe behavior and, subsequently, try to identify the outcome's cause (i.e., causal ascription; Weiner, 1986). According to Tomlinson and Mayer (2009), these causes comprise trust-related characteristics, such as ability, benevolence, and integrity. Having identified the behavior's cause, individuals, then, evaluate this cause based on three attribution dimensions (i.e., causal attribution; Weiner, 1986): They distinguish 1) whether the behavior was internally (e.g., by the trusted party) or externally (e.g., by the situation) generated (i.e., locus of causality), 2) whether the behavior was under the active control of the trusted party (i.e., controllability), and 3) whether this behavior can be expected to reoccur under similar circumstances (i.e., stability). In the context of trust development, the stability dimension is

considered particularly relevant (Kim et al., 2009; Tomlinson & Mayer, 2009). Only if trustworthy behavior is attributed to a stable characteristic of the trusted party, individuals are theorized to expect the same behavior in future interactions, which, in turn, fosters the development of favorable trustworthiness perceptions. Therefore, on the team level, we expect team trustworthy behavior (i.e., team competent behavior, team benevolent behavior, team integrity behavior) to positively affect team trusting behavior via trustworthiness perceptions if considered a stable characteristic of the team.

2.2.4 Differences in the Relevance of Trustworthy Behavior for Team Trusting Behavior

Theories on trust development assume that the bases of trusting behavior change over time (Lewicki & Bunker, 1995, 1996; Rousseau et al., 1998; Shapiro et al., 1992). Variables that may have been critical in early stages of a team's lifecycle for the development of trust may become less relevant over time whereas others grow in importance. In the context of trustworthiness factors, theory suggests two important dynamics, which are crucial for their relevance for trusting behavior over time: First, attributing trust-relevant behavior to a stable trustworthiness perception is considered a time-consuming process (Lewicki & Bunker, 1995, 1996; Mayer et al., 1995). Individuals have to learn and reevaluate across multiple interactions to differentiate between permanent dispositions and fluctuating behavior. The speed at which one may infer stable characteristics likely differs for ability, benevolence, and integrity. Second, trust is theorized to be increasingly based on interpersonal care and concern (i.e., affective factors) rather than calculations of benefit and utility (i.e., cognitive factors) as relationships progress (Levin & Cross, 2004; Rousseau et al., 1998). More affective variables should, thus, be more relevant in later stages of the team's lifecycle (Colquitt et al., 2012). Based on these dynamics, we will now consider each form of trustworthy behavior. According to theory, team benevolent behavior (i.e., behavior which indicates a team's benevolence) is controllable and

directed towards specific (groups of) individuals (Tomlinson & Mayer, 2009). As such, observed benevolent behavior towards others does not easily transfer to oneself, which, in turn, slows down the formation of stable perceptions of benevolence. Moreover, seemingly benevolent behavior may not necessarily be ascribed to perceptions of benevolence in the first place if other causes are plausible. The trusted party may simulate benevolence for strategic reasons to earn one's trust and the respective benefits. Thus, we expect team benevolent behavior to only slowly increase in relevance for team trusting behavior over time. In later stages of the relationship, benevolence perceptions are expected to increase in relevance. First, once benevolence perceptions have formed, they are theorized to be highly stable even to the point that evidence of the opposite is disregarded (Lewicki & Bunker, 1996; Tomlinson & Mayer, 2009). Second, theorists have highlighted a strong link between benevolence and the affective dimension of trust which should lead to a stronger relationship of benevolent behavior with trusting behavior (Colquitt et al., 2012). Consequently, we theorize a curvilinear relationship of team benevolent behavior with team trusting behavior, which increases over time. Hypothesis 2a summarizes this:

> *Hypothesis 2a. The positive relationship between team benevolent behavior and team trusting behavior increases curvilinearly over time – that is, in early team phases the relationship remains weak but strengthens in later phases.*

Team integrity behavior (i.e., behavior which indicates a team's integrity) is theorized as controllable by the trusted party as laziness and industriousness are commonly perceived as personal choices (Tomlinson & Mayer, 2009; Weiner, 1986). In contrast to benevolence, however, integrity behavior is not directed towards specific individuals such that information can be obtained faster through third-party sources and observations without the need for direct interaction (Mayer et al., 1995). Further, integrity is observable irrespective of the value of exchanges among team members which are likely to be low in the initial team formation phase

(Blau, 1972). Therefore, as compared to team benevolent behavior, we expect team integrity behavior to increase faster in relevance for team trusting behavior. Integrity perceptions are theorized to be the most stable of all trustworthiness perceptions (Tomlinson & Mayer, 2009) but may be adjusted given sufficient disconfirming or "frame-breaking" evidence (Lewicki & Bunker, 1996). Yet, integrity may remain an important predictor of trust at later stages of the team as well. Therefore, we expect team integrity behavior to increase curvilinearly in relevance for team trusting behavior up to a certain point and stagnate on that level. These expectations are summarized in hypothesis 2b.

> *Hypothesis 2b. The positive relationship between team integrity behavior and team trusting behavior increases curvilinearly over time – that is, in early team phases the relationship strengthens and flattens in later phases.*

Theory suggests that team competent behavior (i.e., behavior which indicates a team's ability) can be based on both aptitude or acquired skills and competencies (Mayer et al., 1995). As such, it can be potentially both controllable and uncontrollable (Tomlinson & Mayer, 2009). Of the trustworthiness factors, competent behavior is likely to be the easiest to detect and measure and, thus, offers the largest amount of interaction opportunities. Consequently, we expect team competent behavior to grow fastest in relevance for team trusting behavior. Ability perceptions represent the cognitive assessment of one's trustworthiness. Thus, in later stages, the relevance of team competent behavior can be assumed to decrease in favor of more affective assessments of the trusted party (C. C. Chen et al., 2011). Hypothesis 2c summarizes these findings.

> *Hypothesis 2c. The positive relationship between team competent behavior and team trusting behavior increases curvilinearly over time – that is, in early team phases the relationship strengthens and decreases in later phases.*

2.3 Methodology

2.3.1 Research Setting

In order to investigate the dynamic relationship of trustworthy behavior with trusting behavior on the team level, quantitative and longitudinal data is required with multiple observations for each of the variables over time. Collecting this data can be challenging. On the one hand, laboratory studies may allow for collecting large amounts of data but are typically rather short-lived with small groups and little psychological investment (e.g., Hambley, O'Neill, & Kline, 2007; Staples & Zhao, 2006). On the other hand, field studies are typically small in scale and/or lack quantitative or objective data to investigate. To overcome these challenges, scholars proposed collecting data from virtual worlds to be a promising new avenue for research in the social sciences (Bainbridge, 2007; Castronova & Falk, 2009). Therefore, for our study, we collected data from an online simulation game. This has been done in the past for research on social processes and group dynamics as it provides significant advantages over alternative approaches (e.g., G. Chen, Kanfer, DeShon, Mathieu, & Kozlowski, 2009; Dimotakis, Davison, & Hollenbeck, 2012; Drescher et al., 2014). Virtual simulations allow for collecting large-scale and unobtrusive data on participants' behavior over long periods of time, hence, making it a desirable alternative to reactive self-reports from research participants (Bainbridge, 2007). Also, virtual games have been proposed to be highly engaging and psychologically meaningful to participants and, thus, may be a more suitable setting than, for instance, laboratory settings for studying longitudinal relationships (Williams et al., 2006; Yee, 2006). Specifically, we utilized data from an online game called *Travian* (www.travian.com) as part of a larger research project on leadership and virtual team research (e.g., Drescher et al., 2014; Gallenkamp et al., 2012; Picot et al., 2009). Notably, this data was not collected for research but for the purpose of commercial entertainment. *Travian* is a complex, psychologically demanding, and interdependent massively multiplayer online game, which runs 24 hours a day for roughly 12 months per game round. As such, participants have plenty of time to get to know each other during the

game, thus, making it particularly suited for studying the dynamics of trust development. At the time of data collection, this game ran on servers in more than fifty countries around the world simultaneously. Participants in this game compete to be the first to acquire sufficient resources to finish a final monument (i.e., "Wonder of the World") within one participant's base. The required resources for this monument can be acquired either by investing in one's own base to increase resource production over time or by raiding and stealing from other players. Apart from acquiring resources, participants, consequently, also have to make sure that they adequately defend and secure their base from others by building defensive structures and armies. Finishing the final monument requires vast amounts of resources, which cannot be obtained by an individual player. Therefore, participants have the option of forming or joining teams (i.e., "alliances") once they passed a specific resource threshold. These teams can consist of a maximum of 60 members and allow participants to pool their resources, defend each other, and, ultimately, finish the final monument as a team. Each team has access to a private discussion forum, a chat room, an in-game messaging system, and a regularly updated news list showing team and individual performance statistics. Moreover, teams can create a profile page on which they can provide information they consider relevant for non-group members. Cohen & Bailey (1997) define groups as consisting of at least three or more people who are a "collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems" (p. 241). Teams in this game meet this conceptualization as they have to coordinate their actions, exchange resources, and depend on each other's contributions to the team in order to progress in the game.

2.3.2 Sample and Procedure

Data was collected in cooperation with *Travian Games GmbH*, the provider of the online game, in the form of log-file data. We downloaded daily backups for each country's game server

and merged them into one large database. The resulting dataset comprises information on all interactions within the game (e.g., resource transactions, troop movements, attacks, communication) for each participant and day over the whole span of each game round. For our investigation, we derived a sample from eight game servers in Chile, Hungary, Iran, Japan, Portugal, Russia, Spain, and Turkey. The number of participants over the whole game round for each server ranges from 41,319 to 189,454 – with an overall average of 100,485.75 participants for each server. Each game round lasted on average 372 days. As we are interested in the relevance of team trustworthy behavior, all individual data was aggregated to the team level. We utilized daily trace data over a period of 27 weeks and aggregated all information to weekly measures by taking the average. Establishing a team takes time and resources in this game after its formation. Therefore, we started data collection for each team after 7 days of their respective existence. Observations of the dependent variable (i.e., team trusting behavior) were lagged by one week respectively. The resulting dataset was restricted by three conditions. First, following the conceptualization of groups by Cohen and Bailey (1997), we included only those teams which consist of at least three members for the whole observation period of 27 weeks. Second, to assure that teams collaborate for a significant portion of the game and have a long-term perspective, only those teams were retained who lasted for at least the whole observation period. Lastly, we excluded those teams which were inactive for more than 10% of the days to ascertain active involvement in the game. This process resulted in a final sample of 785 teams and 20.673 measurements. They consist of 32,5 members on average, ranging between 3 and 60 team members, and last an average 284 days.

2.3.3 Measures

Team trusting behavior. Trusting behavior is conceptualized as the proximal behavioral manifestation of trust (Mayer et al., 1995). As such, team trusting behavior is related to the choice of creating a kind of dependency or vulnerability to the decisions of the team (Mayer et

al., 1995; Ross & Lacroix, 1996). This comprises behavior such as the delegation of important tasks, the choice to share information, contact seeking, or the decision to avoid monitoring (Colquitt et al., 2007). Participants in this game are allowed to appoint other participants (i.e., "sitters") to take care of their account in their name. These sitters can act on behalf of the account owner and have direct control over all of her actions within the game. This is an important feature as the game runs for 24 hours a day and 7 days a week during which participants can be attacked or raided at any time. Therefore, participants have to log into the game consistently to maintain and protect their resources from other participants. The sitter feature, thus, allows participants to delegate control to the nominated sitters and have them take care of their account in case of longer absences from the game or, for instance, for better protection overnight. Notably, the account owner cannot directly monitor or control actions of the sitter making him or her particularly vulnerable to opportunistic exploitation. Given this lack of control, establishing a sitter tie is considered a trusting behavior in this context. At any time, participants can nominate a maximum of two sitters. In accordance with Drescher et al. (2014), we, therefore, calculate team trusting behavior as the actual number of sitter ties within a team divided by the maximum number of possible sitter ties – that is, team size multiplied by two.

*Team trusting behavior = Intrateam sitter ties / (team size * 2).*

Team competent behavior. As mentioned above, the ultimate goal of the game involves gathering enough resources to finish a final monument in one participant's base. Consequently, acquiring resources is a highly relevant component of the game. Resources can be either produced in one's own base or stolen from other participants by sending armies to attack their bases. However, in the same way, resources can be raided and stolen from other teams at any time. Acquiring and at the same time retaining resources from other teams, thus, constitutes a key task-specific capability, which is crucial for winning the game. Therefore, in line with previous research on this dataset, we measure team competent behavior as the difference between

a team's acquired resources from raiding other teams and lost resources to other teams divided by the team's production of resources to create a meaningful indicator for team competent behavior over time (Drescher et al., 2011).

Team competent behavior = (Acquired resources - Lost resources) / Resource production.

Team benevolent behavior. According to Mayer et al. (1995), benevolence can be defined as "the extent to which a trustee is believed to want to good to the trustor, aside from an egocentric profit motive" (p. 718). As such, team benevolent behavior is related to a team's loyalty, concern, and support for each other (Colquitt et al., 2007). Participants in the game have the option of supporting others by either sending resources or support armies to protect them from hostile attacks. Participants have no direct advantage from engaging in such activities. Neither is the amount of support sent measured or displayed for others to see, thus, making support activities invisible to third parties. Notably, in later stages of the game, participants tend to unite their resources and military forces in one base in order to develop and defend the final monument. Sending support in this phase would rather constitute a profit-oriented than benevolent behavior. However, we have chosen the observation period in a way that excludes such strategies as the first stage of the final monument is not available yet and uniting a team's resources would be inefficient. We operationalize team benevolent behavior as the sum of resources sent to other team members and the resource equivalent for support armies sent to team members. Similar to the calculation of team competent behavior, we divided the sum by team resource production.

Team benevolent behavior = (Resources sent + Support armies sent) / Resource production.

Team integrity behavior. Integrity relates to adhering to agreed principles, consistency in actions, credibility, and procedural justice (Colquitt et al., 2007; Mayer et al., 1995; Mayer

& Davis, 1999). As indicated above, consistency in logins to take care of one's account, interact, and coordinate with other team members are of crucial importance in the simulation. As a consequence, teams tend to have strict rules about being absent from the simulation and oftentimes state specific schedules with regard to presence time on their team profiles. Login time, therefore, serves as an indicator of sticking to rules and promise keeping within the game. Consequently, we operationalize team integrity behavior as the average daily login time of team members.

Controls. LePine, Piccolo, Jackson, Mathieu, and Saul (2008) suggest that team size may affect group processes due to coordination challenges and motivation losses in larger teams. Moreover, Liden, Wayne, Jaworski, and Bennett (2004) indicate that the likelihood of social loafing is enhanced in larger teams. Therefore, we control for team size by adding the number of team members to the analysis. Further, turnover has been found to influence group processes via members' shared cognition and communication (Levine & Choi, 2004). Thus, we also control for the turnover rate for each team. As team dynamics may also be influenced by the stage of the game, we control for the day of formation within the server time.

2.3.4 Statistical Analysis

We conducted growth modeling analyses utilizing the nlme package (Bates & Pinheiro, 2000; Bliese & Ployhart, 2002) in the open-source software R (R Development Core Team, 2004). Based on the structure of the data, all models are three-level multilevel mixed-effects models, with measurement occasions at Level 1 nested within teams at Level 2 nested within countries at Level 3. Following the procedure recommended by Bliese and Ployhart (2002) for two-level analyses, we first examined whether a three-level model fits the data better than simpler models. We continue by analyzing a model which contains fixed and random time covariates as predictors of team trusting behavior. In the next steps, we gradually improve the model

by adding control variables, independent variables, linear interaction terms, and squared interaction terms. Enders & Tofighi (2007) note that group-mean centering (instead of grand-mean centering) is recommended in multilevel models when investigating the relationship or interaction between two Level 1 variables. Therefore, we group-mean center all time-variant predictor and control variables. Time-invariant covariates (i.e., day of formation) are grand-mean centered. To provide relative and comparable effect size information, we standardized all variables (including trusting behavior) by setting their standard deviation to 1 (see Lang & Bliese, 2009).

2.4 Results

Table 2.1 provides descriptive statistics for our sample. Note that we included only initial, mid-stage, and final values for each time-variant variable to keep the table readable while still providing a meaningful overview.

Before examining the hypothesis tests, we calculated the intraclass correlation type 1 (ICC(1); Bliese, 2000) for the dependent variable to evaluate whether a multilevel approach is appropriate for our data. In our context, the ICC(1) indicates how much of the variance in trusting behavior is a result of between-team differences across the measurement occasions (Bliese, 2000; Bryk & Raudenbush, 1992). It is calculated as the proportion of between-team variance in the overall variance of an unconditional mixed-effects model (i.e., without fixed covariates) with a random intercept (Bliese & Ployhart, 2002).

Table 2.1: Descriptive Statistics and Correlations

Variable	*Mean*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Level 1: Time																				
1. Team trusting behavior Time 0	0.14	0.13																		
2. Team competent behavior Time 0	3.30	7.11	0.17																	
3. Team benevolent behavior Time 0	1.01	1.60	0.32	0.11																
4. Team integrity behavior Time 0	10,115.07	7,037.29	0.35	0.75	0.21															
5. Team size Time 0	20.18	13.63	0.25	0.18	0.18	0.30														
6. Turnover rate Time 0	0.03	0.04	-0.11	0.22	-0.01	0.13	0.05													
7. Team trusting behavior Time 13	0.20	0.14	0.59	0.15	0.22	0.30	0.17	-0.12												
8. Team competent behavior Time 13	-0.24	2.48	0.27	0.40	0.08	0.45	0.20	-0.05	0.39											
9. Team benevolent behavior Time 13	1.79	2.45	0.23	0.02	0.24	0.11	0.11	0.01	0.30	0.17										
10. Team integrity behavior Time 13	7,594.80	4,142.55	0.31	0.47	0.13	0.69	0.28	0.03	0.44	0.66	0.21									
11. Team size Time 13	36.59	16.70	0.19	0.35	0.17	0.36	0.49	0.12	0.28	0.48	0.19	0.45								
12. Turnover rate Time 13	0.02	0.02	-0.05	0.04	0.06	-0.05	0.07	0.17	-0.18	-0.12	0.03	-0.09	0.03							
13. Team trusting behavior Time 26	0.18	0.15	0.46	0.18	0.17	0.30	0.15	-0.10	0.70	0.37	0.20	0.43	0.25	-0.20						
14. Team competent behavior Time 26	-2.18	4.85	0.24	0.24	0.13	0.35	0.18	-0.06	0.32	0.59	0.12	0.53	0.33	-0.13	0.50					
15. Team benevolent behavior Time 26	1.83	3.51	0.18	0.13	0.08	0.22	0.07	-0.01	0.29	0.21	0.15	0.26	0.18	-0.07	0.37	0.24				
16. Team integrity behavior Time 26	5,508.45	3,926.66	0.24	0.42	0.09	0.59	0.26	0.03	0.36	0.55	0.09	0.77	0.42	-0.12	0.51	0.63	0.39			
17. Team size Time 26	28.52	19.52	0.18	0.33	0.11	0.37	0.42	0.03	0.31	0.48	0.15	0.51	0.70	-0.07	0.49	0.60	0.28	0.62		
18. Turnover rate Time 26	0.02	0.04	-0.01	0.07	0.00	-0.01	-0.02	0.25	-0.03	0.03	0.00	0.01	0.13	0.10	-0.16	-0.07	0.02	-0.07	-0.12	
Level 2: Team																				
19. Day of formation	52.89	50.67	-0.13	-0.26	0.06	-0.31	0.05	-0.06	-0.13	-0.20	-0.01	-0.35	-0.15	0.01	-0.14	-0.20	-0.12	-0.40	-0.19	-0.01

Note. N(teams) = 785; N(observations) = 20,673. Correlations greater than .07 are significant at $p < .05$. Correlations greater than .09 are significant at $p < .01$.

As such, the ICC(1) can also be interpreted as an indicator of the strength of non-independence in the data, which is particularly common for longitudinal data (Bliese & Ployhart, 2002). If values for ICC(1) are sufficiently small (i.e., <.10), it is suggested to return to simpler and more parsimonious models (J. H. Kahn, 2011). Otherwise, it is advisable to utilize mixed-effects models, which account for non-independence in the data (Bliese & Ployhart, 2002). We calculated an ICC(1) of .75, which indicates that team membership explains 75% of the variance in team trusting behavior across time. This suggests, that there are considerable differences in the teams' trusting behavior which require a multilevel modeling approach (Aguinis et al., 2013). We also tested for whether a model accounting for three levels (i.e., measurement occasions, teams, countries) fits the data better than a model accounting for two levels (i.e., measurement occasions, teams). To do so, we compared model fit of unconditional mixed-effects models with a random intercept on Level 2 or Level 2 and 3, respectively. Results yielded a significantly better model fit for the Level 3 model ($\chi^2_{diff}(1) = 119.02$, $p < .001$). Therefore, we proceeded with a three-level mixed-effects model for all subsequent analyses. For our growth model analyses, we started by analyzing the fixed linear relationship between time and team trusting behavior and gradually tested for more complex relationships (Raudenbush, 2001). In their recent study on trusting intentions of coworkers during socialization, van der Werff and Buckley (2017) found that trust in coworkers grows nonlinearly over time with rapid growth in early stages and late stages and a phase of stability in the mid-stage. This is in line with current stage models of trust development, which suggest a stepwise increase of trust (Lewicki et al., 2006; Lewicki & Bunker, 1995, 1996). To account for this and keep the model as parsimonious as possible, we tested for a maximum of cubic change in team trusting behavior by adding a cubic time variable to the final model. Our analyses reveal a significant positive linear change in the linear model. In addition, we find significant quadratic and cubic change in team trusting behavior in the squared and cubic model, respectively. As we are interested in the dynamic

development of team trusting behavior over time, we continued by assessing team-specific differences in change of team trusting behavior. Following Bliese & Ployhart (2002), we conducted tests on random variability (i.e., random slopes) of all time parameters by contrasting models via log-likelihood ratio tests. We found support for a significant amount of random variability in linear change ($\chi^2_{diff}(4) = 9{,}509.63$, $p < .001$) and quadratic change in team trusting behavior ($\chi^2_{diff}(6) = 4{,}512.12$, $p < .001$). Models accounting for random variability in cubic change ran into convergence problems. Thus, all proceeding models contain random effects for the linear and quadratic time parameter. Following recommendations by DeShon, Ployhart, & Sacco (1998) we also controlled for autocorrelation and heteroscedasticity, which is particularly relevant for longitudinal data (Bliese & Ployhart, 2002). We found evidence of autocorrelation ($\chi^2_{diff}(1) = 14{,}873.02$, $p < .001$); however, models accounting for heteroscedasticity did not converge. Consequently, we control for autocorrelation in all proceeding models.

To test for the development of team trusting behavior, we extended the basic growth model by adding our control variables (i.e., team size, day of formation, turnover rate) to the equation. Results are stated in Model 1 of Table 2.2. Hypothesis 1 suggested that team trusting behavior increases curvilinearly over time, such that it grows rapidly in early stages, and stabilizes in later stages. As indicated by Model 1 of Table 2.2, we found a significant positive linear relationship between time and team trusting behavior ($\gamma = 0.0504$, $SD = 0.0060$, $p < .001$) and a negative quadratic relationship between time and team trusting behavior ($\gamma = -0.0023$, $SD = 0.0005$, $p < .001$). We also found evidence for a marginally significant positive cubic relationship between time and team trusting behavior ($\gamma = 0.0000$, $SD = 0.0000$, $p < .05$).

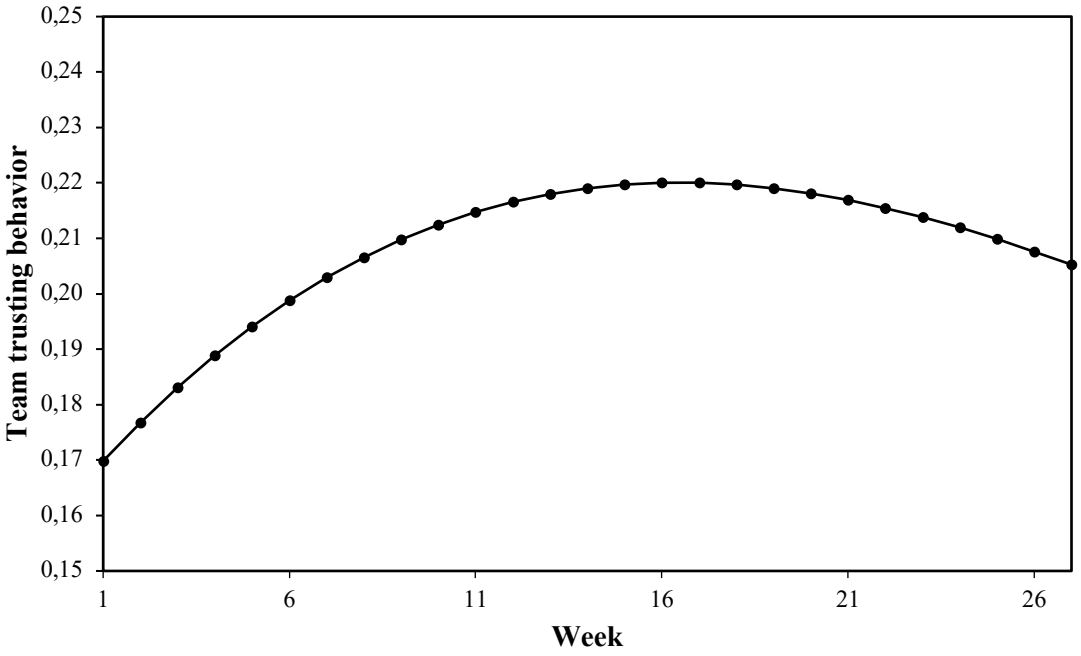
Table 2.2: Mixed-Effects Model on the Relationship Strength of Team Trustworthy Behavior with Team Trusting Behavior Over Time

	Model 1				*Model 2*				*Model 3*				*Model 4*			
	Coeff.	SD	t	p	Coeff.	SD	t	p	Coeff.	SD	t	p	Coeff.	SD	t	p
Fixed Effects																
Level 1																
Intercept	1.2310 ***	0.0460	26.74	0.000	1.1874 ***	0.0465	25.53	0.000	1.1968 ***	0.0465	25.74	0.000	1.2031 ***	0.0472	25.49	0.000
Time	0.0504 ***	0.0060	8.45	0.000	0.0589 ***	0.0060	9.81	0.000	0.0530 ***	0.0080	6.59	0.000	0.0553 ***	0.0063	8.71	0.000
Time^2	-0.0023 ***	0.0005	-4.83	0.000	-0.0028 ***	0.0005	-6.09	0.000	-0.0025 ***	0.0005	-4.86	0.000	-0.0026 ***	0.0005	-5.22	0.000
Time^3	0.0000 *	0.0000	1.98	0.047	0.0000 **	0.0000	3.07	0.002	0.0000 **	0.0000	2.73	0.006	0.0000 *	0.0000	2.55	0.011
Team size	0.0819 ***	0.0085	9.62	0.000	0.0740 ***	0.0085	8.70	0.000	0.0717 ***	0.0085	8.40	0.000	0.0717 ***	0.0085	8.39	0.000
Turnover rate	-0.0133 ***	0.0015	-8.85	0.000	-0.0139 ***	0.0015	-9.27	0.000	-0.0138 ***	0.0015	-9.17	0.000	-0.0137 ***	0.0015	-9.14	0.000
Team competent behavior (TCM)					0.0244 ***	0.0057	4.26	0.000	0.0019	0.0085	0.23	0.819	-0.0036	0.0094	-0.38	0.701
Team benevolent behavior (TBM)					0.0073 ***	0.0020	3.72	0.000	0.0040	0.0048	0.84	0.403	0.0172 *	0.0077	2.24	0.025
Team integrity behavior (TIM)					0.0397 ***	0.0068	5.81	0.000	0.0520 ***	0.0113	4.61	0.000	0.0610 ***	0.0145	4.21	0.000
TCM × Time									0.0021 ***	0.0006	3.62	0.000	0.0047 *	0.0022	2.16	0.031
TBM × Time									0.0002	0.0003	0.75	0.454	-0.0021	0.0012	-1.83	0.067
TIM × Time									-0.0009	0.0008	-1.07	0.286	-0.0045	0.0029	-1.54	0.124
TCM × Time^2													-0.0001	0.0001	-1.22	0.224
TBM x Time^2													0.0001 *	0.0000	2.02	0.044
TIM × Time^2													0.0002	0.0001	1.38	0.169
Level 2																
Day of formation	-0.0025 ***	0.0006	-4.42	0.000	-0.0025 ***	0.0006	-4.30	0.000	-0.0025 ***	0.0006	-4.38	0.000	-0.0025 ***	0.0006	-4.33	0.000
			Correlations				Correlations				Correlations				Correlations	
	Variance	SD	1	2	Variance	SD	1	2	Variance	SD	1	2	Variance	SD	1	2
Random Effects																
Level 2																
1. Intercept	0.0000	0.0000	–		0.4724	0.6873	–		0.4766	0.6904	–		0.4810	0.6935	–	
2. Time	0.0000	0.0000	0.00	–	0.0007	0.0266	-0.37	–	0.0007	0.0267	-0.38	–	0.0007	0.0264	-0.38	–
3. Time^2	0.0000	0.0000	0.00	0.00	0.0000	0.0001	0.00	-0.03	0.0000	0.0000	0.00	-0.01	0.0000	0.0001	0.00	-0.03
Level 3																
1. Intercept	0.0000	0.0004	–		0.0000	0.0000	–		0.0000	0.0000	–		0.0000	0.0000	–	
2. Time	0.0000	0.0069	0.21	–	0.0001	0.0071	0.62	–	0.0003	0.0162	0.68	–	0.0001	0.0073	0.55	–
3. Time^2	0.0000	0.0000	-0.01	0.00	0.0000	0.0000	-0.02	0.00	0.0000	0.0006	-0.92	-0.48	0.0000	0.0000	-0.01	0.00
Residual	0.9341	0.9665			0.4542	0.6739			0.4365	0.6607			0.4532	0.6732		

Note. N(teams) = 785; N(observations) = 20,673. All time variables were centered at the end of week 1 of each team's existence so that the intercept reflects baseline values at the end of week 1. All Level 1 variables were z-standardized and group-mean centered. Level 2 variables were z-standardized and grand-mean centered. *** p < .001; two-tailed. ** p < .01, two-tailed. * p < .05, two-tailed.

Figure 2.1 models the development of team trusting behavior for week 1 to week 27 based on the results of Model 1 to help interpret the results. To receive meaningful values we repeated the analyses for Model 1 with unscaled values for team trusting behavior and plotted them. As suggested by the regression results and Figure 2.1, hypothesis 1 is partly supported: The results indicate that team trusting behavior indeed increases significantly over time. Instead of the expected stabilization, we find, however, a significant decrease in team trusting behavior after approximately 16 weeks of existence.

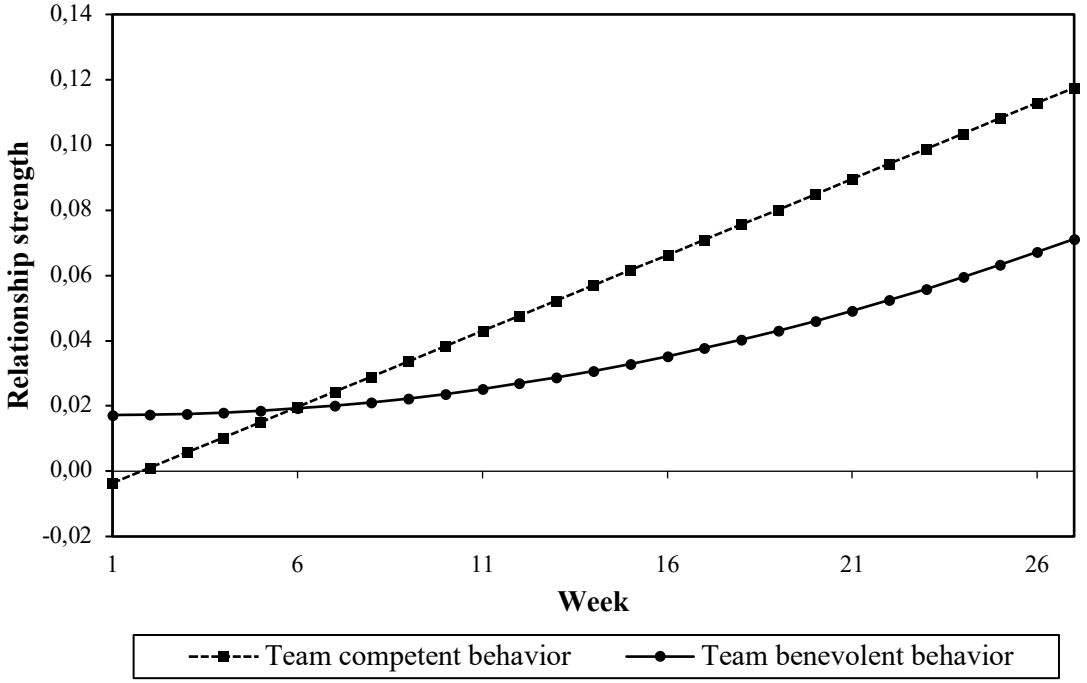
Figure 2.1: Team Trusting Behavior Development in Teams Over Time



Next, we tested for the relevance of team trustworthy behavior for team trusting behavior by gradually adding team trustworthy behavior (Model 2), linear interaction terms for team trustworthy behavior and time (Model 3), and quadratic interaction terms (Model 4). The final results are stated in Model 4 of Table 2.2. With respect to team benevolent behavior, hypothesis 2a predicted a positive relationship between team benevolent behavior and team trusting behavior, which increases curvilinearly over time. The results suggest a significant positive main effect of team benevolent behavior on team trusting behavior (γ = 0.0172, *SD* = 0.0077, $p <$

.05) and a significant positive quadratic interaction term with time (γ = 0.0001, *SD* = 0.0000, $p < .05$). Results on a linear interaction did not show significant results (γ = -0.0021, *SD* = 0.0012, $p > .05$). This indicates that team benevolent behavior slightly affects team trusting behavior in early stages. As teams mature, the influence of team benevolent behavior on team trusting behavior increases curvilinearly, such that it rises slowly in earlier stages and gains momentum in later stages. Thus, hypothesis 2a is supported. As for team integrity behavior, hypothesis 2b suggested that the positive relationship between team integrity behavior and team trusting behavior increases curvilinearly over time. Our analyses suggest a positive significant main effect of team integrity on team trusting behavior (γ = 0.0610, *SD* = 0.0145, $p < .001$). However, results show no significant interaction of team integrity behavior with time (γ = -0.0045, *SD* = 0.0029, $p > .05$; γ = 0.0002, *SD* = 0.0001, $p > .05$). This suggests that team integrity behavior has a significant positive relationship with team trusting behavior early on which does not change as teams age. Consequently, hypothesis 2b is not supported by our analyses. Hypothesis 2c stated that the positive relationship between team competent behavior and team trusting behavior increases in earlier stages and decreases as teams mature in later stages. As indicated in Model 4, we find an insignificant negative main effect of team competent behavior on team trusting behavior (γ = -0.0036, *SD* = 0.0094, $p > .05$) when controlling for interactions with time. Moreover, results suggest a significant positive interaction term of time and team competent behavior (γ = 0.0047, *SD* = 0.0022, $p < .05$) and an insignificant negative quadratic interaction with time (γ = -0.0001, *SD* = 0.0001, $p > .05$). This result suggests that at the beginning of a team's lifecycle, team competent behavior is not significantly related with team trusting behavior. As teams mature, the relationship between team competent behavior and team trusting behavior increases linearly. Thus, hypothesis 2c is not supported as no evidence for a decrease in relationship strength is found in later stages. Figure 2.2 visualizes the significant interactions of team benevolent behavior and team competent behavior over time based on the results of Model 4.

Figure 2.2: Relationship Strength of Team Competent Behavior and Team Benevolent Behavior with Team Trusting Behavior Over Time



2.5 Discussion

Team trust development is considered a dynamic process which involves both changes in level and in the strength of its relationships with antecedents and outcomes (Mitchell & James, 2001; Serva et al., 2005). Research suggests that team trustworthy behavior affects trusting behavior in teams via the formation of trust (Mayer et al., 1995; Schoorman et al., 2007). However, less is known about the dynamics of these relationships. Specifically, we do not know a) when specific trust-relevant cues affect trust and b) what their relative importance is in the development of trust (Dietz, 2011; Li, 2012a; Schoorman et al., 2007). Building on attribution theory (Weiner, 1986) and the integrative model of organizational trust (Mayer et al., 1995), we established a model on the dynamic relationships of trustworthy behavior with team trusting behavior as well as the development of team trusting behavior itself. To test this model, we utilized longitudinal data from an online simulation game. Our findings are twofold: As for our first result, we find trusting behavior to increase in earlier phases and decrease in later phases

of the team. This is inconsistent with theory and empirical findings on trust development, which suggest trust to increase stepwise in stages of stagnation and growth (Lewicki & Bunker, 1995, 1996; van der Werff & Buckley, 2017). This surprising finding may be caused by restrictions of our dataset. Specifically, as dissolving teams is possible in this simulation, we included only those teams which endured for at least the whole observation period of 27 weeks to examine dynamic relationships over an extended period of time. Thus, teams are allowed to dissolve only after week 27 in the simulation. Gambetta (1988) argues that if given the opportunity to exit, a trustor will continue a relationship only with partners that are trusted. Due to this selection, trust should be higher in teams which still have the perspective of long survival (Korsgaard et al., 2018; Vanneste et al., 2013). Conversely, teams which are close to dissolution should be lower in trust. This selection may result in a downward trend of trusting behavior in later phases in our sample as more and more teams approach their dissolution shortly after the observation period. Interestingly, we find team trusting behavior to decrease around 10 weeks prior to the first possible dissolution. This may imply that a decrease in team trusting behavior could foreshadow a potential dissolution of the team. We believe that this could be a fruitful area for future research. Our second result refers to the dynamic relationships of trustworthy behavior with trusting behavior. We find that team competent behavior, team benevolent behavior, and team integrity behavior all significantly affect trusting behavior on the team level. However, only team benevolent behavior and team competent behavior seem to differ in relevance for trusting behavior over time. Specifically, we find competent behavior to be irrelevant in early phases but to increase in relevance as teams age. As for benevolent behavior, our results suggest a low but significant impact on trusting behavior early on which slowly increases as time passes. Conversely, we find a moderate and consistent relevance of integrity behavior for trusting behavior. Regarding the relative importance of trust cues for trusting behavior, we find team integrity behavior to be most relevant for team trusting behavior in early phases. As teams get to

know each other, both team benevolent behavior and team competent behavior increase in relevance. In contrast to our expectations, we find competent behavior to be most relevant in later stages followed by benevolent behavior and integrity behavior. Theory suggests that affective factors, such as benevolence and, subsequently, benevolent behavior should become more important over time and be most relevant in later stages of a relationship (Levin & Cross, 2004; Mayer et al., 1995; Rousseau et al., 1998). In turn, cognitive factors should decrease in importance for trusting behavior. Our results are somewhat consistent with this in that we find benevolent behavior to increase curvilinearly in later stages. Thus, it can be expected that benevolent behavior further rises in relevance for trusting behavior. Moreover, we find a negative but insignificant decrease in relevance of team competent behavior over time. These results indicate the theorized shift, which may materialize in even later stages of the game. This is in line with recent research suggesting trust to develop slower in our context of virtual teams (Webber, 2008). Notably, we find only for team benevolent behavior and team competent behavior the theorized rise in relevance as teams learn to form stable perceptions of their dispositions (Lewicki & Bunker, 1996; Mayer et al., 1995). Conversely, team integrity behavior shows a stable and consistent importance for team trusting behavior early on. This may be caused by a dropout of members indicating low integrity. Tomlinson and Mayer (2009) argue that of all trustworthiness factors integrity perceptions are most stable – particularly when integrity is considered low. Kim, Ferrin, Cooper, and Dirks (2004) found, for instance, that individuals considered dishonest in one situation are likely to be deemed dishonest in general. Similarly, Trafimow, Bromgard, Finlay, and Ketelaar (2005) posit that behaviors which reflect low integrity have a strong signaling value for future behavior. As consistency in this online simulation is of particular importance, teams in our sample may be keen to drop all members showing signs of low integrity. Consequently, integrity may rather be a fixed requirement to be part of the team than additional information to team members which is learned over time. Due to this selection, integrity behavior may show only a moderate relevance for trusting behavior, which

is consistent over time. Our findings are partially consistent with existing work on the relationship between trustworthiness perceptions and trust on the team level over time. In their survey-based studies, both Serva et al. (2005) and van der Werff and Buckley (2017) find ability to relate strongest with trust even after an extended period of time but find inconsistent results regarding a general trend of its relevance. In line with our findings on integrity, Aubert and Kelsey (2003) find a fairly stable relevance of integrity for trust in their two-wave survey on student teams. Results on benevolence are generally the most inconsistent with the majority of studies finding no significant positive impact on trust at all (Aubert & Kelsey, 2003; van der Werff & Buckley, 2017) or no clear pattern over time (Serva et al., 2005). Given the lack of agreement on the trajectories of these dynamic relationships, our study constitutes a valuable contribution to existing literature in the area of trust development.

2.6 Limitations

Our study has some noteworthy limitations. One concern is the setting of computer-mediated online simulations which may pose limitations in terms of generalizability due to the possibility of task or population differences (Castronova & Falk, 2009). However, this study focuses on basic group processes and relationships between participants, which are often compared to relationships between co-workers in a professional environment due to increasingly similar tasks within these contexts (Williams et al., 2006; Yee, 2006). Also, gathering data in this setting provided us with the unique advantage of gathering unobtrusive, nonreactive, and objective behavioral data on team trusting over a long period of time, which is typically considered hard to achieve in traditional settings.

Another limitation is the relatively small effect sizes for the relationships between trustworthy behavior and trusting behavior and their interactions with time. The reasons for these may be threefold: First, in contrast to existing studies, we do not examine psychological states

(i.e., trustworthiness perceptions, trusting intentions), but actual trustworthy and trusting behavior. Trustworthy behavior is theorized to affect trusting behavior via the formation of trustworthiness perceptions, which, in turn, affects trusting intentions (Mayer et al., 1995; Tomlinson & Mayer, 2009). As such, the relationship between trustworthy and trusting behavior is much more distant than their respective psychological states. Consequently, it is not surprising to receive smaller effect sizes in our analyses. Second, as we examine linear and squared interactions over 27 measurement points, the standardized effect sizes quickly add up. For instance, based on our results the standardized effect size for team competent at the last measurement point can be expected to reach 0.12. Lastly, even small effect sizes can have considerable consequences in practice. Harter, Schmidt, and Hayes (2002) found, for instance, that employee satisfaction explains only 1% to 2% of the variance in business-unit outcomes. Still, they were able to show how changes in satisfaction relate to sizable improvements in terms of sales and productivity. Thus, given the relevance of trust in a broad range of work outcomes (De Jong et al., 2016; De Jong & Elfring, 2010), it can be assumed that even small relationships may have strong practical implications (Abelson, 1985).

2.7 Conclusion

Our focus in this study was to contribute to theory on trust development and its predictors over time. As such, we answer recent calls from scholars to examine the importance and dynamics of trust cues in the context of teams (Dietz, 2011; Li, 2012a; Schoorman et al., 2007). In doing so, we established and tested a model on the curvilinear relationships of trustworthy behavior with trusting behavior in teams. While the dynamics of trust, trusting behavior, and their antecedents require further research, our results provide some initial understanding of these relationships.

3 Essay II: Exploring the Functionality of Fundamental Interpersonal Climates: How Relational Climates Shape Team Performance Over Time

Abstract

Four relational models – communal sharing, authority ranking, equality matching, and market pricing – constitute the fundamental building blocks that govern all interpersonal relationships. Whereas management research has increasingly turned to relational models theory for theory building, the functionality of the four relational models for group effectiveness is not well understood. We address this void in the literature by investigating how the four relational model-based team climates influence the development of interdependent team performance over time. Based on longitudinal multilevel analyses of a six-country sample of 291 interdependent teams, we find that communal sharing and authority ranking climates positively influence team performance growth over time, whereas market pricing negatively and equality matching do not significantly influence team performance growth over time. We advance team effectiveness research by investigating how the fundamental team relational climates give rise to differential team effectiveness trajectories.

Note: This chapter is based on a paper co-authored by Maria Strobel, Andranik Tumasjan, and Isabell Welpe. Therefore, the plural instead of the singular is used throughout this chapter. Author contributions to this paper are summarized in Appendix D.

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3.1 Introduction

Companies increasingly rely on interdependent project teams to take advantage of their high adaptive capabilities and diverse knowledge set. Such teams are particularly useful to tackle complex problems and foster innovative solutions. Their interdependent nature, however, provides a unique context, which can make effective performance of its team members difficult. Team interdependence describes the degree to which team members have to interact and rely on each other to complete their tasks and achieve their mutual goals. Tasks and goals within these teams, thus, are typically interconnected and cannot be completed or achieved, respectively, without cooperating with other members of the team (Van de Ven & Ferry, 1980). A core insight from extant team research is that interpersonal relationships in teams matter (Grant, 2007; LePine et al., 2008; Mathieu et al., 2019). To theorize on interpersonal relationships, management research has increasingly turned to relational models theory (Fiske, 1992) as a theoretical framework describing the fundamental building blocks of social relationships (Blatt, 2009; Bridoux & Stoelhorst, 2016; Mossholder et al., 2011; Wellman, 2017). In short, relational models theory posits that all social relationships can be described in terms of just four elementary relational models: communal sharing, authority ranking, equality matching, and market pricing (Fiske, 1992). For instance, Mossholder et al. (2011) have theoretically integrated relational models theory with organizational climate research (see Kuenzi & Schminke, 2009) to propose the existence of distinct relational climates and to theorize how these climates influence helping behavior. However, whereas theory building based on relational models theory has progressed in management research, we know only little about the actual functionality of the four relational models – that is, how and in which particular context relational models (or their derived relational climates) influence team effectiveness. While extant research clearly documents the existence of the four distinct relational models (Haslam, 2004; Vodosek, 2009) and their usefulness for describing and predicting diverse organizational behaviors, such as prosocial behavior (Stofberg et al., 2019), knowledge sharing (Boer et al., 2011), proactivity (Batistič et al.,

2016), and ethical behavior (Keck et al., 2020), our knowledge of the four relational models' functionality for team effectiveness both theoretically and empirically is very scant. In this vein, recent team effectiveness research has called for more studies investigating team emergent states – such as the relational climates – concurrently lamenting the scarcity of longitudinal team effectiveness research in this field (Mathieu et al., 2019). Accordingly, in their recent comprehensive review, Mathieu et al., (2019) conclude that "[f]uture research should continue to examine the growing body of emergent states as not all have been fully covered, especially regarding their relationship with time" (p. 29). Responding to these calls, our study addresses these voids in the literature by investigating the following research question: *How do the four fundamental relational climates influence performance of interdependent teams over time?* As interdependent teams interact more closely with each other they are likely to share or at least have very similar perceptions of the team (G. Chen et al., 2009). This makes them a particularly suitable context for investigating the impact of relational climates on team effectiveness in this study.

We make three major contributions to the literature. First, we advance literature on team emergent states by investigating the functionality of the four basic relational climates for team effectiveness. While prior research based on relational models theory has mainly focused on explaining how the relational models influence prosocial and proactive behaviors, we theorize on and test their team performance implications. We thereby also advance research on general relational models theory which to date has not built and empirically tested theory on the relational models' functionality. By advancing the emergent relational climate research (Mossholder et al., 2011), we concurrently respond to Kuenzi and Schminke's (2009) call for investigating how multiple distinct climates operate in work group settings. Second, we advance research on interdependent teams by investigating how various contextual factors affect their overall functionality. Researchers have recognized for years that task and goal interdependence of employees affect the way in which people work together (e.g., Saavedra et al., 1993; Van

Der Vegt et al., 2000; Wageman, 1995). However, research on the contextual factors under which interdependent teams may thrive is relatively sparse. We contribute to this research stream by showing the differential impact of relational climates on the functionality of interdependent teams. Third, we advance team effectiveness research by investigating team performance growth over a longer period of time as called for in recent comprehensive reviews (Mathieu et al., 2019). Recent theoretical models on team effectiveness highlight the interrelatedness of team domains and their interplay over time (Mathieu et al., 2017). Our multilevel longitudinal design enables us to examine how relational climates as team emergent states affect team performance over a two-month period, thus, advancing our understanding of the dynamic process underlying the relationship of team effectiveness and its antecedents. Our findings contribute to team effectiveness research by demonstrating that team emergent climates significantly contribute to team performance and that this effect unfolds over time.

3.2 Theory

3.2.1 The Four Fundamental Relational Team Climates

Relational climates can be defined as "shared employee perceptions and appraisals of policies, practices, and behaviors affecting interpersonal relationships in a given context" (Mossholder et al., 2011, p. 36). This definition constitutes a theoretical integration of two research streams: Climate theory (Kuenzi & Schminke, 2009) and relational models theory (Fiske, 1992). While the focus on shared perceptions of policies, practices, and behaviors stems from the climate literature (e.g., Schneider & Reichers, 1983), the distinct types of relational climates posited by Mossholder et al. (2011) are based on Fiske's (1992) relational models theory. Although several authors have provided categorizations of relational schemes (e.g., Clark & Mills, 1993; Foa & Foa, 1980), Fiske's (1992) relational models theory constitutes the most comprehensive and empirically established theoretical framework.

Reviewing a large body of theoretical and empirical research from economics, sociology, social psychology, and anthropology, Fiske (1992) identified four fundamental relational models that essentially underlie almost all social interactions. In short, relational models theory (Fiske, 1992) posits that all social relationships can be described as combinations, concatenations, or arrangements of just four basic relational models. These models are communal sharing, authority ranking, equality matching, and market pricing (Fiske, 1992). Building on Mossholder et al.'s (2011) definition, we argue that these four relational models also manifest as team climates, as will be explained below. The existence of the four relational models has been empirically demonstrated across different social domains in a wide range of countries and cultures (see Haslam, 2004, for a comprehensive overview). Mossholder et al. (2011) have put forward the notion of relational climates being established by formal HR systems at the organizational level. Complementing their approach, we argue that relational climates can also informally emerge in smaller organizational units, such as teams and workgroups. Our proposition is supported by relational model research, which has documented the existence of all four relational models in work groups (e.g., Vodosek, 2009). From the climate perspective, Tesluk, Vance, and Mathieu (1999) have called attention to the importance of climates especially at lower organizational levels as they are more proximal and thus may exert a more direct influence on behavior. Furthermore, climate is a perceptual collective phenomenon (Kuenzi & Schminke, 2009), which does not necessarily require formal implementation. We, therefore, suggest that the four relational climates may exist and function differently in teams. In the following paragraphs, we will illustrate how each of the four climates is manifest and likely functions in interdependent work teams (see also Fiske, 1992; Mossholder et al., 2011).

Communal Sharing. Teams with a communal sharing relationship are keen on equivalence with a strong focus on commonalities rather than individual differences (Fiske, 1991, 1992; Haslam, 2004). In these kinship-like relationships, members of a team find it natural to be altruistic towards other members and, thus, share information, resources, and support openly

without keeping track of each other's contribution (Haslam, 2004). In so doing, people are not motivated by favorable exchanges or extrinsic rewards (Blatt, 2009). Rather, they are motivated to meet each other's needs based on the experience of empathy towards each other (Clark et al., 2001) as well as the feeling of guilt induced by the failure to meet these demands (Mills et al., 2004). As consensus is highly valued in communal sharing relationships, members also strive to strongly identify with their team and align their thoughts and needs with emerging norms in the team (Bridoux & Stoelhorst, 2016; Fiske, 1992). As such, scholarly work argued that communal sharing relationships lead to increased cooperation (e.g., Mossholder et al., 2011; Sheppard & Sherman, 1998; Sheppard & Tuchinsky, 1996), engagement (Batistič et al., 2016), intrateam trust (Blatt, 2009), and knowledge sharing behaviors (e.g., Boer, Berends, & Van Baalen, 2011; Kaltcheva, Patino, Laric, Pitta, & Imparato, 2014) within teams and organizations. Interdependent teams with a communal sharing climate likely benefit in particular from close cooperation and reduced coordination efforts (Saavedra et al., 1993). If, for instance, one member of the communal sharing team is unable to perform a specific task that is relevant to overall team functioning, the other members are intrinsically motivated to provide support and, thus, may avoid costly bottlenecks in the interdependent team. In addition, the high motivation to reach consensus in communal sharing teams, likely allows interdependent teams to agree on a mutually accepted approach to reach a goal faster and move on quicker to more productive action phases (LePine et al., 2008). Therefore, we suggest a communal sharing climate to be beneficial for performance in interdependent teams.

Authority Ranking. Authority ranking relationships are based on the assumption of ranked differences and asymmetric relationships between individuals (Fiske, 1991, 1992). In these teams, one or more superior individuals manage and control the actions of their subordinates while the latter can expect protection and responsibility from the former (Fiske, 1991, 1992). When manifesting in decision-making, information is typically channeled upwards the hierarchy while orders and operative tasks are handed down the ranks. Authority ranking, thus,

implies a sort of centralized redistribution controlled by the superiors, which typically also receive a larger share of the available resources (Fiske, 1991, 1992). Notably, this relational model does not describe the mere ranked order of individuals itself, but also its legitimacy to its members. By definition, inferior team members in authority ranking relationships believe that their superiors' authority is legitimate, appropriate, and accepted and would voluntarily defend their superiors' decisions (Tyler, 2006). In the literature, this form of relationship has been linked to rapid coordination and decision-making in teams (e.g., Fiske, 1992) as well as strong individual identity in teams (e.g., Wellman, 2017). Interdependent teams will likely benefit from an authority ranking climate due to the structure and coordination potential it provides. Specifically, a central authority can guide resource allocation, clarify roles and expectations about the delegated tasks, and monitor overall progress of the interdependent team (Greer et al., 2017). As the team's central point of communication and information, this authority may also be particularly suitable for keeping track of the overall progress and realigning the team's capacities if necessary. Therefore, we propose that interdependent teams with a strong authority ranking climate perform better than those which do not.

Equality Matching. In equality matching relationships, a loose form of reciprocity guides the relationship" (Sheppard & Sherman, 1998, p. 426). This relational model bases on an egalitarian "tit-for-tat" principle where team members exchange resources and information with the expectation that each favor will be retaliated (Fiske, 1991, 1992). Equality matching reflects a psychological contract with a primary concern on retaining balance in the relationship (Fiske, 1992; Mossholder et al., 2011; Rousseau, 1995). As such, team members tend to keep track of their and others' contributions and adjust either their input or share of outcomes based on their perception of equality within the team (Fiske, 1991, 1992). In interdependent teams, this manifests, for instance, as members taking turns for specific team-related tasks (e.g., writing protocols), an equality-based (vs. equity-based) distribution of work packages, and a one-

person-one-vote system for decision-making. This may have both positive and negative implications for interdependent teams. On the one hand, scholars have noted that the reciprocity induced by an equality matching climate may lead team members to recognize the benefits of helping each other over time (e.g., Lin, Wu, & Lu, 2012; Mossholder et al., 2011). This form of reciprocity is also considered the foundation for forming deeper relationships over time (Blau, 1964). In so doing, an equality matching climate encourages knowledge sharing as well as cooperation across team members. On the other hand, Fiske (1992) describes equality matching as "deficient as a model for organizing labor" (p. 714), when working in an interdependent work context due to the inability to always distribute tasks in a completely equal and fair manner. For instance, team members may perceive the team's effort as unbalanced when distributed work packages differ in size or when more (less) productive individuals receive a larger (smaller) portion of the workload. Under an equality matching climate, this may not only damage overall satisfaction with the team for specific members but has also been theorized to induce counterproductive behavior such as holding back information and resources in order to restore balance in the relationship (Fiske, 1992). Considering both aspects, it remains unclear how an equality matching climate may influence the effectiveness of interdependent teams.

Market Pricing. Team members in a market pricing relationship organize their interactions based on agreed-on rates, prices, or ratios (Fiske, 1991, 1992). The value of exchanges is typically broken down to a single value or metric, which allows comparison of diverse actions independent of the bilateral relationship (Fiske, 1991). Individuals in this relationship model tend to base their decision to cooperate on self-interest and a desire to optimize personal outcomes (Fiske, 1991, 1992; Mossholder et al., 2011). In practice, this relationship is typically reflected in a pay-for-performance system, narrowly defined obligations for individual team members, and a general independence in task fulfillment. Team members under this relationship model are expected to conduct cost-benefit analyses to decide whether to cooperate and only do so if they personally benefit from the specific cooperative action (Mossholder et al.,

2011; Murnighan, 1994). Individual maximization in teams is specifically detrimental when facing social exchanges, such as psychological support or helping behaviors. For these functional behaviors, a priori assessments of costs and potential rewards are hard to quantify, thus, making them more risky and less attractive for individuals seeking to maximize their own benefit (Sheppard & Sherman, 1998). Consequently, cooperative acts as well as helping behaviors will likely occur much less frequently as compared to other relational models (Mossholder et al., 2011). Moreover, market pricing teams tend to invest a significant amount of effort and time in precisely coordinating and specifying each individual's contribution to a goal, thus, increasing predictability of results but also diminishing flexibility during unexpected events. In interdependent teams, where cooperation, contribution to a mutual goal, and flexibility are considered crucial, this can be detrimental. Only if its members are willing to cooperate – that is, for instance, by assisting with the task itself, helping each other, sharing information, or giving feedback – interdependent teams can effectively leverage their knowledge and resources for overall performance (Jehn & Shah, 1997; Marks et al., 2001). Therefore, we expect market pricing climates to negatively affect performance of interdependent teams.

Notably, relational models theory suggests that teams are not limited to a single relational model. Rather, teams may use a combination of multiple models based on the specific situation they find themselves in (Fiske, 1991; Haslam, 2004). Teams may, for instance, share information freely without keeping track of each member's contribution (i.e., communal sharing) while voting for one leader of the team (i.e., authority ranking) on a one-person-one-vote basis (i.e., equality matching). Consequently, multiple models can be used within the same team without violating the team's norms (Fiske, 1992). Nonetheless, it has been suggested in the literature that teams tend to converge on one model, which is used more frequently for coordinating social interaction (Fiske, 1991, 1992). For example, teams may have a tendency to solve interactions mostly through a coordinating seniority (i.e., authority ranking)

3.2.2 Team Performance: Toward a Dynamic Perspective

When investigating team performance, researchers traditionally used some version of an input-process-outcome (IPO) or input-mediating mechanism-outcome heuristic (IMO) as theoretical framework (Cohen & Bailey, 1997; LePine et al., 2000; Marks et al., 2001). This basic model suggests that factors, such as team characteristics, dispositions, abilities, and context (i.e., input) affect team performance (i.e., outcome) via team activities, collective affect, and cognition (i.e., process or mediator). The processes or mediating mechanisms can be understood as "a logic that explains a causal relationship between independent and dependent variables" and describe how inputs are transformed into outcomes (Van De, 1992, p. 169). Advancing this traditional view, recent scholarly work on teams has highlighted the dynamic, multilevel, and complex nature of teams (Cronin et al., 2011; Humphrey & Aime, 2014; Mathieu et al., 2014), and emphasizes the simultaneous and interrelated relationships between these three team constituents. In their multilevel model, Mathieu et al., (2017) suggest team inputs (i.e., structural and compositional features of the team), mediating mechanisms (i.e., behavioral processes and emergent states, such as relational climates) and team outcomes (i.e., team effectiveness and individual reactions) to be dynamic entities, which all interrelate with one another in a reciprocal manner over time. In so doing, they explicitly acknowledge the dynamic aspect of team factors and effectiveness (Mathieu et al., 2019). In the present study, we rely on the team model by Mathieu et al. (2017) to guide our theory building. Following this rationale, we expect the functionality of the relational climates in interdependent teams to fully unfold in a positive (or negative) spiral and through multiple steps over time. Specifically, theoretical work suggests that teams will likely perceive their fellow team members' (dys-)functional behaviors (e.g., cooperative activities or self-interested actions) and reciprocate them over multiple interactions (Blau, 1964; Sahlins, 1965). For instance, in a communal sharing climate, individuals will likely perceive cooperative and empathic behavior within their team and, subsequently, respond to it by engaging in the same functional behaviors over time. Team members will learn

to trust their fellow team members from these cooperative exchanges, leading to increasing stakes in their exchanges, which, ultimately, foster the development of team trust (Blau, 1964; Ferrin et al., 2008; Korsgaard, 2018). In turn, higher levels of trust will likely reduce coordination efforts due to the neglect of unresolved issues within the team. Theory suggests that this is a time-consuming process with team members' cooperation and functional behaviors increasing over multiple interactions over time (Blau, 1964; Mathieu et al., 2017, 2018). Simultaneously, team members will gather information from prior performance over time and utilize this feedback for their decision on how to interact with their fellow team members. Hereby, a positive feedback (i.e., increasing performance) will likely result in increasing positive feelings and unification, which further boosts functional behaviors across team members (Casey-Campbell & Martens, 2009). Consequently, we expect relational climates to affect team performance not in an immediate static manner but in small iterations and increasing effect over time. Notably, this likely occurs in both directions. We expect, for instance, a market pricing climate to provide fewer opportunities for social exchange due to its calculative and self-interested nature (Fiske, 1991, 1992; Jehn & Shah, 1997; Mossholder et al., 2011). Over time, team members will likely engage less in functional behaviors resulting in slower trust development, higher coordination efforts, and, consequently, comparatively poorer performance as time progresses.

3.3 Methodology

3.3.1 Research Setting

Investigating the dynamic development of team performance requires objective quantitative and longitudinal data with multiple observations for the team performance indicator. As it takes time for relational climates to manifest as a shared perception at the team level, teams also need a sufficient long-term perspective with an adequate life span and psychological involvement (K. J. Klein et al., 2000). Therefore, we employed behavioral log-file data from a large-scale online computer simulation as an alternative research context. Scholars proposed

online simulations to be a promising new avenue for research in social sciences (Bainbridge, 2007; Castronova & Falk, 2009) and for studying group dynamics in particular (G. Chen et al., 2009; Dimotakis et al., 2012). Such research settings allow for collecting large-scale unobtrusive and nonreactive data over longer periods of time and have shown to provide valuable insights in team research (e.g., Drescher, Korsgaard, Welpe, Picot, & Wigand, 2014). They are also considered highly engaging and meaningful to players and, thus, provide an excellent opportunity to study social dynamics in teams (Williams et al., 2006; Yee, 2006).

Specifically, we employed data from the online simulation game *Travian* (www.travian.com). *Travian* is a strategic, psychologically demanding, and interdependent massively multiplayer online game where interdependent teams compete over being the first to build a major landmark as the ultimate winning condition. To do so, teams have to accumulate and defend vast amounts of resources, which are beyond what one individual member could possibly achieve. These resources can be acquired by investing in the team's own resource production or by raiding and stealing from other teams. Consequently, team members have to collaborate and coordinate production, defense of their own storages, and raids on other teams in an interdependent manner to be successful. To facilitate this, all teams have access to a private discussion forum, a chat room, an in-game messaging system, and a regularly updated news feed listing relevant performance statistics. In the literature, groups are commonly conceptualized as a "collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social system" (Cohen & Bailey, 1997, p. 241). Teams in this game correspond to this definition as they share and protect each other's resources (i.e., interdependence), work towards the goal of creating a major landmark as a team (i.e., shared responsibilities for outcomes), establish their identity as a team via profile pages (i.e., team identification), and are embedded within a huge network of other teams and individuals within the game (i.e., broader social network).

3.3.2 Sample and Procedures

We collected data in cooperation with *Travian Games GmbH*, a company in Southern Germany, which runs the online simulation game as a form of commercial entertainment. Specifically, we made use of two types of data: Log-file data and online survey data. As for the log-file data, *Travian Games GmbH* provided us with backup files of the game covering all in-game actions (e.g., entering/leaving a team) and statistics (e.g., performance measures, team size) on a continuous basis. For this study, we derived a sample from six servers in Australia, Finland, France, Italy, Poland, and the United Arab Emirates with player numbers per server ranging from 29,484 to 146,651 and an overall average of 88,857.33. We collected daily log-file data for all teams over a period of 56 days and aggregated them to weekly measures. We started data collection approximately nine months after the game round started – that is, roughly at the 75% mark of the game round. This was done because team formation is a time-consuming process in this game as initially each participant starts on his or her own. Participants have to accumulate significant amounts of resources before either forming or joining a team.

At the first measurement point of the log-file data, we conducted the survey within the game to obtain measures for team relational climates as well as sociodemographic and game-related information (i.e., experience with the game). Participation in the survey was voluntary and incentivized with a chance to win in-game currency worth about $2.50 USD. Specifically, participants received an in-game message, which directed them to the survey of their respective national languages. Translation was administered utilizing a standard back-translation procedure (Brislin, 1980).

The resulting mixed dataset was restricted based on four conditions. First, we included only responses from adult individuals above the age of 18. Second, following the definition of groups by Cohen & Bailey (1997), we included only those teams with at least three team members throughout the whole observation period of eight weeks. Third, to obtain meaningful team

level measures, we restricted our sample to teams with at least two complete survey responses. Fourth, we excluded teams that were inactive for more than 10% of the days throughout the observation period to assure the teams' psychological involvement in the game. This resulted in a final dataset of 2,328 observations nested in 291 teams (comprising 1,746 individual survey responses) from all six countries (Australia: 5.8%, Finland: 7.4%, France: 23.2%, Italy: 36.8%, Poland: 16.4%, United Arab Emirates: 10.4%). Teams had an average of 36.5 members (*SD* = 17.3) ranging from 3 to 60. From the survey, we know that participants were on average 32.4 years old (*SD* = 10.57) with 20.0% being female. Moreover, the average participant had around 20 months of experience with the game (*SD* = 14.5) from previous game rounds.

3.3.3 Measures

Team performance. In our online simulation, teams grow a simulated population as they develop and extend their infrastructure. In turn, a developed infrastructure allows teams to accumulate and defend their resources more effectively, which is a key requirement to win the game. The team's population size functions as an indicator of productivity and its potential to win the game. This variable is also the recommended in-game criterion to compare and rank the players' own success in the game. It is transparent, continuously updated, and accessible to all players. Therefore, we utilize team population size as our performance measure from the log-file data.

Relational climates. We utilized 16 items from Vodosek (2009) to operationalize relational climates and adapted them to our research setting. Sample items are "The members of my alliance have many things in common that make them essentially the same." (i.e., communal sharing), "One of the group members calls the shots in the group." (i.e., authority ranking), "When alliance members work together, they usually split the work evenly." (i.e., equality matching), "The members of my alliance calculate what their "payoffs" are in this alliance and act accordingly." (i.e., market pricing). Participants were asked to rate their extent of agreement

with Likert-type scales ranging from "none of the time" (1) to "always" (5). Because relational climates were conceptualized as a shared team level perception, we aggregated all individual responses to the team level. To justify this, we calculated interrater agreement ($r_{wg(j)}$) with expected random variance of 2 for all relational climates (James et al., 1984). Analyses revealed moderate agreement among team members with $r_{wg(j)}$ ranging from .56 to .64 (i.e., communal sharing = .64, authority ranking = .64, equality matching = .59, market sharing = .56). This indicates slightly lower agreement as compared to the commonly accepted cutoff of .70 as a rule of thumb (Lance et al., 2006), but are in range to prior findings on organizational climates (Boehm et al., 2014; McKay et al., 2009). We also examined two intraclass correlations: The ICC(1), representing the amount of total variance residing on the team level, and ICC(2), representing the stability of group means (Bliese, 2000). Concretely, we find ICC(1) ranging from .09 to .15 (i.e., $ICC_{\text{Communal Sharing}}(1) = .13$, $ICC_{\text{Authority Ranking}}(1) = .13$, $ICC_{\text{Equality Matching}}(1) = .09$, $ICC_{\text{Market Pricing}}(1) = .15$) indicating that for our relational climates 9 to 15% of the total variance is accounted for by team membership. For ICC(2), we find values ranging from .36 to .50 (i.e., $ICC_{\text{Communal Sharing}}(2) = .46$, $ICC_{\text{Authority Ranking}}(2) = .47$, $ICC_{\text{Equality Matching}}(2) = .36$, $ICC_{\text{Market Pricing}}(2) = .50$), thus, indicating mostly good reliability of team level means (LeBreton & Senter, 2008). Overall, these results provide sufficient support to aggregate individual responses at the team level.

Controls. Scholarly work suggests that team size may affect performance through various channels. Larger teams are theorized to suffer from coordination and motivation losses as well as difficulties to maintain role clarity (LePine et al., 2008). At the same time, larger teams may have more available information and capabilities to make better decisions and, thus, improve performance (Carnevale & Probst, 1998; Haleblian & Finkelstein, 1993). Therefore, we controlled for team size in all models. Further, research suggests that turnover in teams affects team effectiveness. For instance, van der Vegt et al. (2010) find learning behavior as well as

task flexibility to mediate the negative relationship between team turnover and team performance. Thus, we added team turnover rate as control to our models. As team dynamics may be influenced by the team phase during observation, we also controlled for the day of formation of each team. Moreover, we controlled for the sociodemographic variables age and gender within the team as well as stated experience with the game by each team (e.g., accumulated in various rounds of this game).

3.3.4 Analytical Strategy

To test our model, we conducted multilevel growth model analyses utilizing the nlme package (Bates & Pinheiro, 2000; Bliese & Ployhart, 2002) in the open-source software R (R Development Core Team, 2004). In doing so, we followed the procedures for conducting multilevel analyses recommended by (Bliese & Ployhart, 2002). As we are interested in cross-level interactions, we group-mean centered all time-variant predictor variables (i.e., team size, turnover rate) and grand-mean centered all time-invariant predictor variables (i.e., age, gender, game experience, communal sharing, authority ranking, equality matching, market pricing) (Enders & Tofighi, 2007). To make effect sizes comparable, we also standardized all predictor variables by setting their standard deviation to 1. In addition, a confirmatory factor analysis was conducted to examine construct distinction of our predictor variables utilizing the lavaan package in R (Rosseel, 2012).

3.4 Results

Table 3.1 provides descriptive statistics for our sample. Note that for each time-variant variable, we included only initial, mid-stage, and final values to provide a meaningful overview of the longitudinal data while still keeping the table readable. Following Bliese & Ployhart (2002), we started our analyses by examining at which level significant variation in the dependent variable resides before testing our hypotheses. This is important to avoid unnecessary complexity in multilevel modeling (Aguinis et al., 2013). To do so, we, first, examined the intraclass

correlation (i.e., ICC(1)) of the outcome variable and, second, determined whether a model accounting for such higher-level effects fits the data significantly better (Bliese & Ployhart, 2002). Specifically, we find that team membership explains 98% of the variance in team performance across measurement occasions (i.e., ICC(1) = .98). To test whether this between-team variance is significantly different from zero we contrasted model fit with a model not allowing for a random intercept (i.e., generalized least square model). Results yielded a significantly better model fit for the random intercept model ($\chi^2_{diff}(1) = 3928.34$, $p < .01$). This indicates that between-team variance in performance is significantly different from zero and suggests team level characteristics to be responsible for team performance differences (Aguinis et al., 2013). As our dataset consists of multiple measurement occasions within teams within countries, we also tested whether a model accounting for a random intercept on three levels fits the data better (i.e., level 1: measurement occasion; level 2: team; level 3: country). Results indicated that a three-level multilevel model fits the data significantly better ($\chi^2_{diff}(1) = 2.92$, $p < .05$). Therefore, we utilized three-level mixed-effects models for all subsequent analyses. In line with Bliese & Ployhart (2002), we proceeded by examining a model accounting for linear change of the dependent variable (i.e., team performance) over time. Analyses revealed a significant linear growth of performance in teams over time.

Table 3.1: Descriptive Statistics and Correlations

Variable	*Mean*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Level 1: Time																		
1. Team Size Time 0	38.64	16.44																
2. Team Size Time 3	36.73	17.07	0.93															
3. Team Size Time 7	34.06	17.95	0.85	0.93														
4. Turnover Rate Time 0	0.01	0.02	-0.25	-0.30	-0.29													
5. Turnover Rate Time 3	0.01	0.02	-0.14	-0.28	-0.30	0.17												
6. Turnover Rate Time 7	0.01	0.03	-0.12	-0.13	-0.25	0.09	0.06											
7. Performance Time 0	5,423.28	4,600.34	0.42	0.42	0.43	-0.23	-0.15	-0.12										
8. Performance Time 3	5,949.77	4,929.55	0.44	0.45	0.46	-0.25	-0.19	-0.12	0.99									
9. Performance Time 7	6,532.36	5,286.38	0.47	0.49	0.50	-0.26	-0.23	-0.13	0.98	0.99								
Level 2: Team																		
10. Age	31.61	6.14	-0.01	0.01	0.03	-0.06	-0.24	-0.13	0.09	0.10	0.10							
11. Female	0.22	0.22	-0.23	-0.21	-0.23	0.05	0.02	0.01	-0.16	-0.16	-0.14	0.02						
12. Game Experience	18.61	8.96	0.28	0.28	0.29	-0.14	-0.11	-0.08	0.65	0.64	0.63	0.09	-0.11					
13. Day of Formation	94.09	80.54	-0.40	-0.37	-0.39	0.16	0.15	0.23	-0.38	-0.38	-0.39	-0.12	0.14	-0.34				
14. Communal Sharing	3.36	0.61	0.34	0.33	0.33	-0.21	-0.08	-0.10	0.37	0.38	0.38	0.10	-0.03	0.27	-0.18			
15. Authority Ranking	3.30	0.60	0.46	0.44	0.44	-0.17	-0.08	0.01	0.41	0.41	0.42	0.01	-0.24	0.35	-0.24	0.59		
16. Equality Matching	3.05	0.60	0.35	0.35	0.37	-0.12	-0.01	-0.14	0.34	0.34	0.33	0.04	-0.10	0.25	-0.18	0.72	0.63	
17. Market Pricing	2.51	0.62	-0.14	-0.13	-0.12	-0.03	0.24	0.01	-0.09	-0.09	-0.11	-0.27	0.07	-0.10	0.21	0.15	0.12	0.31

Note. N(observations) = 2,328; N(teams) = 291. Correlations greater than .05 are significant at $p < .05$. Correlations greater than .06 are significant at $p < .01$

Note that this increase in team performance is in line with conceptual work on team development (Marks et al., 2001; Tuckman, 1965; Tuckman & Jensen, 1977). Models accounting for time effects of higher power indicated no significant squared or cubic trend. As we are primarily interested in team-specific differences in performance growth, we continued by examining whether linear change in performance varies across teams and countries. Thus, we test for random variability of the linear time effect across teams by contrasting models with log-likelihood ratio tests (Bates & Pinheiro, 2000; Bliese & Ployhart, 2002). Analyses revealed a significant amount of random variability in team performance growth over time ($\chi^2_{diff}(4)$ = 1,220.72, $p < .01$). This proposes that team level characteristics not only affect static differences in performance but also differences in the speed of growth in performance. Following recommendations in the literature (DeShon et al., 1998), we also tested for autocorrelation and heteroscedasticity. Both are considered to be particularly relevant for longitudinal data (Bliese & Ployhart, 2002). Analyses provided evidence for both (controlling for autocorrelation: $\chi^2_{diff}(1)$ = 381.44, $p < .01$; controlling for heteroscedasticity: $\chi^2_{diff}(1) = 7.91$, $p < .01$). Consequently, we control for autocorrelation and heteroscedasticity in all subsequent models.

3.4.1 Testing the Measurement Model

To examine whether our constructs are distinguishable in our dataset, we conducted a confirmatory factor analysis. Initially, all 16 items were included as respective indicators of the underlying four latent constructs (i.e., communal sharing, authority ranking, equality matching, market pricing). However, according to global fit measures, this model showed only poor fit with the empirical data ($\chi^2(51) = 887.05$, $p < .01$, comparative fit index (CFI) = .90, Tucker–Lewis index (TLI) = .87, root mean square error of approximation (RMSEA) = .10.; standardized root mean square residual (SRMR) = .08). Therefore, items with insufficient model compatibility were sequentially removed from the model until adequate model fit was reached. Items were eliminated if 1) indicator reliabilities were low (Hair et al., 2004) or 2) modification

indices suggested substantial improvement of fit through elimination (Kline, 2005). The resulting model comprised 13 items and exhibited sufficient global fit ($\chi^2(59) = 369.12$, $p < .01$, CFI = .97, TLI = .95, RMSEA = .05., SRMR = .05). All items loaded significantly on their corresponding factor. The four-factorial model also provided better global fit than all possible models with three, two, or one single factor ($806.52 < \chi^2(\Delta df = 3) < 4152.41$, $ps < .01$, $.54 <$ CFI $<$ .92, $<$ TLI $< .95$, $.08 <$ RMSEA $< .19$, $.05 <$ SRMR $< .16$). The Cronbach alphas for the dataset were .77 (communal sharing), .82 (authority ranking), .78 (equality matching), .80 (market pricing) and indicate sufficient internal consistency. These results give additional support to the conceptualization of the relational climates as four distinct but related factors.

3.4.2 Testing the Research Model

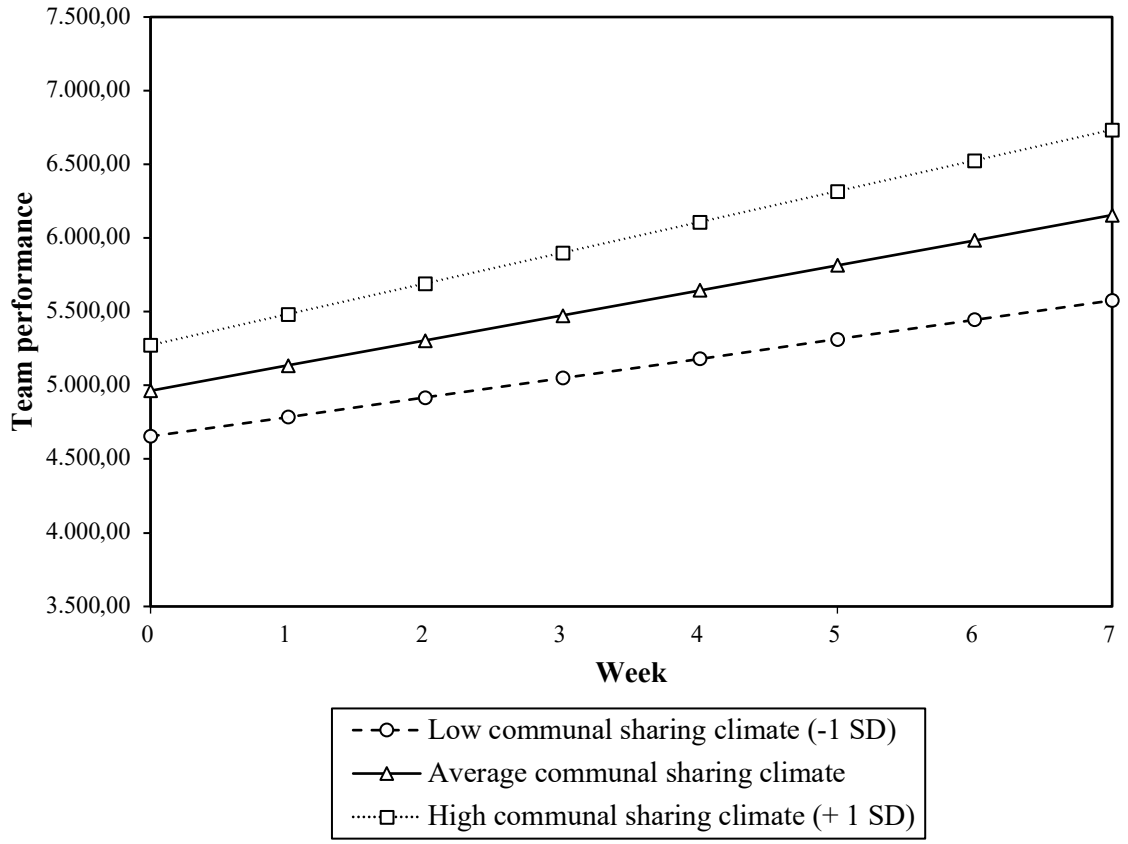
To investigate the functionality of relational climates in our teams, we conducted three nested multilevel models, which are reported in Table 3.2. In Model 1, level 1 and level 2 control variables were used to predict team performance. In Model 2, we predicted team performance using team relational climates (i.e., communal sharing, authority ranking, equality matching, market pricing) while controlling for our control variables. Finally, in Model 3, we added interaction terms for each team relational climate and time to examine the effect over time. As for a communal sharing climate, we expected a positive effect on performance, such that performance would grow comparatively faster with a stronger communal sharing climate. Results on the linear interaction term of communal sharing and time indicate a significant positive relationship with team performance ($\gamma = 38.52$, $SD = 14.85$, $p < .01$). This suggests that teams with a communal sharing climate increase team performance more rapidly as compared to teams with a lower communal sharing climate. Figure 1 illustrates the significant interaction by plotting the predicted team performance over time in relation with low and high team communal sharing climate.

Table 3.2: Mixed-Effects Model on the Moderating Effect of Relational Climates on the Development of Team Performance

	Model 1				*Model 2*				*Model 3*			
	Coeff.	SD	t	p	Coeff.	SD	t	p	Coeff.	SD	t	p
Level 1												
Intercept	5,028.71 **	510.63	9.85	0.00	4,976.22 **	614.55	8.10	0.00	4,963.89 **	653.85	7.59	0.00
Time	171.75 **	16.32	10.52	0.00	171.62 **	16.35	10.50	0.00	170.30 **	16.48	10.33	0.00
Team Size	240.94 **	34.33	7.02	0.00	240.43 **	34.40	6.99	0.00	240.83 **	34.31	7.02	0.00
Turnover Rate	17.18 **	4.82	3.57	0.00	17.39 **	4.81	3.62	0.00	17.17 **	4.81	3.57	0.00
Time × Communal Sharing									38.52 *	14.85	2.59	0.01
Time × Authority Ranking									36.24 *	13.74	2.64	0.01
Time × Equality Matching									-9.98	16.09	-0.62	0.54
Time × Market Pricing									-26.63 *	11.47	-2.32	0.02
Level 2												
Age	-307.91	200.04	-1.54	0.12	-393.15	199.49	-1.97	0.05	-399.82 *	199.52	-2.00	0.05
Female	-557.43 **	186.20	-2.99	0.00	-490.95 **	183.72	-2.67	0.01	-493.59 **	183.57	-2.69	0.01
Game Experience	2,603.31 **	189.97	13.70	0.00	2,407.44 **	191.00	12.60	0.00	2,408.70 **	190.80	12.62	0.00
Day of Formation	-532.23 **	191.62	-2.78	0.01	-478.71 *	188.96	-2.53	0.01	-481.60 *	188.76	-2.55	0.01
Communal Sharing					58.66	265.82	0.22	0.83	309.58	282.03	1.10	0.27
Authority Ranking					806.90 **	255.60	3.16	0.00	1,041.23 **	270.12	3.85	0.00
Equality Matching					430.60	289.21	1.49	0.14	360.43	306.72	1.18	0.24
Market Pricing					-536.71 *	222.18	-2.42	0.02	-701.50 **	233.89	-3.00	0.00
BIC		33,985.38				33,941.17				33,912.62		
AIC		33,887.64				33,820.48				33,768.97		
logLik		-16,926.82				-16,889.24				-16,859.49		

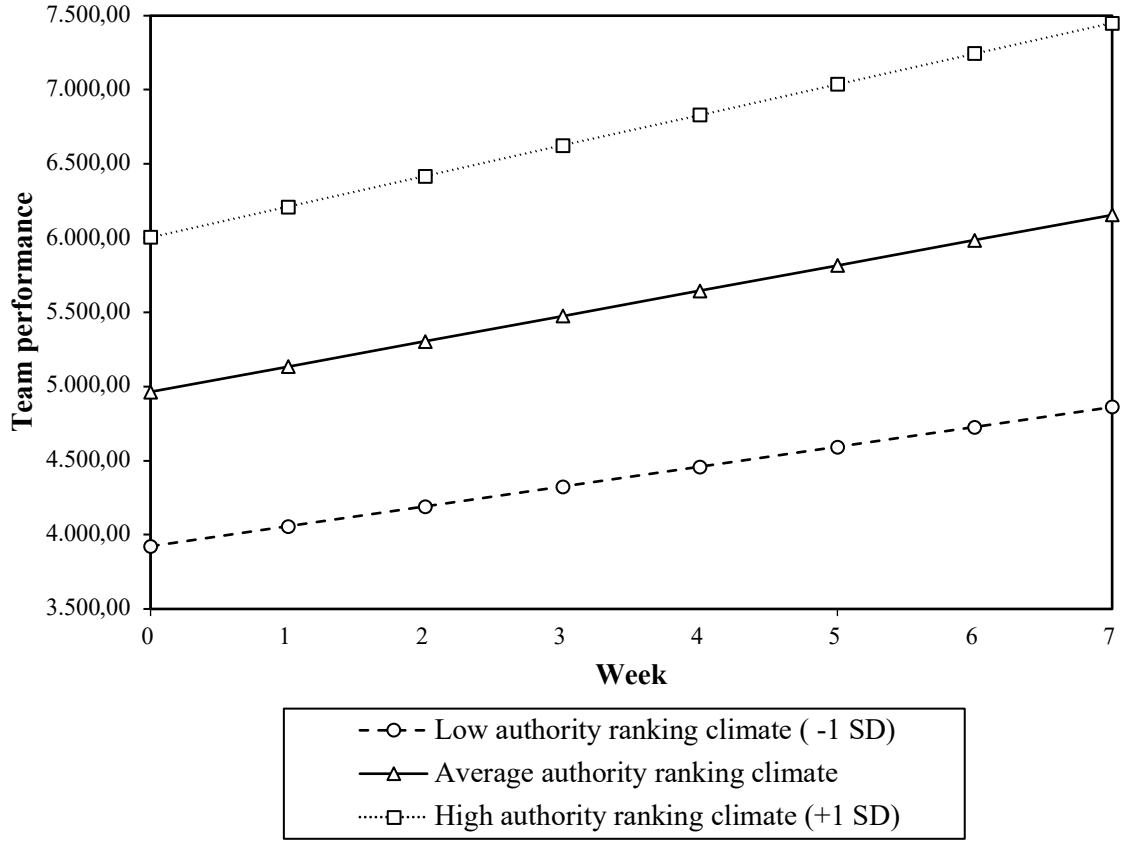
Note. N(observations) = 2,328 N(teams) = 291. All Level 1 predictors were z-standardized and group-mean centered. Level 2 predictors were z-standardized and grand-mean centered. *** p < .001; two-tailed. ** p < .01, two-tailed. * p < .05, two-tailed.

Figure 3.1: Predicted Team Performance as a Function of Time and Communal Sharing Climate



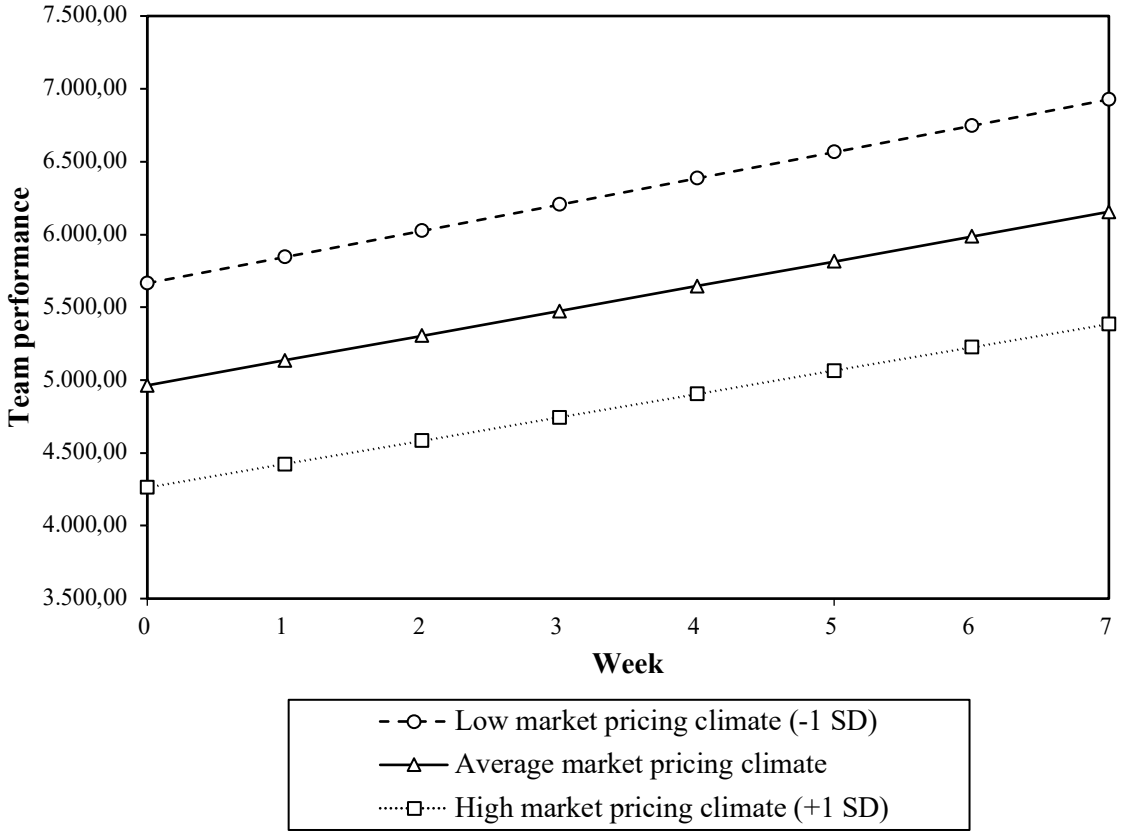
With regard to authority ranking teams, we also expected a positive effect on performance growth. Analyses revealed a significant positive interaction term for authority ranking and time ($\gamma = 36.24$, $SD = 13.74$, $p < .01$) indicating that authority ranking climate significantly increases the rate of performance increase in teams. Figure 3.2 models the significant interaction of time with authority ranking climate.

Figure 3.2: Predicted Team Performance as a Function of Time and Authority Ranking Climate



For equality matching teams, we found no clear indication in the literature on whether an equality matching climate would affect performance of interdependent teams positively or negatively. Our results are in line with this, suggesting no significant interaction effect (γ = -9.98, *SD* = 16.09, $p > .05$). Consequently, an equality matching climate does not affect the development of team performance in our dataset. Concerning market pricing, we predicted a negative impact on performance development. In line with our expectations, our analysis results state a significant negative interaction effect for market pricing climate and time (γ = -26.63, *SD* = 11.47, $p < .05$), thus, indicating that team performance grows slower in teams with a market pricing climate. The interaction effect is plotted in Figure 3.3.

Figure 3.3: Predicted Team Performance as a Function of Time and Market Pricing Climate



Among the control variables, we find team size, turnover rate, game experience, and team age (i.e., day of formation) to positively affect team performance. Moreover, we find teams with a higher percentage of male members and younger teams to perform better.

3.5 Discussion

Teams are considered dynamic entities with varying aspects of the team (e.g., structural features, behavioral processes, emergent states) interrelating in their effect on a team's performance (Mathieu et al., 2017, 2018). Building on relational models theory (Fiske, 1991, 1992), climate theory (Kuenzi & Schminke, 2009), and the team model by Mathieu et al. (2017), we aimed to develop a model which explains how the different relational climates affect the performance of interdependent teams over time. Theoretical work stresses that all four models rely on well-established fairness principles and are all functional for facilitating interaction between individuals but that their effectiveness differs across contexts (Fiske, 1991, 1992). To test our

model, we collected and combined behavioral data from a complex and interdependent team-based online simulation game with survey data generated in the same sample. The resulting dataset was analyzed utilizing multilevel growth models (Bliese & Ployhart, 2002). To the best of our knowledge, this is the first study to formally investigate the effect of relational models on team performance both generally and specifically in the context of interdependent teams. Our results demonstrate that relational climates had a significant and varying impact on performance development of interdependent teams over time, thus, highlighting the importance of interpersonal relationships for understanding team effectiveness. Specifically, we found that both an authority ranking and communal sharing climate (in descending effect size) positively affect team performance and that this effect unfolds over time. In contrast, our results suggest a market pricing climate to negatively affect the performance of interdependent teams over time, while an equality matching climate did not significantly affect team performance in our sample.

As for communal sharing, we find interdependent teams under this relational climate to improve performance significantly faster as compared to those which do not. This is consistent with theoretical work on the effectiveness of entrepreneurial teams. Blatt (2009) argues that interdependent entrepreneurial teams work best when making significant investments of time, energy, and expertise towards the relationship and, thus, should benefit most from a communal sharing climate. Moreover, based on interdependence theory, Kelley et al. (2003) argue that interdependence in teams generates high demands for relationship maintenance, which of all relational climates is generally highest in communal sharing. The suitability of communal sharing climates for creating such an environment is also supported by recent empirical studies. For instance, Cherry, Kallbekken, Kroll, & McEvoy (2013) found in a series of experiments that cooperation is higher when participants are exposed to words such as “group” or “contributing” (i.e., communal sharing) as compared to “buyer” or “market” (i.e., market pricing). Similarly, Liberman, Samuels, & Ross (2004) find participants in a prisoner’s dilemma to cooperate more

often when the game itself is called "Community Game" (i.e., communal sharing) rather than "Wall Street Game" (i.e., market pricing). Moreover, DeScioli & Krishna (2013) find support that individuals in a communal relationship tend to behave more altruistically as compared to authority ranking or trading relationships, thus, supporting the beneficial effect of communal sharing climates for interdependent teams.

Concerning authority ranking teams, we find them to perform significantly better over time and even demonstrate by far the strongest effect of all relational climates. This is inconsistent with recent meta-analytical work by Greer et al. (2017), who find an overall negative effect of hierarchical structures on team effectiveness. Specifically, these authors challenge the functionalist perspective on hierarchies by showing that the increased conflict potential in hierarchical structures outweighs the functional coordinating potential of authorities. Our analyses contrast these results as we find interdependent teams with an authority ranking climate to perform significantly better than non-hierarchical teams under all remaining relational climates. Notably, Greer et al. (2017) also investigate the moderating effect of task interdependence but do not find any significant effect. This points towards additional mechanisms (apart from the increased coordination potential) through which authority – and particularly an authority ranking climate – may benefit a team and offers a fruitful avenue for future research. Specifically, future studies could evaluate the qualitative differences and advantages that the emergence of an authority ranking climate may have on teams as compared to a typical hierarchical structure. Fiske (1992) notes that individuals under an authority ranking climate readily accept the superior authority and would willingly defend their superiors' decisions. This may decrease the potential for status conflicts and, consequently, stabilize hierarchical systems.

As for equality matching, we find no significant impact of an equality matching climate on the performance of interdependent teams. This implies that an equality matching climate might indeed act as a double-edged sword in interdependent teams: On the one hand, it might

encourage helping and knowledge sharing behaviors by inducing reciprocal behaviors between team members and, thus, facilitating effectiveness in interdependent teams. On the other hand, this climate may increase the conflict potential when equal distribution of labor across team members is unfeasible. In the literature, equality matching is generally investigated the least as a unique relational model. Instead, it is oftentimes considered a kind of intermediate step in the relationship development between a market pricing and a communal sharing model. In this vein, equality matching is, for instance, described as inducing less helping behavior (e.g., Mossholder, 2011) or reciprocal behavior (e.g., Tong et al., 2008) than communal sharing but more than market pricing, or is not considered at all (e.g., Batistič et al., 2016). Our results indicate that these positive aspects may not comprise the full spectrum of consequences for interdependent teams. Instead, they suggest that an equality-based climate may have an additional dysfunctional aspect in interdependent teams that we do not yet fully understand. Future research should further investigate the potential negative side of an equality-based relationship in interdependent teams. In this vein, Fiske (1992) argues that equality matching is a common source of conflict and aggression and ”encourages people to be scrupulously fair and to hide their resources, in order to avoid envy” (p. 705). Consequently, we encourage future studies to investigate when and how an equality-based relationship may either act as a facilitator for deeper relationships or a catalyst for conflict and counterproductive behavior.

As for the negative effect of market pricing, our results are largely consistent with existing theoretical and empirical work on market pricing models. Specifically, in teams where team members have to work interdependently and rely on cooperation and joint value creation, market pricing is considered suboptimal due to the general egocentric motivation encouraged by it (Bridoux & Stoelhorst, 2016). In line with this, Sheppard & Sherman (1998) associated market pricing with lower levels of trust. Szirtes (2012) found in their empirical study on a consulting firm that knowledge exchange is suppressed under a market pricing model, thus, compromising team performance.

3.6 Limitations, Future Research, and Practical Implications

We want to point out three important limitations in this study, which future research should address. First, we investigate the influence of relational climates on the effectiveness of interdependent teams. While this may be an increasingly relevant work design in modern organizations, it does not comprise the whole spectrum of existing team types. Fiske (1992) argues that all relational models are functional but that their respective advantages differ related to the characteristics of both the team (e.g., skill differentiation) and the task (e.g., task interdependency, differential costs of collecting and storing information). Consequently, it is reasonable to assume that our results differ drastically given other team contexts. For instance, Blatt (2009) argues that a communal sharing climate may be superior for entrepreneurial teams in early phases as it allows them to build up relational capital and, thus, overcome the liability of novelty in this context. Based on this, we encourage future research to investigate the functionality of relational climates in other team types to get a clearer picture of when certain climates may be effective.

Second, we do not investigate potential dynamics in the relational climates of teams themselves. Instead, we focused on isolating the influence of each relational climate by giving teams enough time to stabilize and establish a dominant relational climate to guide their interaction before the start of the observation period. In his seminal paper, Fiske (1992) theorizes that groups likely move from a market pricing to an equality matching to a communal sharing climate – or from an authority ranking to a communal sharing climate as time progresses and members get to know each other better. While it seems reasonable to assume that not all teams will radiate towards the deepest form of relationships, we still do not know when and under what circumstances teams transform their relationship to a higher (or lower) level. Theoretical work on the development of trust in work teams indicates that deepening the relationship partially depends on the outcome of the cooperation itself (Lewicki & Bunker, 1996). Based on

this, a fruitful avenue for further research would be to investigate how performance development of teams may facilitate the transformation of team relational climates.

Third, we do not investigate dissimilar individual perceptions of the team relational climate. While our sample of established teams indicates sufficiently similar relational climate perceptions on the individual level to be aggregated to the team level, this does not necessarily have to be the case in all (and especially younger) teams. This may have significant consequences for the functionality of teams, which we do not yet fully understand. For instance, Boer et al. (2011) show that the willingness to share knowledge largely depends on the perception that the respective relational model is shared by the other party, thus, indicating that functionality in teams may depend on symmetry in individual perceptions. Therefore, future studies should further investigate potential asymmetries in relational climate perceptions across team members and their consequences for team effectiveness.

This study has several practical implications for managers of interdependent teams. Our results show that managers should care for and be aware of the dominant relational climate in use within their team. Our findings imply that for interdependent teams these may have direct implications on the team's effectiveness. To stimulate team effectiveness, we encourage managers to acquaint their members with either a communal sharing or authority ranking climate and, in turn, avoid market pricing structures. This may be a challenging task as, for instance, achievement-oriented individuals in particular feel drawn towards the comparability and predictability of market pricing structures (Fiske, 1992). With regard to an authority ranking structure, we encourage managers to be aware of the two-sided obligation of coordinating resources and tasks while also protecting employees in times of external pressure, thus, strengthening the legitimacy of their authority. As for a communal sharing structure, interventions at the team

level could be the focus on team level incentives as well as a transparent information and feedback system (Zak, 2017). Team building activities may also help to enhance identification with the team and a communal feeling among team members.

3.7 Conclusion

Relational climates (Mossholder et al., 2011) are based on relational models which constitute the fundamental building blocks of all social interactions (Fiske, 1992). Our analysis of the functionality of these climates in interdependent teams demonstrates that they matter for performance and should be taken into consideration by researchers and practitioners alike. Overall, these findings indicate that the relational climates framework provides a fruitful basis for the understanding of team processes and emergent states as they arise from individual perceptions of team members. We discuss our findings with regard to existing literature and develop potential avenues for future research on the notion of interpersonal relationships in work teams.

4 Essay III: Exploring the Impact of Team Trusting Behavior on Team Turnover: A Cross-Cultural Comparative Analysis

Abstract

Turnover remains an important issue in team research even after a century of research. Trust has been identified to be an important antecedent to turnover. However, little is known about cultural differences and the underlying dynamics involved in this process. This paper sets out to investigate this void in the literature by investigating the overall development of turnover over time as well as the varying impact of team trusting behavior across cultures. To do so, I collected longitudinal behavioral data on a sample of 1,766 teams in 22 countries over 28 weeks from an online simulation game. Overall, I find a significant negative curvilinear development of turnover in teams over time, which differs both in magnitude and direction across cultures. Moreover, I find a significant negative relationship between trust and turnover, which differs in magnitude across cultures. I advance both trust and turnover literature by investigating turnover dynamics in an intercultural context.

Current Status (see also Appendix C):

Uhlemann, K. F. (2022). Exploring the Impact of Team Trusting Behavior on Team Turnover: A Cross-Cultural Comparative Analysis. *Working paper*.

4.1 Introduction

Turnover remains a crucial topic for practitioners and scholars alike due to its large consequences for organizational work (Hom et al., 2017). Voluntary turnover is considered very costly for organizations (Han et al., 2016; Holtom et al., 2005) and has been found to have a significant impact on overall organizational productivity (Shaw et al., 2005). Yet, job changes are becoming more and more frequent: In the US more than 25% of workers change their job every second year (Rollag et al., 2005). According to the Duke CFO survey, hiring and retaining employees has even become the most frequently mentioned concern by CFOs for the future of their business (Duke CFO Survey, 2019). Therefore, it is not surprising that thousands of studies have accumulated over the last century with the goal of describing and predicting voluntary turnover in organizations (Memon et al., 2018). In the literature, trust has been discovered as a crucial predictor of turnover due to its strong implications with commitment to the team and organization (Cropanzano & Mitchell, 2005). For instance, in their meta-analysis, Dirks & Ferrin (2002) find an overall strong negative relationship between trust and turnover.

Nonetheless, we know surprisingly little about the underlying temporal and contextual factors associated with team membership. This is, however, important to understand as team processes are known to be highly affected by both previous team processes and outcomes (Mathieu et al., 2017) and the culture in which the respective behavior is interpreted (Abelson, 1981). For instance, Costigan et al. (2013) find collectivism to moderate the relationship between trust and turnover in their sample of four countries. To address this research gap, I focus on the development of turnover in teams over time in various cultures and investigate the cross-cultural differences in the trust–turnover relationship in these teams. Specifically, I analyze the trusting and turnover behavior of 1,766 virtual teams in 22 countries in an online simulation game called *Travian* over a period of 28 weeks. In doing so, I develop a three level mixed-effects growth model on the development of turnover and investigate potential differences in both.

Thereby, this study contributes to the following literature streams: First, it adds to literature on the development of turnover. Scholarly work in this literature stream has emphasized the importance of a dynamic perspective on team processes and voluntary turnover (Hom et al., 2017; Mathieu et al., 2017); however, so far longitudinal research on turnover behavior is sparse in the literature. I add to this by investigating actual turnover in virtual teams over a period of 28 weeks. In doing so, I do not only measure turnover intention but rather investigate the actual turnover behavior in teams. Second, it adds to literature on the impact of culture on turnover development. Research in this area stresses that the cultural context significantly affects the way team processes and reciprocity are interpreted by team members (Cropanzano & Mitchell, 2005). In line with this, cross-sectional studies have shown that specific cultural factors such as collectivism affect turnover and related constructs (J. Chen et al., 2014). Despite these efforts, research is still lacking a comprehensive overview of the dynamic development of turnover in different cultures. This study adds to this notion, by investigating the impact of different cultures on the longitudinal development of turnover in teams. Third, it adds to our understanding of the trust–turnover relationship. Research has investigated the impact of trust on turnover for decades and has found an overall negative effect of trust on turnover (Dirks & Ferrin, 2002). However, relatively little is known about the cultural context of this relationship (Majeed & Jamshed, 2021). Although some scholarly work shows cultural aspects to moderate this relationship (Arshad, 2016; Costigan et al., 2013), research is still dominated by studies in a Western context (Nair & Salleh, 2017). I add to this perspective by investigating the impact of team trusting behavior on turnover behavior in a cross-cultural context with 22 different cultures.

4.2 Theory

4.2.1 Team Trust and Trusting Behavior

Trust is typically defined based on two components: “The willingness to be vulnerable”, and a “positive expectation of others” (Fulmer & Gelfand, 2012). Based on this, trust can be

described as the voluntary acceptance of risk regarding the behavior of the respective other combined with the belief that the trusted party reacts favorably or at least not harmful towards oneself (Gambetta, 1988; Luhmann, 1988). In line with this, I follow Rousseau et al. (1998) who define trust as "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another" (p. 395). Notably, research agrees that trust can manifest on multiple levels including the individual, team, and organizational level (see Fulmer & Gelfand, 2012, for an extensive review). On these higher levels, trust is considered a shared perception and emergent phenomenon over time (Costa & Anderson, 2011).

In their seminal paper, Mayer et al. (1995) describe trust as conceptually different from risk-taking or trusting behavior, respectively. While the former is described as a psychological state and, thus, the *willingness* to make oneself vulnerable, the latter describes the actual behavioral manifestation of this willingness into action. On the team level, such actions include sharing information, giving feedback, asking questions, or seeking help among members of the team (Edmondson, 2002). In line with this, I follow Breuer et al., (2020) and define team trusting behavior as "team members' actions reflecting the shared willingness of the team members to be vulnerable to the actions of other team members" (p. 9).

4.2.2 The Impact of Team Trusting Behavior on Turnover in Different Cultures

Research typically refers to one of two literature streams when describing the development of turnover: Expectancy theory (e.g., Lee & Mowday, 2017; Porter & Steers, 1973; Price, 2001) and social exchange theory (e.g., Aryee et al., 2002; Costigan et al., 2013). Social exchange theory describes the development and consequences of relationships which are formed via multiple interactions with increasing stakes over a period of time (Blau, 1964). Specifically, in his theory, Blau (1964) states that individuals interact and exchange resources and information with the expectation of reciprocal behavior. He theorizes that if a favorable exchange

elicited by party A is perceived by party B, the latter feels the need to retaliate the favorable exchange and – accordingly – react in a favorable way (Blau, 1964, 1972). In turn, the favorable response is perceived by party A, who is likely to continue the exchange with slightly higher stakes throughout the next interactions. The theory states that over multiple rounds of interactions, both parties tend to develop their relationship in a virtuous circle (Blau, 1964) and develop more beneficial attitudes towards each other (Aryee et al., 2002; Colquitt et al., 2007). They become more committed and, in turn, are less likely to leave their team resulting in lower turnover (Cropanzano & Mitchell, 2005). Based on social exchange theory, it can, therefore, be expected that turnover decreases as teams get to know each other and form a relationship over time.

Despite being considered a universal principle, it is reasonable to expect that social exchanges and relationship development do not work identically in all cultures. Cropanzano & Mitchell (2016) suggest, for instance, that reciprocity in itself is valued differently in different cultures, which, consequently, may largely affect the way in which teams form a relationship and become more committed to each other in these cultures. In line with this, J. Chen et al., (2014) find collectivism to moderate the relationship between job attitudes such as commitment with turnover, thus, suggesting that cultural differences may affect the development of turnover in teams. To summarize, we still do not know how turnover develops across different cultures over time. Research question 1 summarizes this.

RQ1: How does turnover develop over time in teams and how does this development differ in different cultures?

Social exchange theory is also key to linking trust in teams with turnover (Brower et al., 2009; Costigan et al., 2013). High-quality relationships formed via multiple interactions and exchanges are typically characterized by trust, mutual commitment, and reciprocity (Costigan et al., 2013). More concretely, social exchanges differ from economic exchanges in that they

are informal and not defined by any sort of contract. Therefore, individuals have to trust that their counterpart retaliates the exchange in kind without having any certainty. In line with theory, research generally agrees on trust having a negative impact on turnover. For instance, in their meta-analysis, Dirks & Ferrin (2002) find a significant negative relationship of trust with turnover intention (r = -0.40).

Similar to the development of turnover over time, trust can be expected to have a varying effect on turnover in different cultures. According to Abelson (1981), different cultures utilize different cognitive scripts, which guide their behavior and reactions towards others. For instance, D. C. Thomas & Au (2002) find that individuals react differently across cultures to low job satisfaction. While some cultures tend to openly voice their concerns, others remain more silent and less confrontational. Research generally agrees that trust has a different role across cultures but is so far inconclusive on the actual causes (Majeed & Jamshed, 2021). In line with this, existing scholarly work suggests that the relationship of trust with turnover differs across cultures. For instance, Costigan et al. (2013) find in their survey-based study in four different cultures that in-group collectivism affects both the relationship strength of affect-based and cognition-based trust. Similarly, Arshad (2016) finds that the relationship between psychological contract violation and turnover intention is moderated by two specific cultural values, thus, suggesting that a decrease in trust affects turnover differently across cultures. Taken altogether, research proposes that trust has a varying impact on turnover across different cultures. Research question 2 summarizes these results.

RQ2: How does team trusting behavior affect turnover in teams and how does this effect differ in different cultures?

4.3 Methodology

4.3.1 Research Setting

Investigating the development of turnover and its relationship with team trusting behavior requires a quantitative and longitudinal approach with multiple observations for each team and country, respectively. To achieve this, I decided to collect and utilize field data from an online simulation game. This not only allows me to collect unobtrusive behavioral data but also offers the opportunity to accumulate a large amount of observations over longer periods of time, which is typically hard to acquire utilizing other research settings such as lab experiments (Hambley et al., 2007; Staples & Zhao, 2006). This rather unconventional setting is considered to be a promising direction for future research in the social sciences (Bainbridge, 2007; Castronova & Falk, 2009). In the area of team dynamics in particular, this has already proven useful to discover dynamic relationships, which may have remained unnoticed utilizing less frequent observations (e.g., Drescher et al., 2014). Online simulations are also considered highly engaging with typically a high psychological investment of its participants, making them the ideal candidate for studies on team dynamics (Williams et al., 2006; Yee, 2006).

I utilized data from the online simulation game *Travian* (www.travian.com). The data from this game has been collected as part of a series of studies on leadership and virtual teams (e.g., Drescher et al., 2014; Gallenkamp et al., 2012; Picot et al., 2009). It is important to note that *Travian* is a commercial online game. Consequently, the data was not collected for research purposes but rather has been generated from backup files from the game provider itself. *Travian* is a complex team-based massively multiplayer online game (MMO) played in more than fifty countries where participants compete to be among the first team to build up a final monument (i.e., "Wonder of the World") in a medieval setting. To do so, participants have to gather up in teams and collect sufficient resources either by investing in their own production or by building up a military to steal resources from other teams. As their resources can also be stolen by other

teams, it is important to simultaneously invest in proper defenses as well. Notably, this game runs for 24 hours a day for roughly 12 months per game round until one team manages to acquire enough resources to build the final monument. This requires teams to coordinate their forces and attacks and provide both military protection, support, and continuous flow of resources to team members at all times. Therefore, proper coordination, reliability, and team-orientation are key to win this game. Teams in this game can consist of up to 60 members. Each team can utilize a private discussion forum, a chat room allowing for in-game messaging, as well as a frequently updated news feed providing information on individual and team performance statistics. Teams also obtain a private profile page on which they can state relevant information for members and non-members alike. As such, teams in this game comply with current definitions of teams by Cohen and Bailey (1997), who define teams as consisting of at least three or more people who are a "collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems" (p. 241).

4.3.2 Sample and Procedure

I collected data from the backup files provided by the game provider *Travian Games GmbH*. Backup files for each country have been merged into a large longitudinal dataset comprising all interactions within each respective country (e.g., stealing resources, providing resources to team members, joining and leaving teams). A sample was derived utilizing data from 22 servers in Australia, Brazil, Chile, Denmark, Finland, France, Germany, Hungary, Indonesia, Iran, Israel, Italy, Japan, Netherlands, Poland, Portugal, Russia, Serbia, Spain, Turkey, the United Arab Emirates, and the United States of America. Participant numbers per server vary between 27,837 and 189,454 with an average of 86,454.27 participants per server. Game rounds in this sample lasted between 336 and 445 days with an average of 376 days.

To receive meaningful results, I aggregated all individual data at the team level. Next, all behavioral data was further aggregated to receive weekly measures for each team. Observations for the dependent variable (i.e., turnover rate) were lagged by one week. Notably, teams can be founded every day while the game round is still running. Therefore, to adequately account for each team's lifecycle, I collected data for 28 weeks after each individual team's formation. As building up a team is a time-consuming process in this game (i.e., participants have to collect a significant amount of resources before being able to form and enter a team), I included data for each team 7 days after their respective formation, leading to a total of 27 weekly observations for each team. I restricted the dataset based on three conditions. First, to make sure that teams in my sample have sufficient time to form a relationship based on mutual trust, I included only those teams which last for at least the whole observation period of 28 weeks (i.e., roughly 52% of an average game round). Second, based on common conceptualizations of groups, I selected teams which consist of at least three members throughout the whole observation period (Cohen & Bailey, 1997). Third, to assure that teams are committed to the game, I excluded teams which are inactive (i.e., no team member has been online on that particular week) for a maximum of 10% of the observation period. This resulted in a total of 46,949 observations from 1,766 teams in 22 countries.

4.3.3 Measures

Turnover rate. Once participants have crossed a certain resource threshold in the early game, they have the option of entering, leaving, and forming new teams at all times. I measure a team's turnover rate as the ratio of members leaving the team to the current total number of team members at that time:

$$\textit{Turnover rate} = \textit{Number of leavers} / \textit{team size}$$

Team Trusting Behavior. According to the integrative model of organizational trust by Mayer et al. (1995), team trusting behavior is the proximal behavioral outcome or expression

of team trust. As such, it reflects the team's trust – that is, its willingness to take risks and be vulnerable to their fellow team members despite the possibility of exploit (Mayer et al., 1995; Rousseau, 1995). However, it differs from trust as a psychological state in that it constitutes not only the willingness to be vulnerable but the actual act of becoming it (Mayer et al., 1995; Ross & Lacroix, 1996). This comprises behaviors, such as information sharing or delegation of tasks (Colquitt et al., 2007). Teams in this game have the option of sharing access to their account with up to two other participants (i.e., "sitters"). These sitters gain complete control over their fellow team member's account and, thus, can act on behalf of them. As mentioned in the previous chapter, this game runs for 24 hours a day for roughly 12 months per game round. Therefore, teams must properly defend their resources and – most importantly – the final monument at all times. To achieve this, team members typically form sitter ties with other team members to provide, for instance, protection overnight. It is important to note that after nominating a sitter once it is impossible to monitor, control, or reverse their actions. Consequently, the account owner makes himself vulnerable to potential exploits and opportunistic behavior by the sitters (e.g., the sitters could send resources to their own account). Therefore, I consider establishing sitter ties an engagement in team trusting behavior. At all times, participants can have a maximum of two sitter ties with other participants. Therefore, the maximum amount of sitter ties equals twice the amount of team members at this specific amount. Based on this and in line with prior conceptualizations on this dataset by Drescher et al. (2014), I define team trusting behavior as the number of sitter ties at a specific point in time as the current number of sitter ties within a team divided by the current team size multiplied by two.

*Team trusting behavior = Intrateam sitter ties / (team size * 2).*

Controls. Research has shown that team size may affect turnover behavior in teams. For instance, Mathieu et al. (2017) argue that as teams may become larger, faultlines between po-

tential majority and minority subgroups may be triggered affecting team processes and outcomes. Literature also suggests that engagement positively affects an individual's likelihood to remain with their organization (Hackman, 1980). To account for this, I control for overall team activity measured by the ratio of active members (i.e., members that are online throughout the specific period) to the total number of team members. Lastly, as teams can be formed and dissolved at any time in this game, teams may find themselves both at different phases of the game throughout their lifecycle as well as varying lengths of each team phase (e.g., Tuckman, 1965). To control for both, I add the in-game day of formation as well as the number of days each team lasted before getting dissolved to my analysis.

4.3.4 Statistical Analysis

I utilized multilevel growth modeling techniques in the open-source software R (R Development Core Team, 2004) for all analyses. Specifically, I made use of the nlme package to conduct the multilevel analyses (Bates & Pinheiro, 2000; Bliese & Ployhart, 2002). As I am interested in differences of the impact of team trusting behavior on turnover between different cultures, I utilize three level multilevel mixed effect models for all analyses. Specifically, the data was structured with measurement occasions at Level 1 nested in their respective teams at Level 2 nested, in turn, in their respective countries at Level 3. This procedure allows for a statistically sound analysis of the longitudinal data while being able to interpret the results for the different countries. I followed the procedure by Bliese and Ployhart (2002) for multilevel analyses with two levels and extended it to three level analyses. Thus, I started by examining whether a three level model describes the data sufficiently better than simpler models. I continue with a model containing fixed and random time covariates to predict team turnover. Then, I proceed with more complex models by adding controls and the independent variable to predict turnover. Literature recommends group-mean centering (instead of grand-mean centering) when investigating variables on the same measurement level (i.e., team trusting behavior and

turnover rate) in multilevel models (Enders & Tofighi, 2007). In line with this, I group-mean centered all time-variant (Level 1) predictor and control variables. All time-invariant variables were grand-mean centered. Lastly, all variables were standardized by setting their standard deviation to 1 to allow for comparable effect sizes (see Lang & Bliese, 2009).

4.4 Results

Results for the descriptive statistics of the sample are provided in Table 4.1. To account for the longitudinal data while still keeping the table readable, I included only the first, mid, and final values for each time-variant variable. In the first step of the analysis, I calculated the intraclass correlation (i.e., ICC(1)) of the dependent variable (i.e., turnover rate) to examine the level at which a significant portion of the variance resides (Bliese & Ployhart, 2002). If there is no significant variance in the dependent variable at higher levels, literature suggests remaining with less complex models which are not accounting for hierarchical data (Aguinis et al., 2013). The analysis suggests an ICC(1) of .106. This indicates that around 10.6% of the variance in turnover rate resides on higher levels, and, thus, can be attributed to the team (i.e., Level 2) and/or country level (i.e., Level 3). This is in line with previous findings and suggests accounting for higher levels in subsequent analysis (J. H. Kahn, 2011). To test whether accounting for these higher levels fits the data significantly better, I proceeded by contrasting model fit for models which are not allowing for a random intercept (i.e., generalized least square model) with models allowing for a random intercept at Level 2 and Level 3, respectively. The results indicate that a model accounting for a random intercept at Level 2 fits the data significantly better than a model not allowing for a random intercept ($\chi^2_{diff}(1) = 1102.02$, $p < .01$). The results, further, suggest that a model accounting for a random intercept at Level 3 fits the data significantly better than model accounting for a random intercept at Level 2 ($\chi^2_{diff}(1) = 300.50$, $p < .01$). Consequently, the data suggests that a significant portion of variance in turnover rate resides on the country level and, thus, that country-level characteristics likely affect the overall level

of the turnover rate in the sample. In line with these findings, I proceeded with three-level mixed-effects models (i.e., level 1: measurement occasion; level 2: team; level 3: country) for all subsequent analyses. Following Bliese & Ployhart (2002), I continued by analyzing a model which accounts for linear change over time in the dependent variable and gradually tested for a squared and cubic time effect (Raudenbush, 2001). The results suggest a curvilinear development with a significantly positive linear fixed effect and a significantly negative squared fixed time effect. Models accounting for a cubic fixed effect for time are not significant in the sample.

As research question 1 covers the varying development of turnover in teams across cultures, I continued by investigating team-specific differences in the development of turnover. To do so, I followed the procedure proposed by Bliese & Ployhart (2002) and conducted tests on random variability (i.e., random slopes) for the time covariates. The results indicate support for significant variation in both linear change ($\chi^2_{diff}(4) = 297.94$, $p < .001$) and quadratic change ($\chi^2_{diff}(6) = 325.25$, $p < .001$) in the turnover rate over time. DeShon, Ployhart, & Sacco (1998) suggest controlling for autocorrelation and heteroscedasticity when working with longitudinal data. Therefore, I tested whether a model controlling for both fits the data better. I find evidence that controlling for autocorrelation ($\chi^2_{diff}(1) = 134.79.02$, $p < .001$) and heteroscedasticity ($\chi^2_{diff}(2) = 1{,}617.47$, $p < .001$) fits the data significantly better and, thus, control for both in subsequent models. Model 1 in Table 4.2 shows the results of the resulting multilevel model. Research question 1 asked the question of how turnover develops and how this development differs across cultures. As can be seen in Model 1 in Table 4.2, I find an overall significant negative relationship between time and turnover ($\gamma = –0.0209$, $SD = 0.0037$, $p < .001$) and a positive quadratic relationship between time and turnover ($\gamma = -0.0007$, $SD = 0.0001$, $p < .001$).

Table 4.1: Descriptive Statistics and Correlations

Variable	*Mean*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13
Level 1: Time															
1. Turnover Rate Time 0	0.02	0.04													
2. Team Trusting Behavior Time 0	0.13	0.14	-0.14												
3. Team Size Time 0	19.45	12.93	0.10	0.23											
4. Member Activity Time 0	0.95	0.07	-0.07	0.35	0.26										
5. Turnover Rate Time 13	0.02	0.03	0.12	-0.09	0.06	-0.08									
6. Team Trusting Behavior Time 13	0.19	0.15	-0.13	0.66	0.21	0.32	-0.18								
7. Team Size Time 13	35.26	17.19	0.13	0.20	0.54	0.20	0.04	0.28							
8. Member Activity Time 13	0.92	0.11	-0.04	0.33	0.25	0.39	-0.07	0.45	0.47						
9. Turnover Rate Time 26	0.02	0.03	0.19	-0.01	0.00	0.01	0.06	-0.03	0.13	0.03					
10. Team Trusting Behavior Time 26	0.17	0.16	-0.10	0.55	0.18	0.29	-0.18	0.75	0.23	0.40	-0.16				
11. Team Size Time 26	27.70	19.74	0.05	0.23	0.44	0.27	-0.05	0.34	0.67	0.47	-0.11	0.49			
12. Team Activity Time 26	0.79	0.24	-0.02	0.31	0.24	0.32	-0.08	0.41	0.38	0.55	-0.04	0.54	0.64		
Level 2: Team															
13. Team Longevity	285.74	62.53	0.07	0.16	0.17	0.20	-0.04	0.19	0.32	0.30	-0.12	0.32	0.52	0.46	
14. Day of Formation	53.59	52.22	-0.08	-0.20	-0.06	-0.24	-0.02	-0.17	-0.21	-0.28	-0.06	-0.16	-0.21	-0.28	-0.50

Note. N = 1.766. k = 46.949. Correlations greater than .03 are significant at $p < .05$. Correlations greater than .06 are significant at $p < .01$.

Table 4.2: Mixed-Effects Model on the Effect of Team Trusting Behavior on the Development of Turnover

	Model 1				Model 2				Model 3			
Variable	Coeff.	SD	t	p	Coeff.	SD	t	p	Coeff.	SD	t	p
Fixed Effects												
Level 1												
Intercept	0.6569 ***	0.0614	10.70	0.000	0.7450 ***	0.0647	11.52	0.000	0.7390 ***	0.0644	11.48	0.000
Time	-0.0209 ***	0.0037	-5.69	0.000	-0.0362 ***	0.0038	-9.46	0.000	-0.0354 ***	0.0038	-9.32	0.000
Time^2	0.0007 ***	0.0001	5.72	0.000	0.0011 ***	0.0001	9.19	0.000	0.0011 ***	0.0001	9.10	0.000
Team Trusting Behavior									-0.0231 *	0.0107	-2.16	0.031
Team Size					0.1414 ***	0.0105	13.52	0.000	0.1445 ***	0.0106	13.67	0.000
Team Activity					-0.0553 ***	0.0087	-6.34	0.000	-0.0523 ***	0.0088	-5.93	0.000
Level 2												
Team Longevity					-0.0707 ***	0.0079	-8.90	0.000	-0.0709 ***	0.0079	-8.92	0.000
Day of formation					-0.0952 ***	0.0079	-12.01	0.000	-0.0954 ***	0.0079	-12.03	0.000
			Correlations				Correlations				Correlations	
		SD	1	2		SD	1	2		SD	1	2
Random Effects												
Level 2												
1. Intercept		0.2987	–			0.2893	–			0.2896	–	
2. Time		0.0443	-0.58	–		0.0477	-0.58	–		0.0476	-0.59	–
3. Time^2		0.0021	0.47	-0.97		0.0023	0.47	-0.98		0.0023	0.47	-0.98
Level 3												
1. Intercept		0.2799	–			0.2941	–			0.2926	–	
2. Time		0.0129	-0.90	–		0.0127	-0.93	–		0.0124	-0.93	–
3. Time^2		0.0003	0.80	-0.95		0.0003	0.85	-0.95		0.0003	0.86	-0.95
Residual		0.6675				0.6665				0.6663		
AIC		125,922.27				125,615.62				125,621.41		
BIC		126,079.89				125,808.27				125,822.82		
logLik		-62,943.14				-62,785.81				-62,787.71		

Note. N = 1.766. k = 46.949. All Level 1 predictors were z-standardized and group-mean centered. Level 2 predictors were z-standardized and grand-mean centered.
*** p < .001; two-tailed. ** p < .01, two-tailed. * p < .05, two-tailed.

In order to compare each country and facilitate interpretability of the data, I extracted the country-specific coefficients for each of the 22 countries and plotted the resulting turnover development over time. Figure 4.1 shows an overview of all resulting plots while Figures 4.2 to 4.23 show the development for each respective country. Note that I repeated the resulting model specification using unscaled values to generate the plot values in order to receive meaningful values.

Figure 4.1: Turnover Development in Teams Over Time

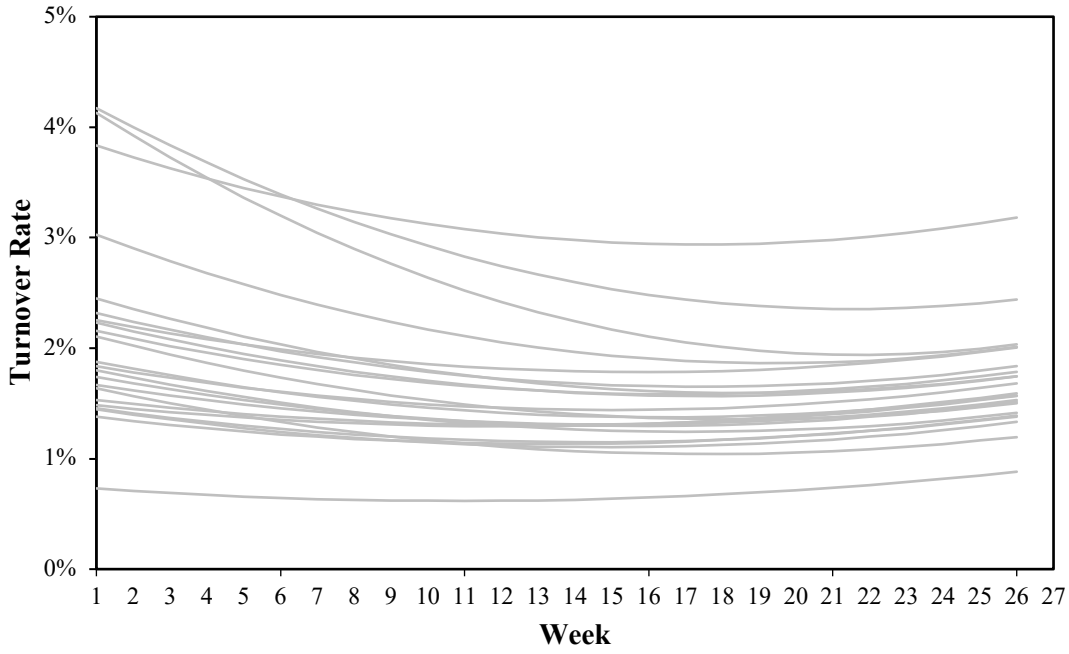


Figure 4.1 indicates that overall turnover starts at around 2.3% per week, decreases to 1.5% at week 17, and slightly rises back up to 1.7% again in week 27 (as indicated by the black line); however, when looking at the different countries the data indicates significant variation in the development and overall values for the different countries (as indicated by the grey lines). As for the overall values, I find the average turnover to range from 0.7% in Japan to a maximum of 3.2% in Iran as well as an overall mean of 1.7% for all countries. Regarding overall development, most – but not all – countries show an overall negative development over time. While countries, such as Turkey (-2.0%), the United Arab Emirates (-1.7%), Israel (-1.0%), Poland (-

0.7%), Iran (-0.6%), Netherlands (-0.6%), Spain (-0.4%), Italy (-0.4%), Serbia (-0.4%), Portugal (-0.3%), Chile (-0.3%), Australia (-0.3%), Brazil (-0.2%), Russia (-0.2%), Finland (-0.1%), Indonesia (-0.1%), and Hungary (-0.1%) show a negative trend over time, Denmark (0%), Germany (0.1%), the United States of America (0.1%), France (0.2%), and Japan (0.2%) even show a positive or null trend in the development of turnover throughout the observation period. The results for each country are summarized in Table 4.3.

Table 4.3: Turnover development in Teams in all Countries

No.	Country	Average Turnover Rate	Turnover Rate (Week 1)	Turnover Rate (Week 1)	Change in Turnover Rate (Week 1-27)
1	Australia	1.52%	1.88%	1.62%	-0.26%
2	Brazil	1.92%	2.25%	2.05%	-0.20%
3	Chile	1.74%	2.16%	1.83%	-0.33%
4	Denmark	1.25%	1.46%	1.42%	-0.03%
5	Finland	1.56%	1.84%	1.73%	-0.11%
6	France	1.39%	1.48%	1.64%	0.15%
7	Germany	1.23%	1.38%	1.43%	0.05%
8	Hungary	1.21%	1.45%	1.37%	-0.07%
9	Indonesia	1.42%	1.67%	1.57%	-0.09%
10	Iran	3.18%	3.83%	3.24%	-0.59%
11	Israel	2.17%	3.03%	2.06%	-0.97%
12	Italy	1.83%	2.32%	1.88%	-0.44%
13	Japan	0.70%	0.73%	0.92%	0.19%
14	Netherlands	1.55%	2.10%	1.54%	-0.56%
15	Poland	1.82%	2.45%	1.79%	-0.66%

16	Portugal	1.39%	1.80%	1.46%	-0.34%
17	Russia	1.43%	1.74%	1.56%	-0.18%
18	Serbia	1.20%	1.64%	1.24%	-0.40%
19	Spain	1.75%	2.23%	1.79%	-0.44%
20	Turkey	2.55%	4.13%	2.08%	-2.05%
21	United Arab Emirates	2.86%	4.17%	2.48%	-1.69%
22	United States of America	1.40%	1.53%	1.61%	0.08%

Figure 4.2: Turnover Development in Teams Over Time in Australia

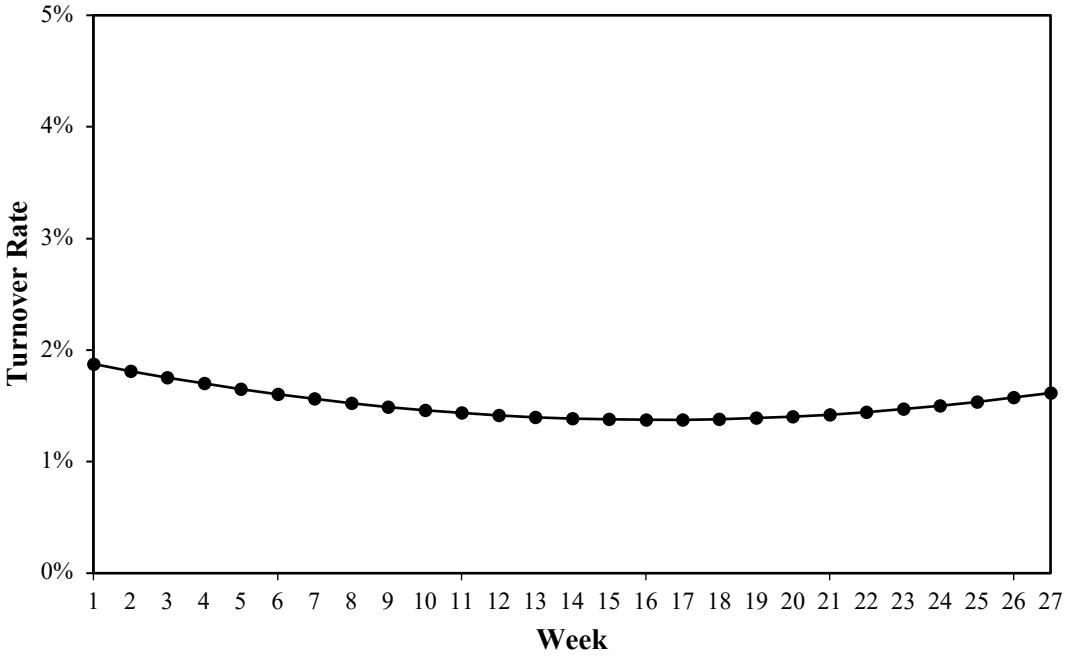


Figure 4.3: Turnover Development in Teams Over Time in Brazil

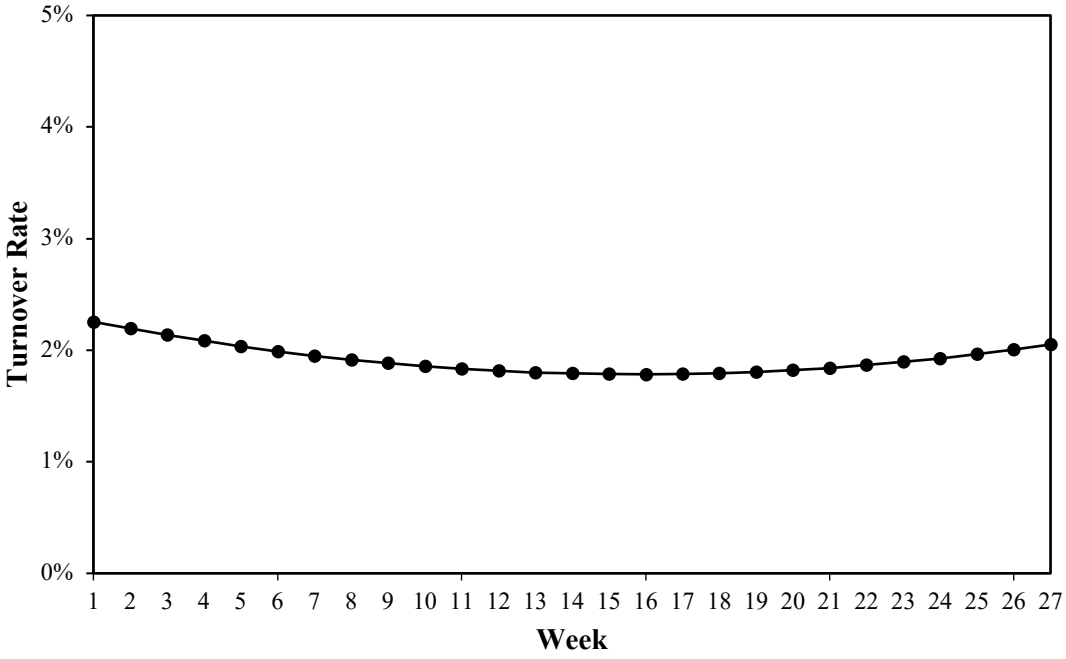


Figure 4.4: Turnover Development in Teams Over Time in Chile

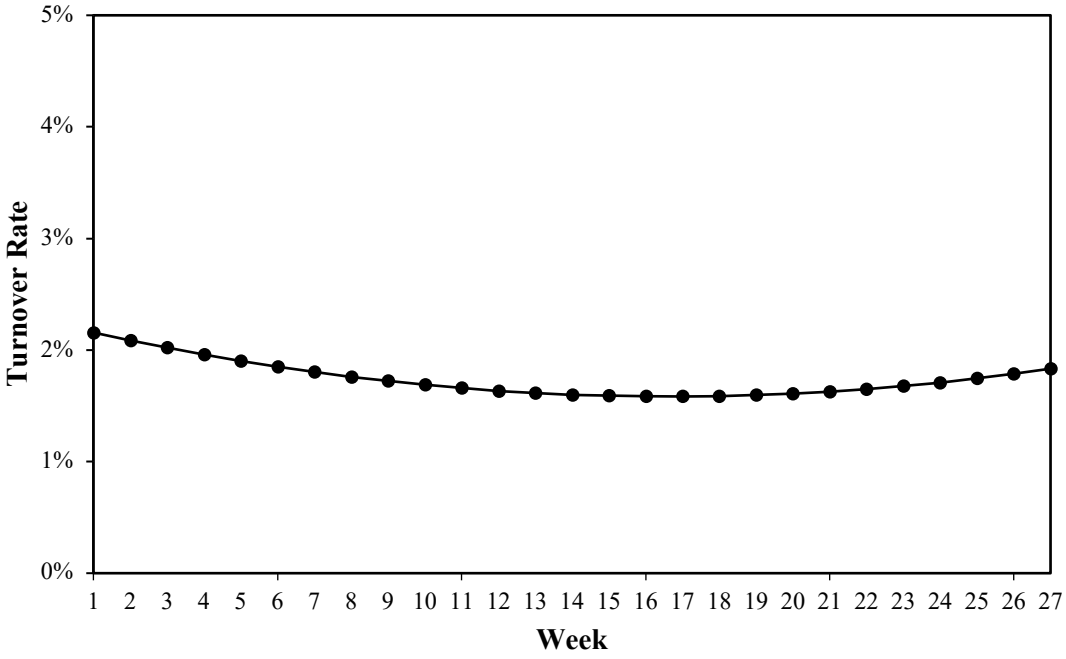


Figure 4.5: Turnover Development in Teams Over Time in Denmark

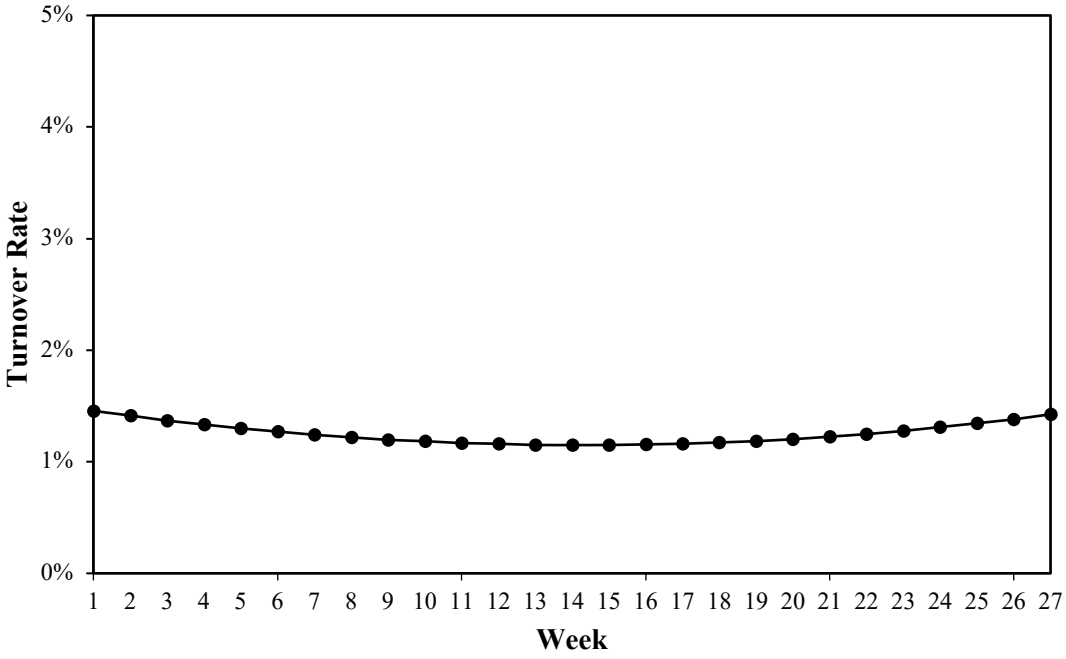


Figure 4.6: Turnover Development in Teams Over Time in Finland

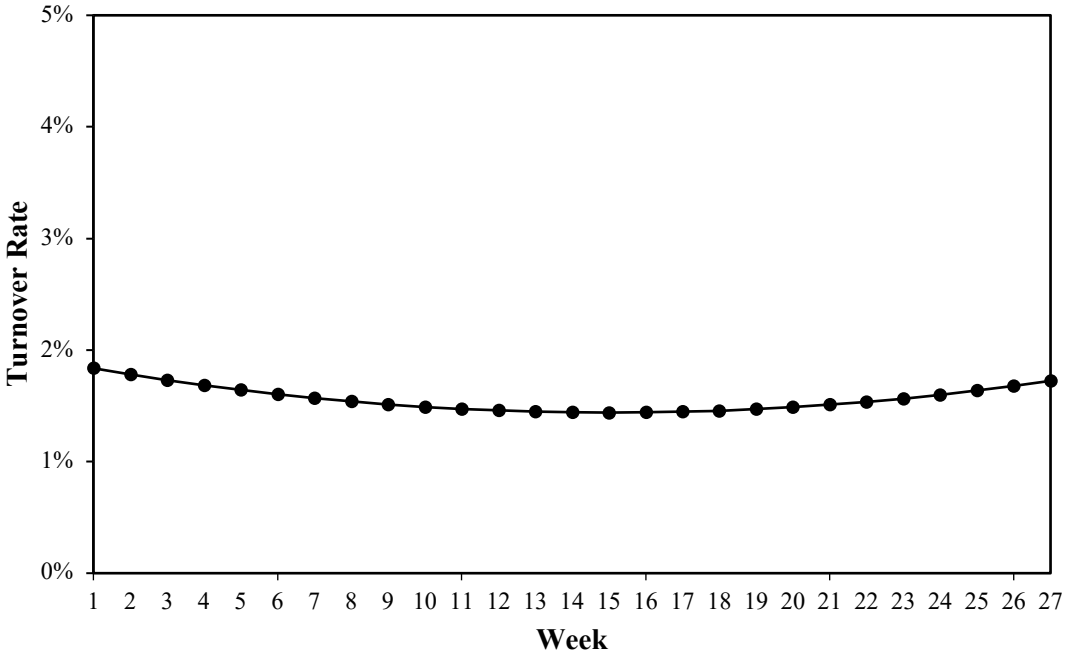


Figure 4.7: Turnover Development in Teams Over Time in France

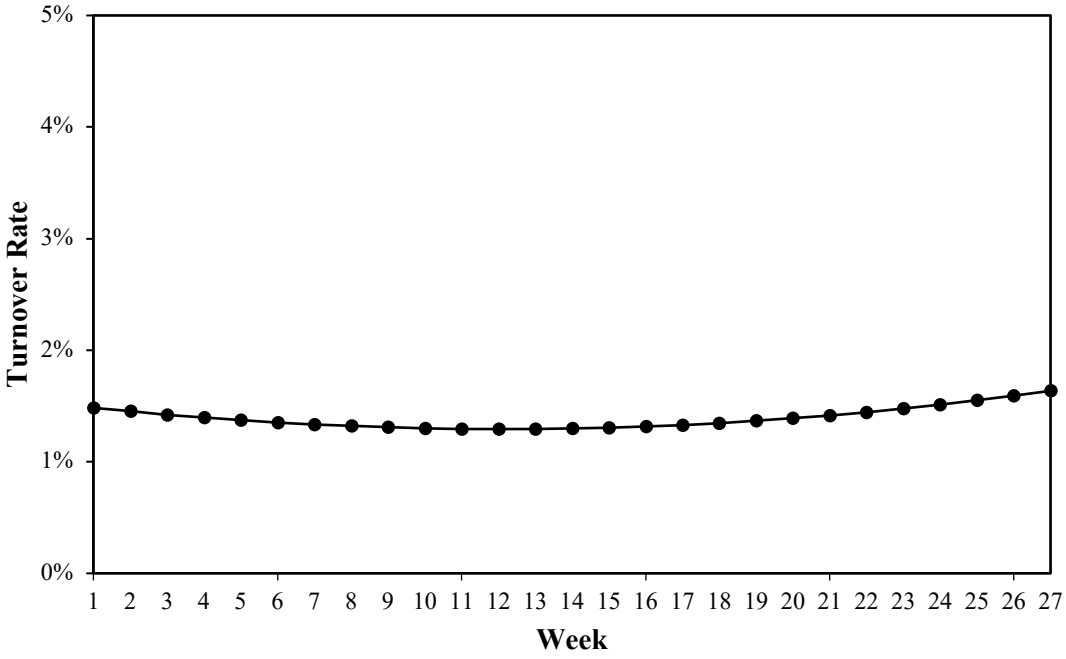


Figure 4.8: Turnover Development in Teams Over Time in Germany

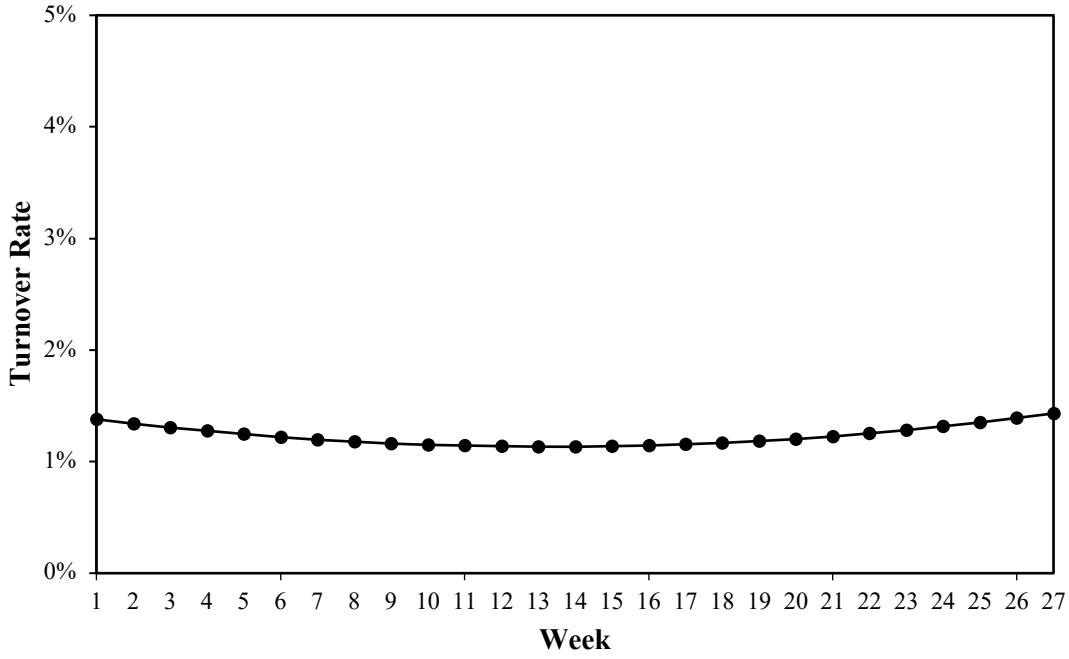


Figure 4.9: Turnover Development in Teams Over Time in Hungary

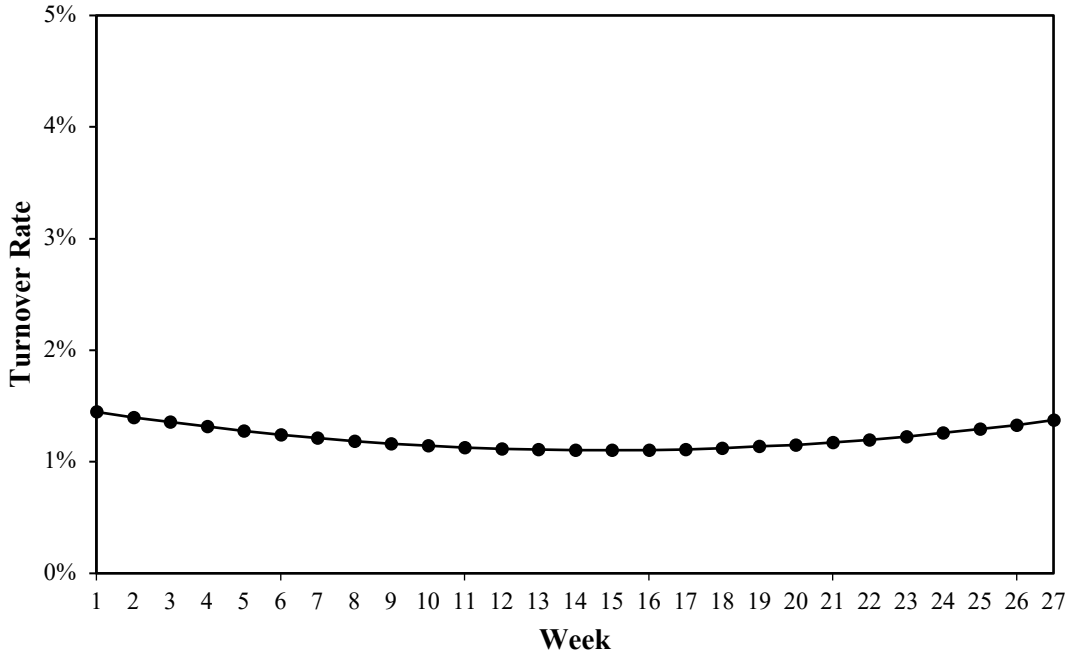


Figure 4.10: Turnover Development in Teams Over Time in Indonesia

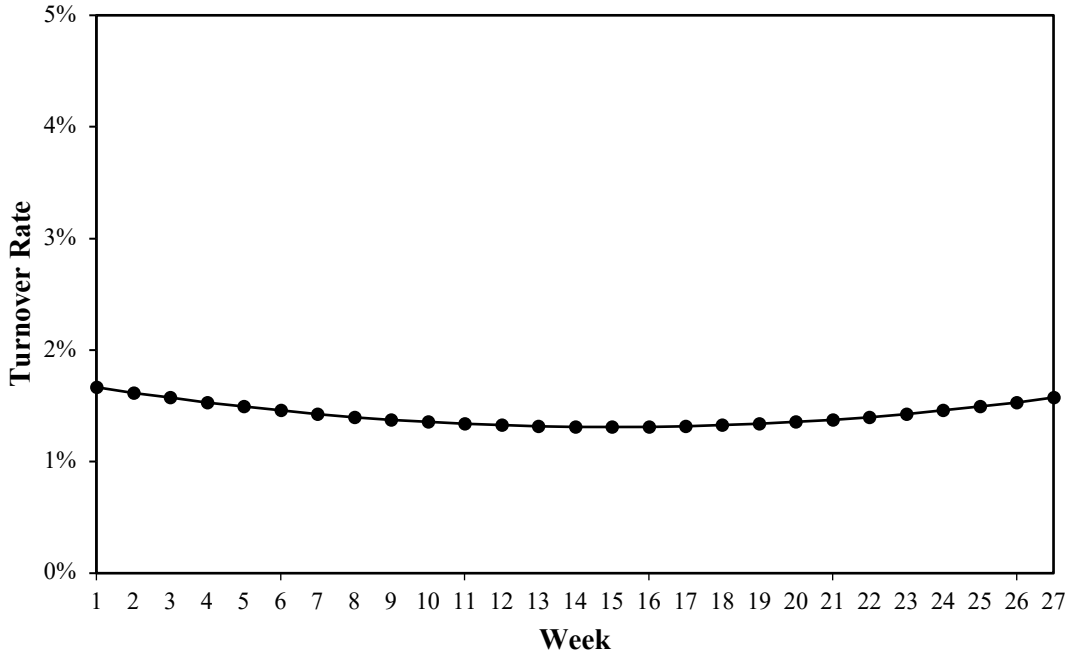


Figure 4.11: Turnover Development in Teams Over Time in Iran

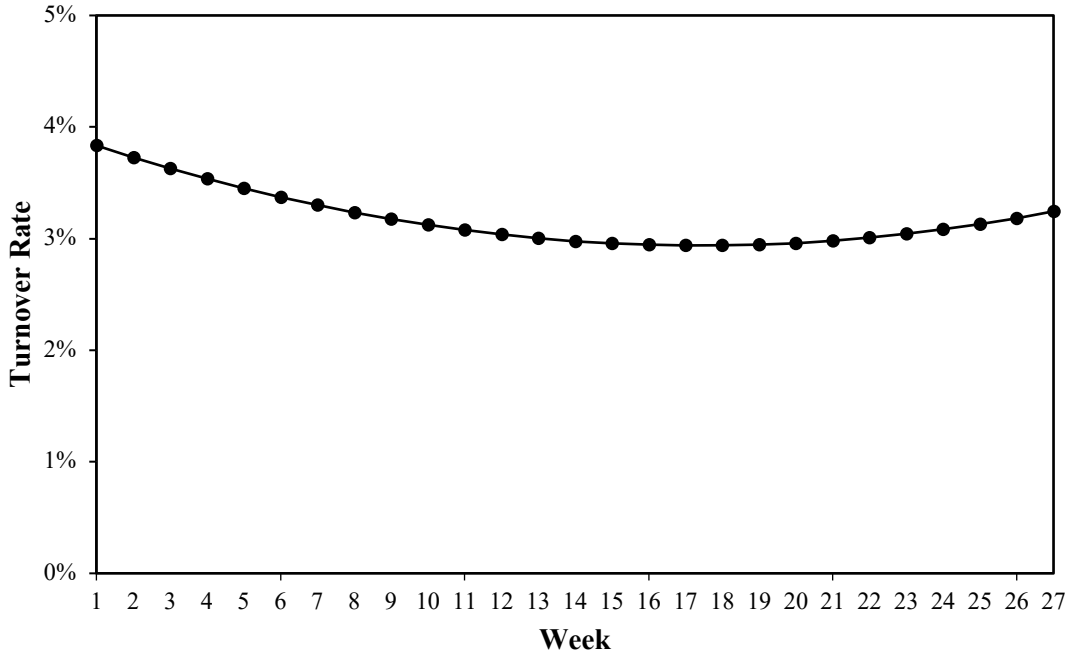


Figure 4.12: Turnover Development in Teams Over Time in Israel

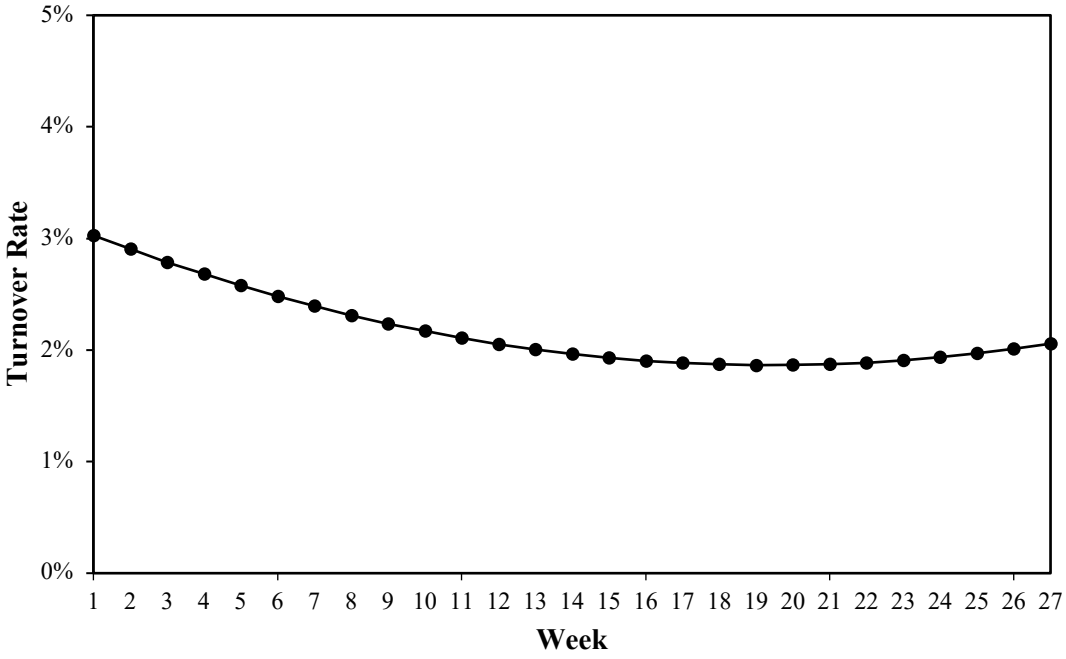


Figure 4.13: Turnover Development in Teams Over Time in Italy

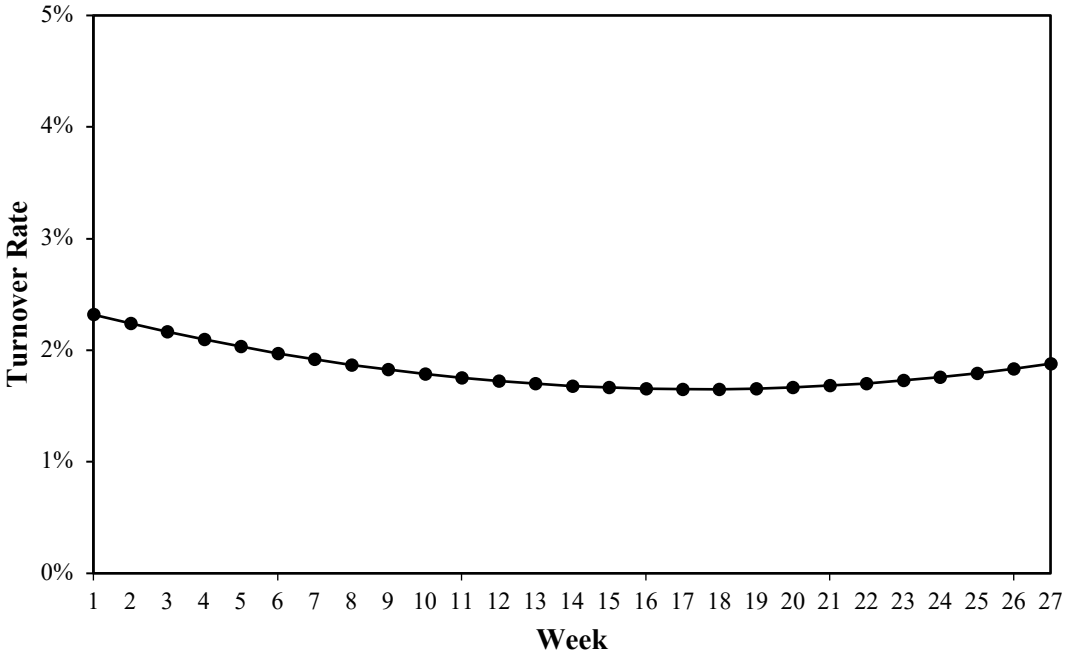


Figure 4.14: Turnover Development in Teams Over Time in Japan

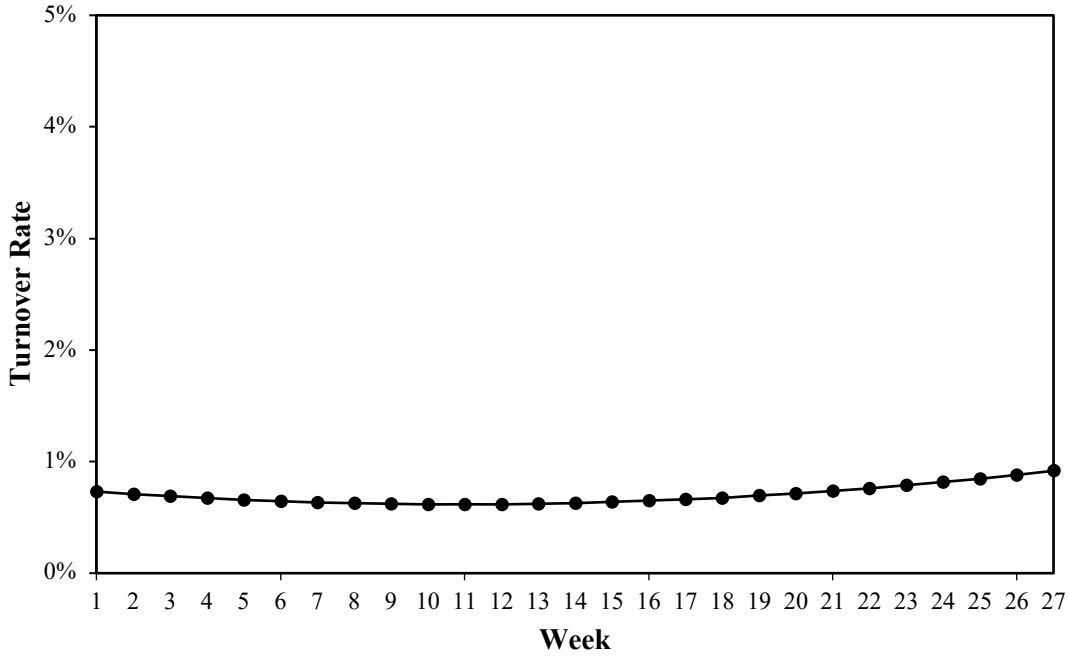


Figure 4.15: Turnover Development in Teams Over Time in the Netherlands

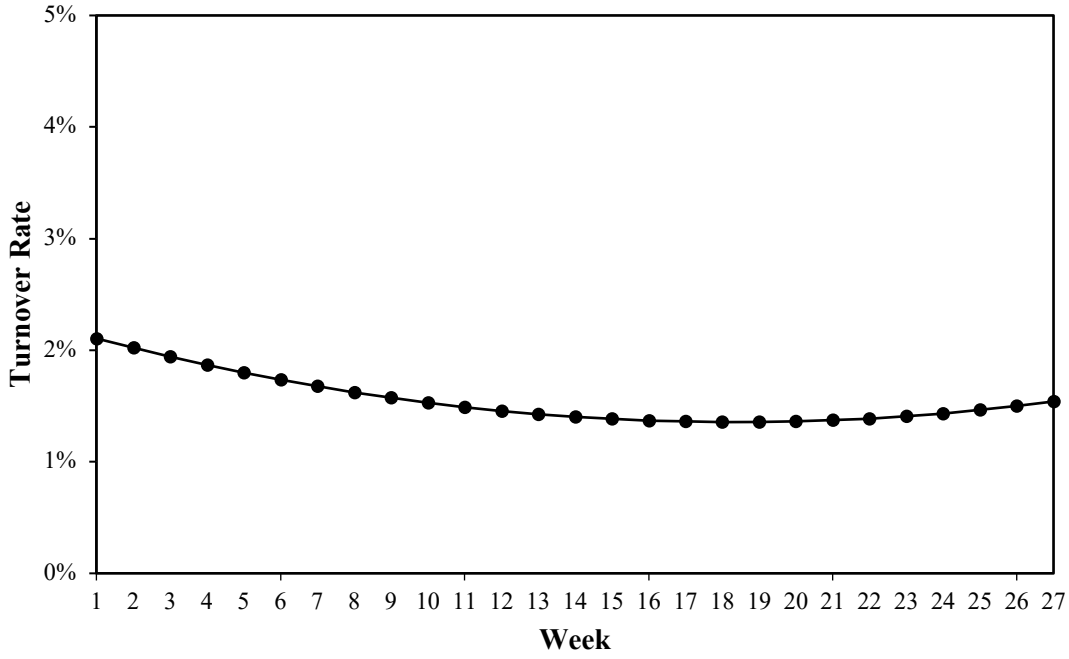


Figure 4.16: Turnover Development in Teams Over Time in Poland

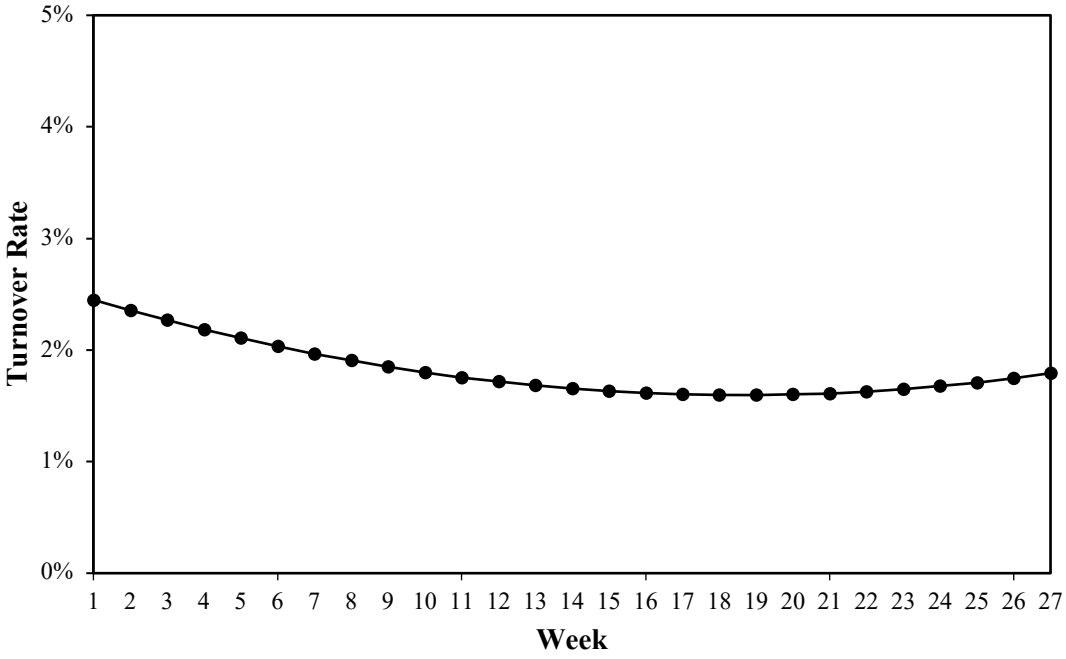


Figure 4.17: Turnover Development in Teams Over Time in Portugal

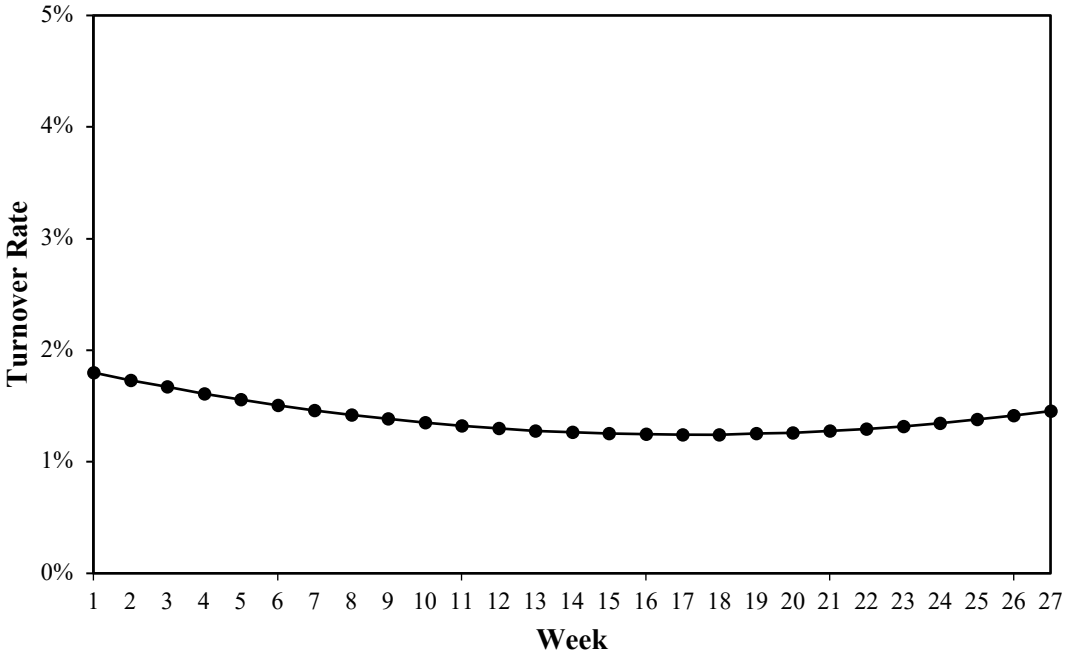


Figure 4.18: Turnover Development in Teams Over Time in Russia

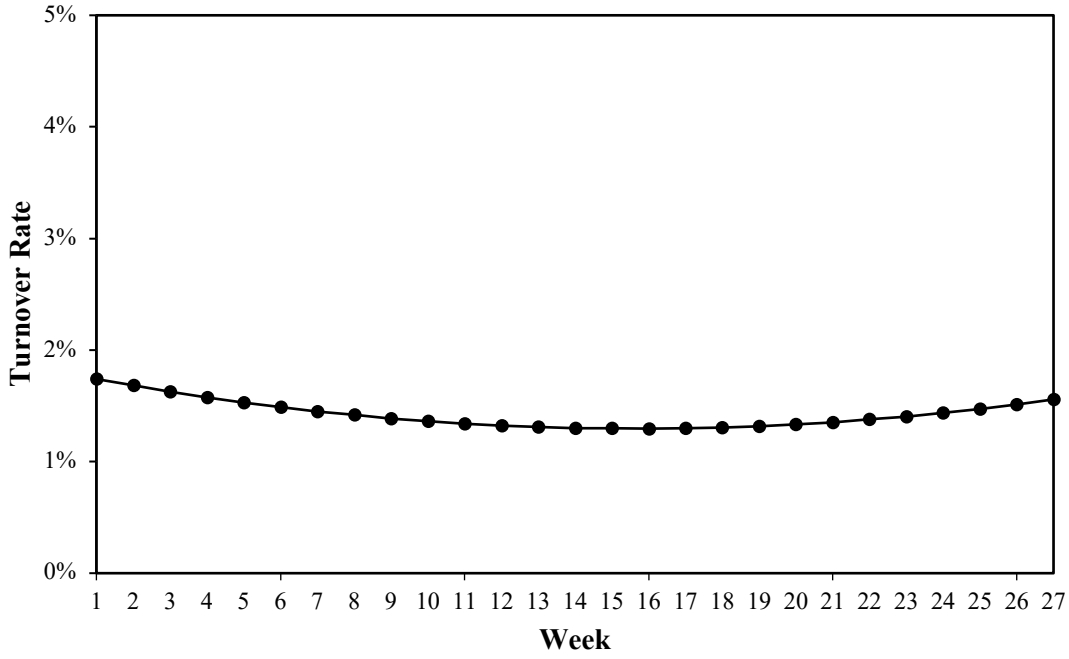


Figure 4.19: Turnover Development in Teams Over Time in Serbia

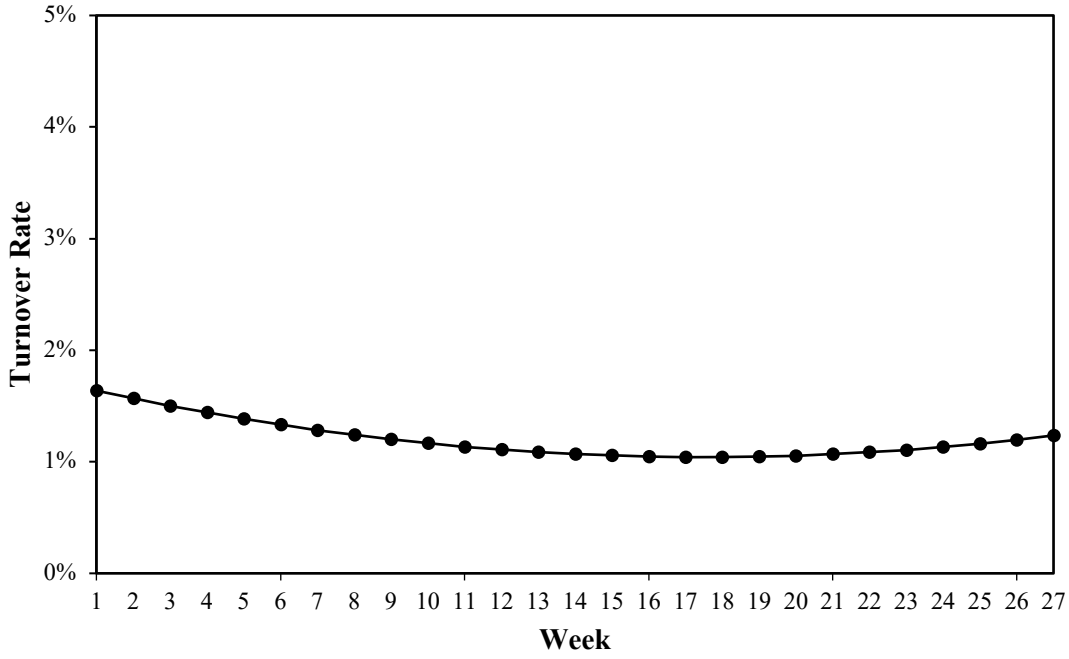


Figure 4.20: Turnover Development in Teams Over Time in Spain

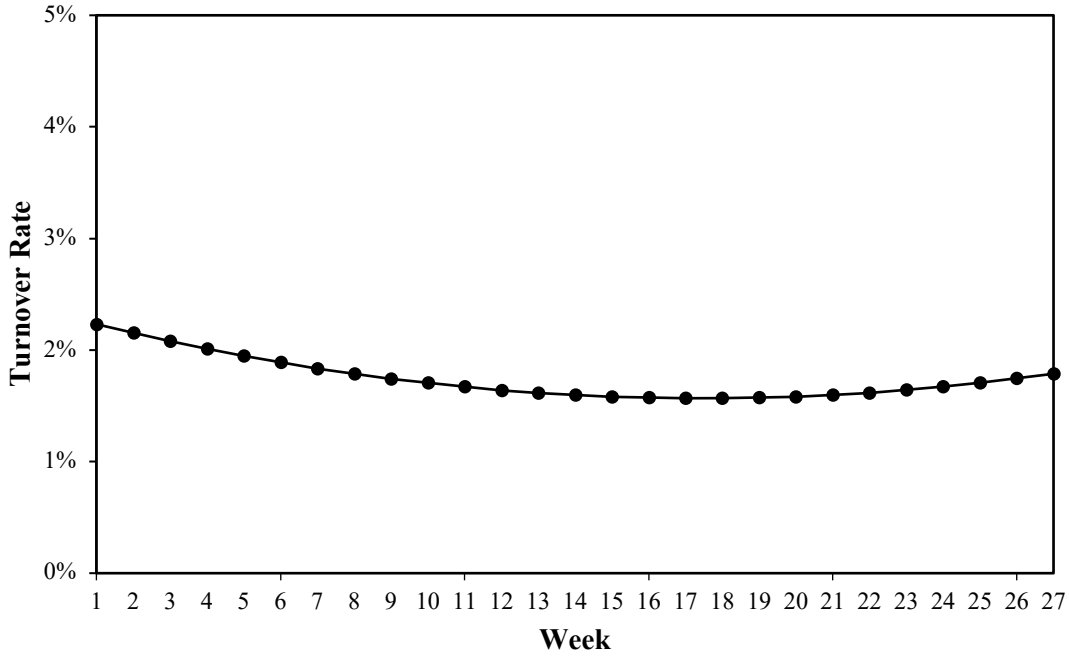


Figure 4.21: Turnover Development in Teams Over Time in Turkey

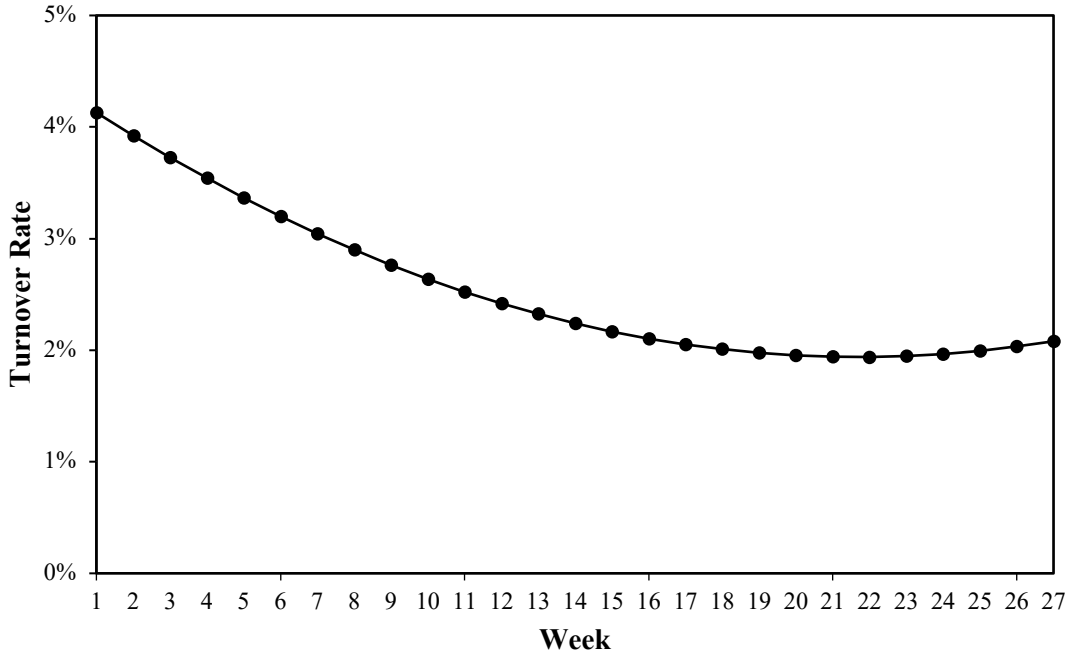


Figure 4.22: Turnover Development in Teams Over Time in the United Arab Emirates

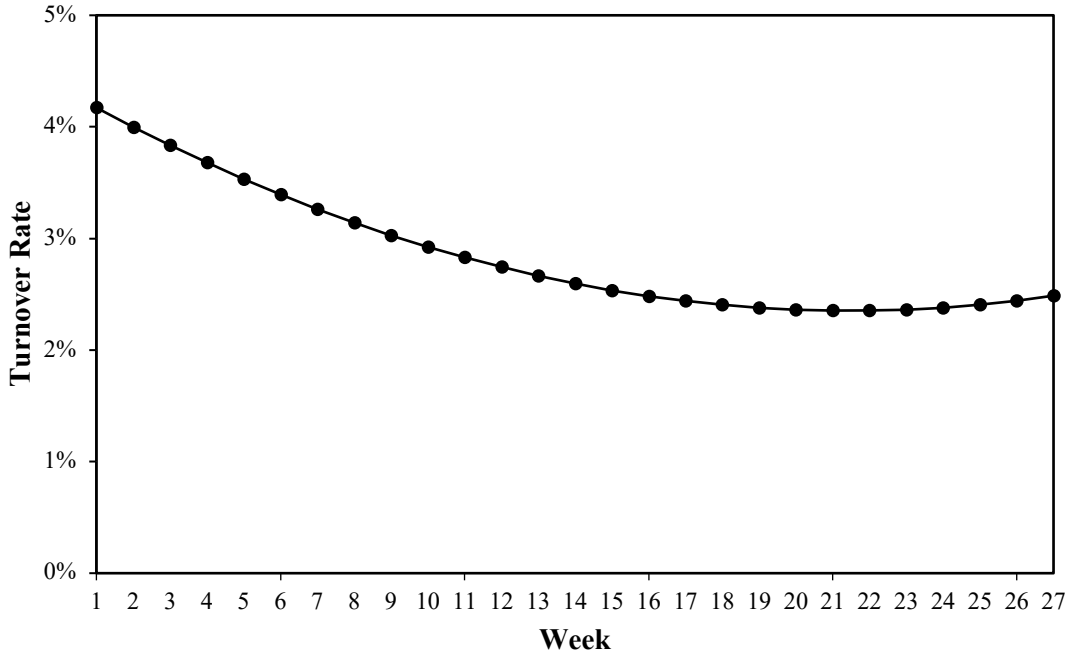
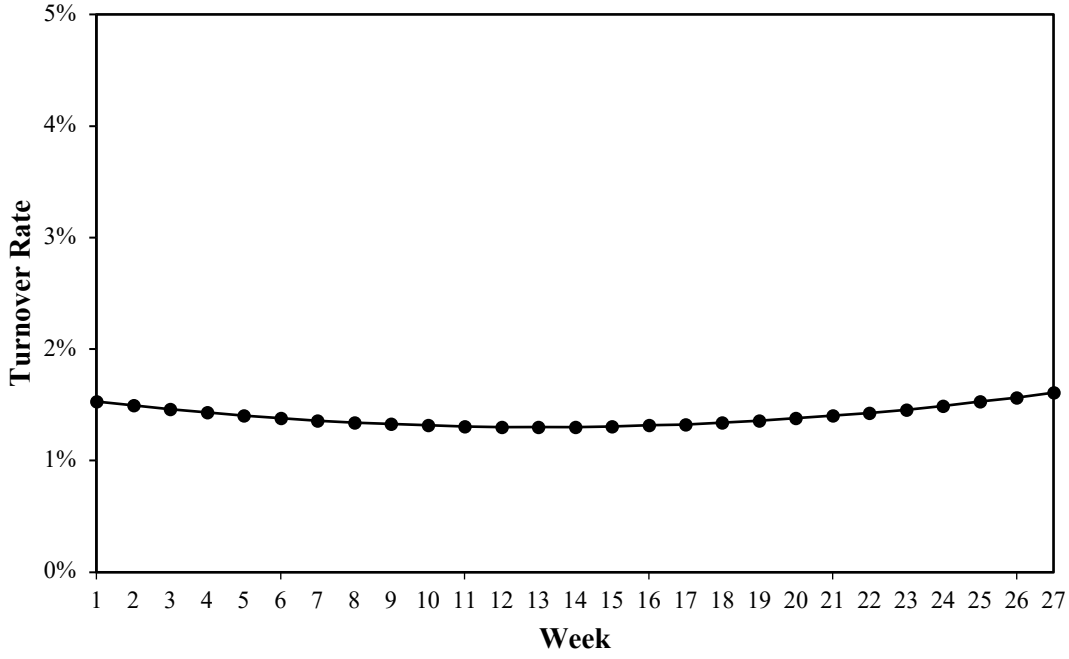
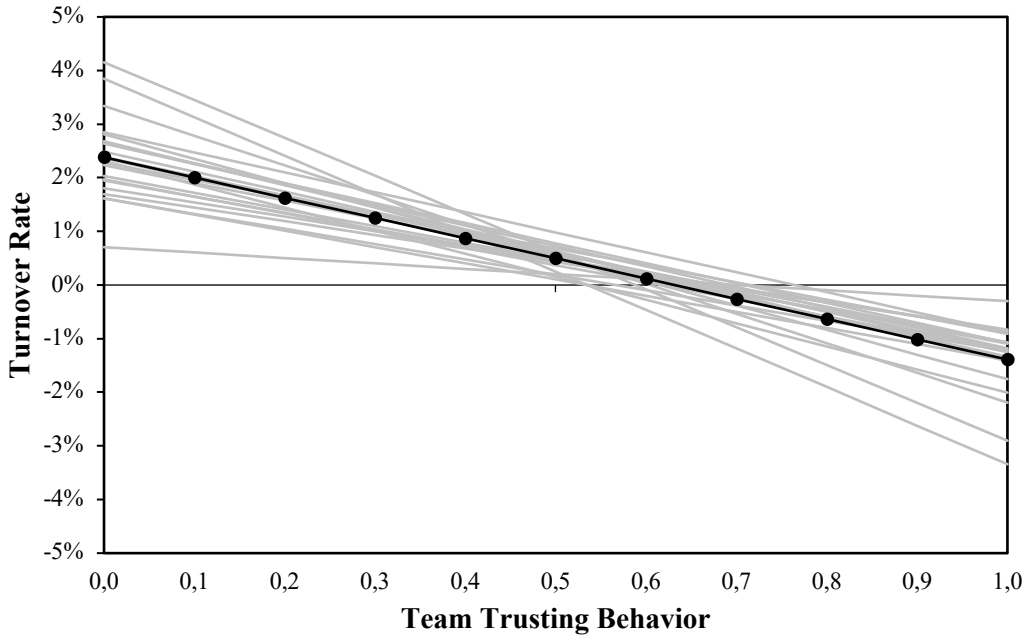


Figure 4.23: Turnover Development in Teams Over Time in the United States of America



Research question 2 covers the relationship of team trusting behavior with turnover and how this relationship varies across cultures. To address this, I extended the basic growth model first by adding controls (i.e., team size, team activity, team longevity, day of formation) in Model 2 and then adding team trusting behavior as the independent variable in Model 3. In line with existing scholarly work, I find an overall negative main effect of team trusting behavior on turnover ($\gamma = 0.0231$, $SD = 0.0107$, $p < .05$). Next, to investigate whether there is significant variation in the relationship between team trusting behavior and turnover (as questioned by research question 2), I tested for random variability (i.e., random slope) in team trusting behavior; however, the resulting model does not converge. According to literature, this may happen due to a variety of reasons including the usage of certain algorithms, highly correlated random effects, or too complex modeling for the data (Aguinis et al., 2013).

Figure 4.24: Predicted Team Turnover as a Function of Team Trusting Behavior



In such cases, Aguinis et al. (2013) suggest simplifying the random effects structure. Therefore, for subsequent analyses I revert to a model which only accounts for random variability in the independent variable, thus, excluding random effects for the time covariates.

Table 4.4: Mixed-Effects Model on the Effect of Team Trusting Behavior on the Development of Turnover

Variable	Model 4 Coeff.	SD	t	p	Model 5 Coeff.	SD	t	p	Model 6 Coeff.	SD	t	p
Fixed Effects												
Level 1												
Intercept	0.6924 ***	0.0454	15.26	0.000	0.6817 ***	0.0454	15.01	0.000	0.6811 ***	0.0455	14.98	0.000
Time	-0.0279 ***	0.0024	-11.68	0.000	-0.0266 ***	0.0024	-11.04	0.000	-0.0266 ***	0.0024	-10.96	0.000
$Time^2$	0.0009 ***	0.0001	10.21	0.000	0.0009 ***	0.0001	9.83	0.000	0.0009 ***	0.0001	9.80	0.000
Team Trusting Behavior					-0.0539 ***	0.0103	-5.22	0.000	-0.0565 ***	0.0135	-4.18	0.000
Team Size	0.0780 ***	0.0098	7.95	0.000	0.0875 ***	0.0100	8.78	0.000	0.0895 ***	0.0102	8.77	0.000
Team Activity	-0.0176 *	0.0076	-2.32	0.020	-0.0111	0.0077	-1.45	0.148	-0.0134	0.0078	-1.72	0.085
Level 2												
Team Longevity	-0.0936 ***	0.0079	-11.86	0.000	-0.0936 ***	0.0079	-11.86	0.000	-0.0943 ***	0.0079	-11.93	0.000
Day of formation	-0.1089 ***	0.0079	-13.79	0.000	-0.1089 ***	0.0079	-11.85	0.000	-0.1090 ***	0.0079	-13.79	0.000
			Correlations				Correlations				Correlations	
		SD	1	2		SD	1	2		SD	1	2
Random Effects												
Level 2												
1. Intercept		0.2055	–			0.2056	–			0.2068	–	
2. Team Trusting Behavior										0.1615	-0.09	–
Level 3												
1. Intercept		0.2004	–			0.2004	–			0.2004	–	
2. Team Trusting Behavior										0.0255	-0.57	–
Residual		0.9515				0.9512				0.9482		
AIC		130,145.26				130,127.40				130,096.30		
BIC		130,232.82				130,223.70				130,227.70		
logLik		-65,062.63				-65,052.69				-65,033.17		

Note. N = 1.766. k = 46.949. All Level 1 predictors were z-standardized and group-mean centered. Level 2 predictors were z-standardized and grand-mean centered.
*** p < .001; two-tailed. ** p < .01, two-tailed. * p < .05, two-tailed.

Table 4.5: Team Trusting Behavior–Turnover Relationship in all Countries

No.	Country	Impact of + 1 SD in team trusting behavior on turnover
1	Australia	-0.57%
2	Brazil	-0.89%
3	Chile	-0.71%
4	Denmark	-0.45%
5	Finland	-0.70%
6	France	-0.63%
7	Germany	-0.48%
8	Hungary	-0.50%
9	Indonesia	-0.59%
10	Iran	-1.43%
11	Israel	-0.96%
12	Italy	-0.81%
13	Japan	-0.22%
14	Netherlands	-0.63%
15	Poland	-0.76%
16	Portugal	-0.60%
17	Russia	-0.57%
18	Serbia	-0.45%
19	Spain	-0.72%
20	Turkey	-1.20%
21	United Arab Emirates	-1.30%
22	United States of America	-0.58%

To remain consistent, I started this set of analyses with an adjusted Model 2 which contains only the time covariates and controls but does not allow for random variability of the time covariates (Model 4 in Table 4.4). Next, I added the independent variable (i.e., team trusting behavior; Model 5). Lastly, I tested for random variability (i.e., random slope) of the independent variable (Model 6). The resulting model accounting for random variability in team trusting behavior converges and fits the data significantly better than a model not accounting for it ($\chi^2_{diff}(4) = 19.51$, $p < .001$). To support interpretability of these results, Table 4.5 shows the predicted impact of team trusting behavior on average turnover (as indicated by the black line) and for each individual country (as indicated by the grey lines). Figure 4.25 to 4.48 show the same predicted impact for each country separately. Note that similar to the development of turnover before, I utilized an unscaled version of

Model 6 for the plots in order to receive meaningful results. Similar to the results of Model 3, I find an overall negative effect (γ = -0.0565, SD = 0.0135, $p < .001$) of team trusting behavior on turnover. The analysis results suggest that this negative effect holds for all countries but differs significantly in size. More specifically, I find that an increase in team trusting behavior of one standard deviation, reduces turnover by an average 0.8 percentage points – with a maximum of 1.43 percentage points in Iran and a minimum of 0.2 percentage points in Japan. The impact of an increase of 1 standard deviation in team trusting behavior is indicated in Table 4.5.

Figure 4.25: Predicted Team Turnover as a Function of Team Trusting Behavior in Australia

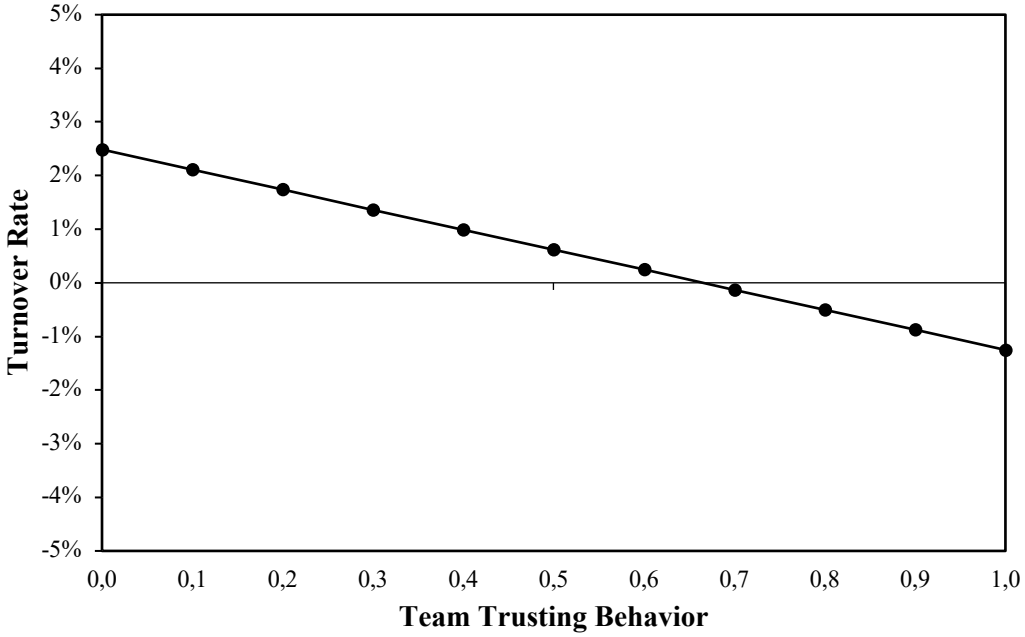


Figure 4.26: Predicted Team Turnover as a Function of Team Trusting Behavior in Brazil

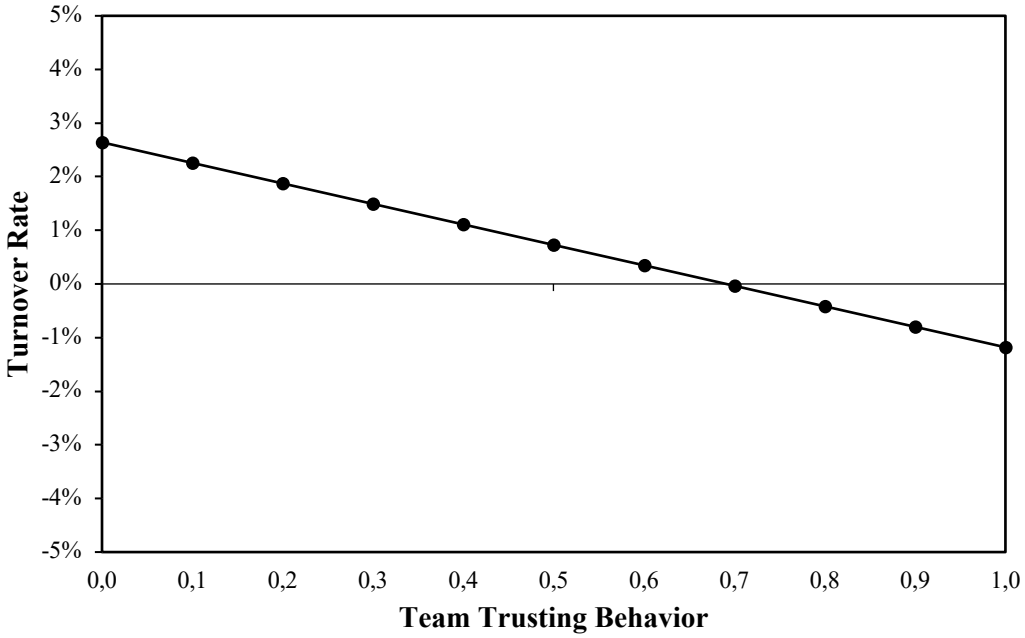


Figure 4.27: Predicted Team Turnover as a Function of Team Trusting Behavior in Chile

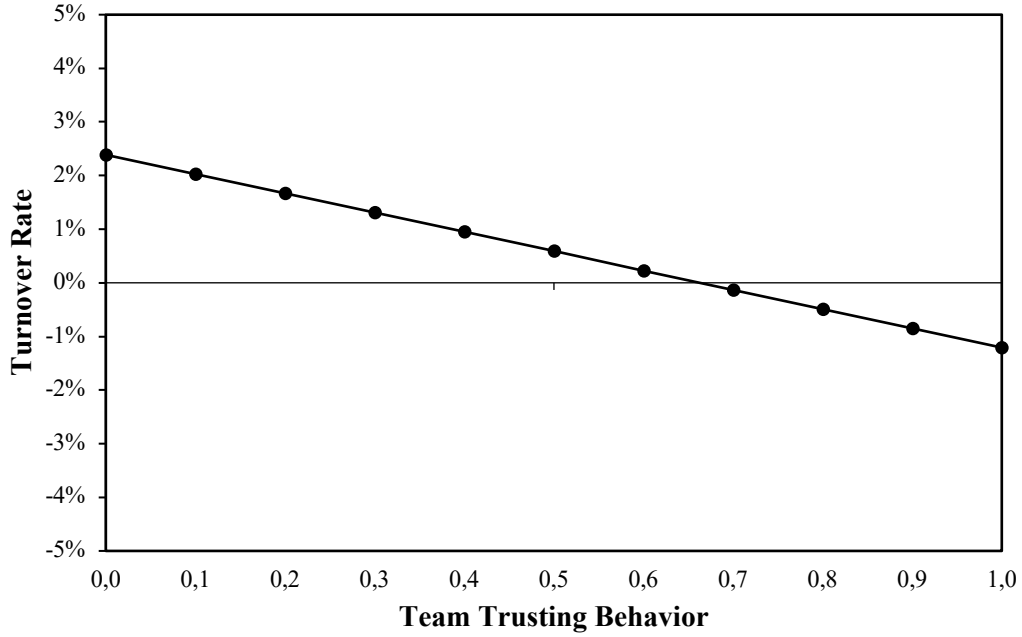


Figure 4.28: Predicted Team Turnover as a Function of Team Trusting Behavior in Denmark

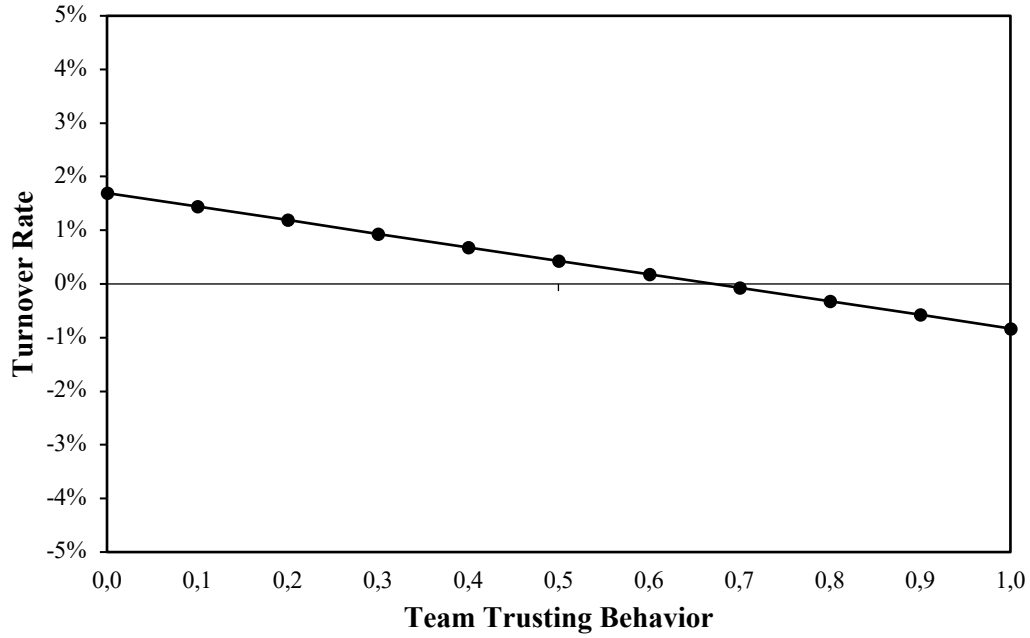


Figure 4.29: Predicted Team Turnover as a Function of Team Trusting Behavior in Finland

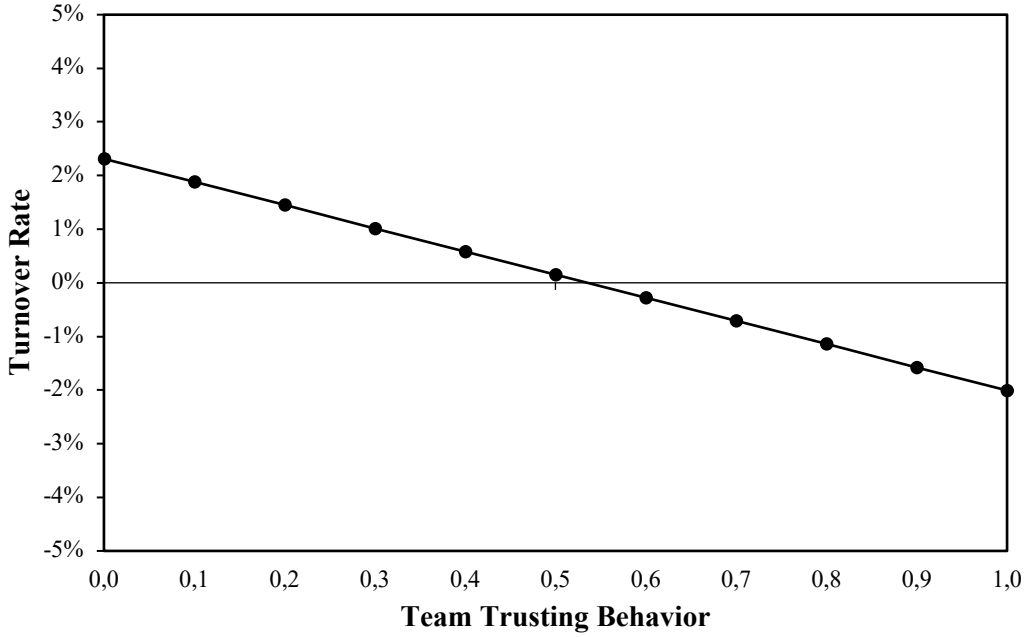


Figure 4.30: Predicted Team Turnover as a Function of Team Trusting Behavior in France

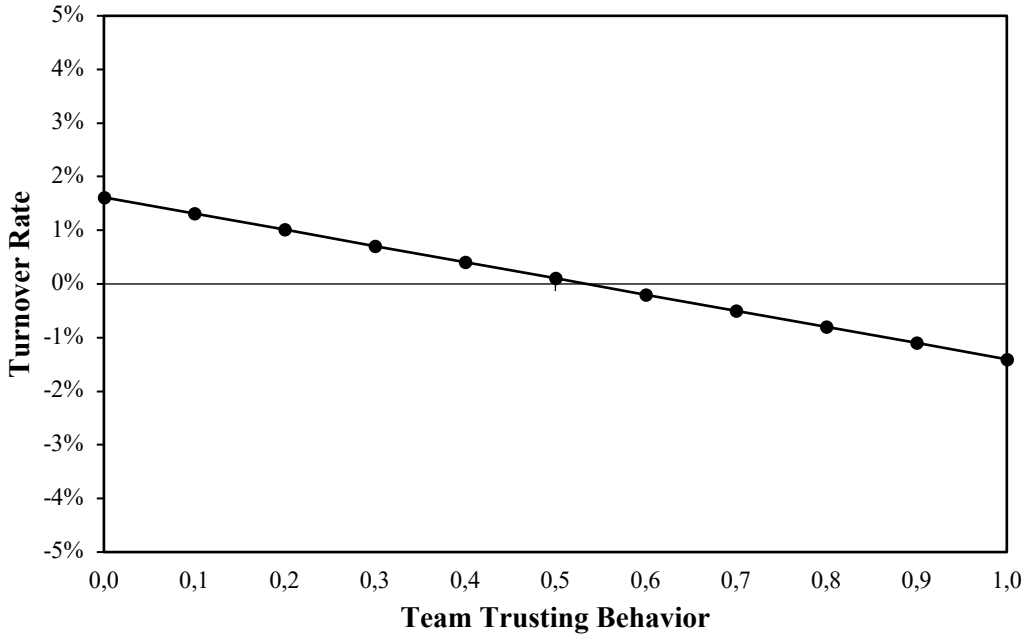


Figure 4.31: Predicted Team Turnover as a Function of Team Trusting Behavior in Germany

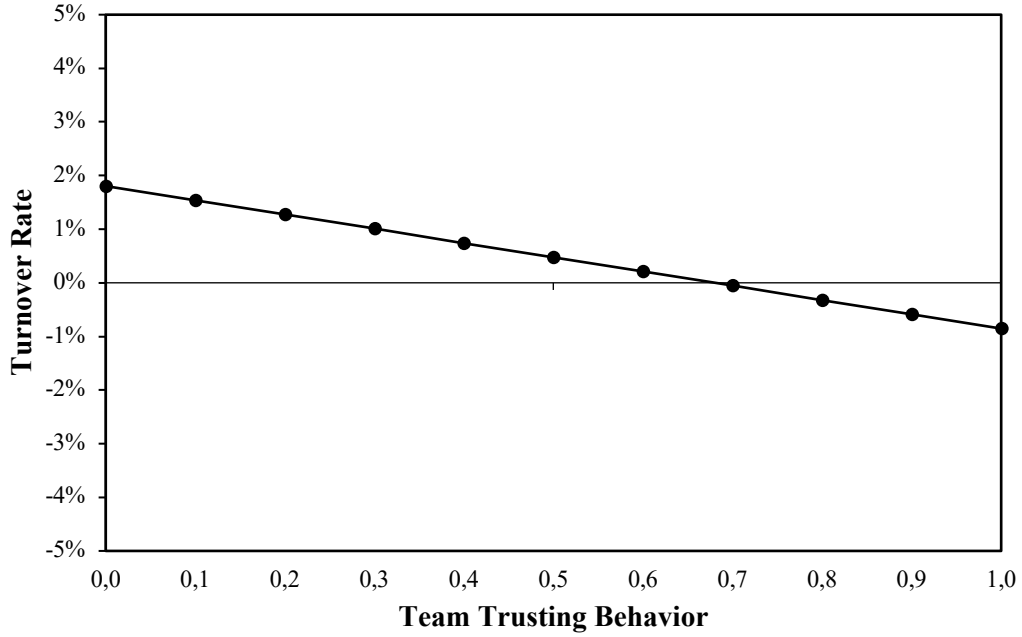


Figure 4.32: Predicted Team Turnover as a Function of Team Trusting Behavior in Hungary

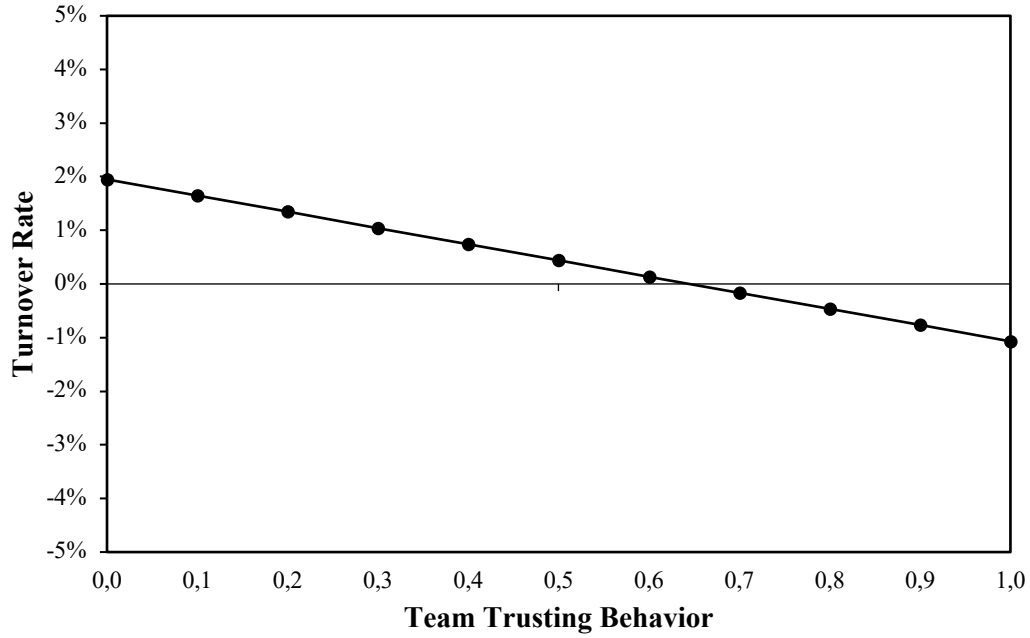


Figure 4.33: Predicted Team Turnover as a Function of Team Trusting Behavior in Indonesia

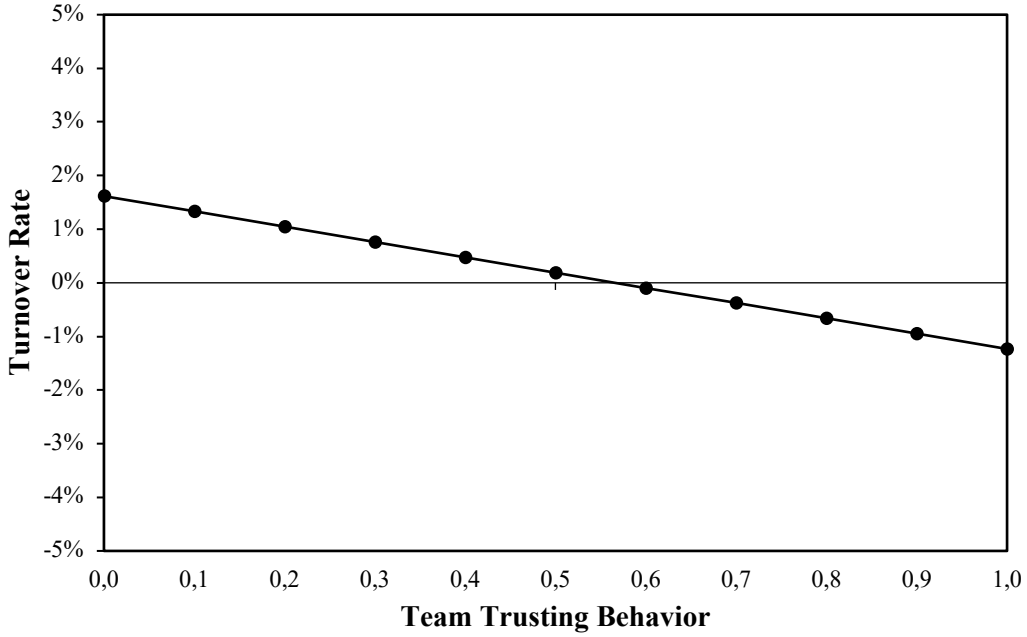


Figure 4.34: Predicted Team Turnover as a Function of Team Trusting Behavior in Iran

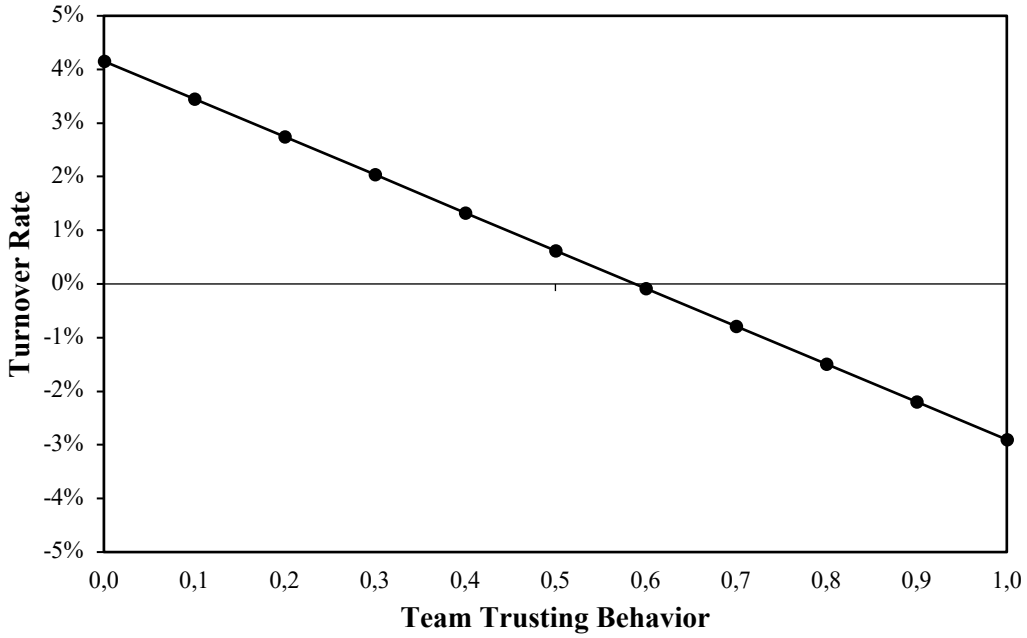


Figure 4.35: Predicted Team Turnover as a Function of Team Trusting Behavior in Israel

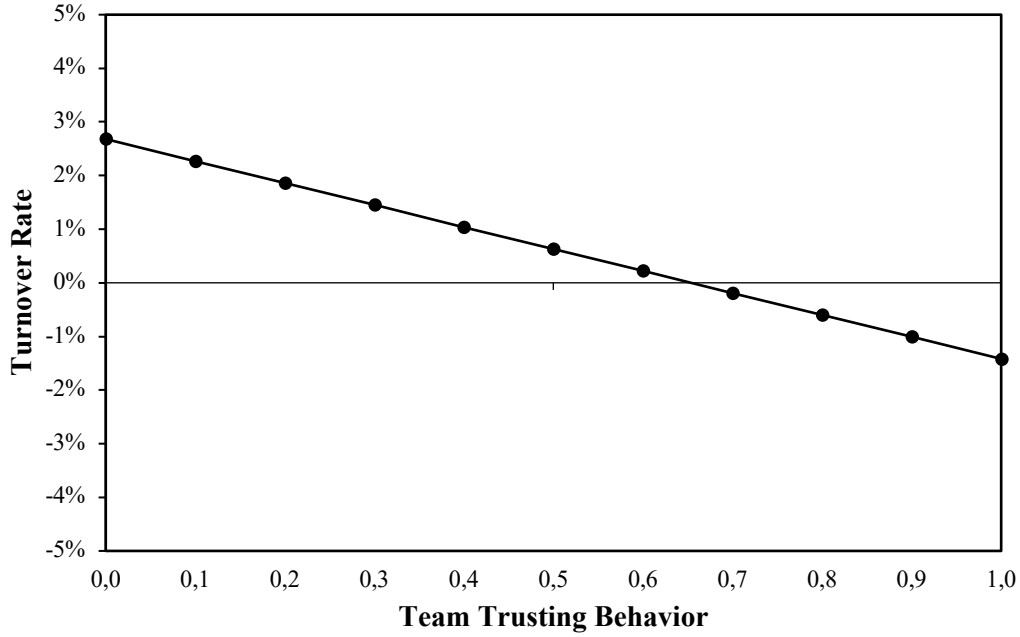


Figure 4.36: Predicted Team Turnover as a Function of Team Trusting Behavior in Italy

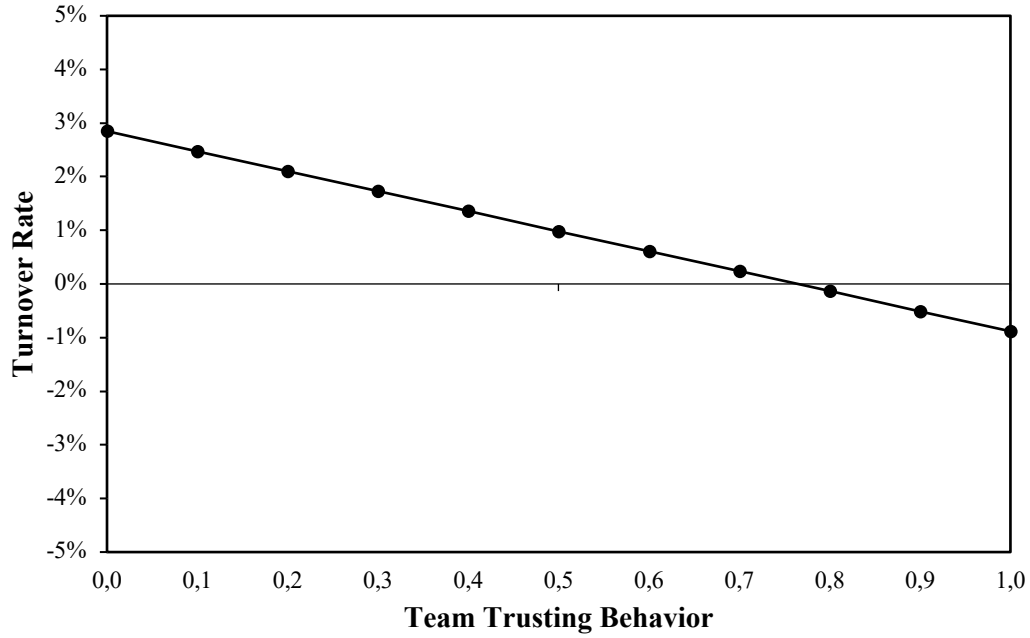


Figure 4.37: Predicted Team Turnover as a Function of Team Trusting Behavior in Japan

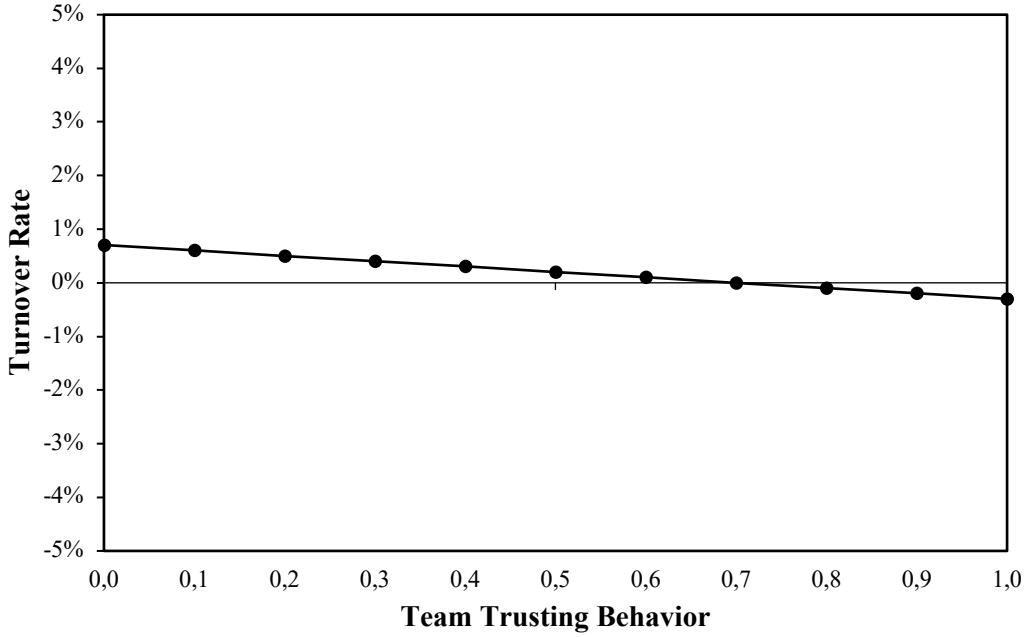


Figure 4.38: Predicted Team Turnover as a Function of Team Trusting Behavior in the Netherlands

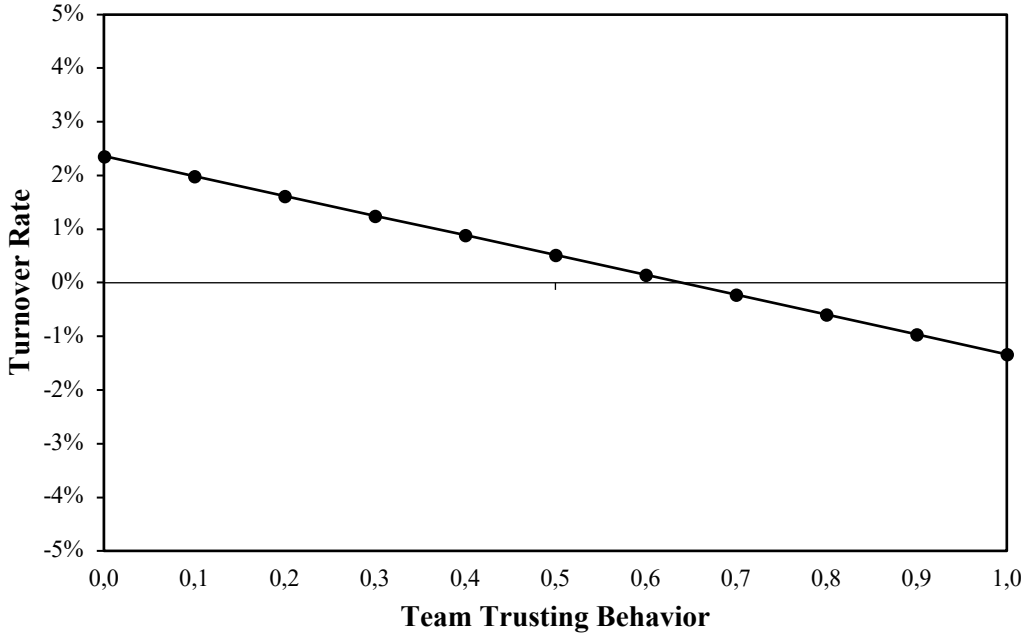


Figure 4.39: Predicted Team Turnover as a Function of Team Trusting Behavior in Poland

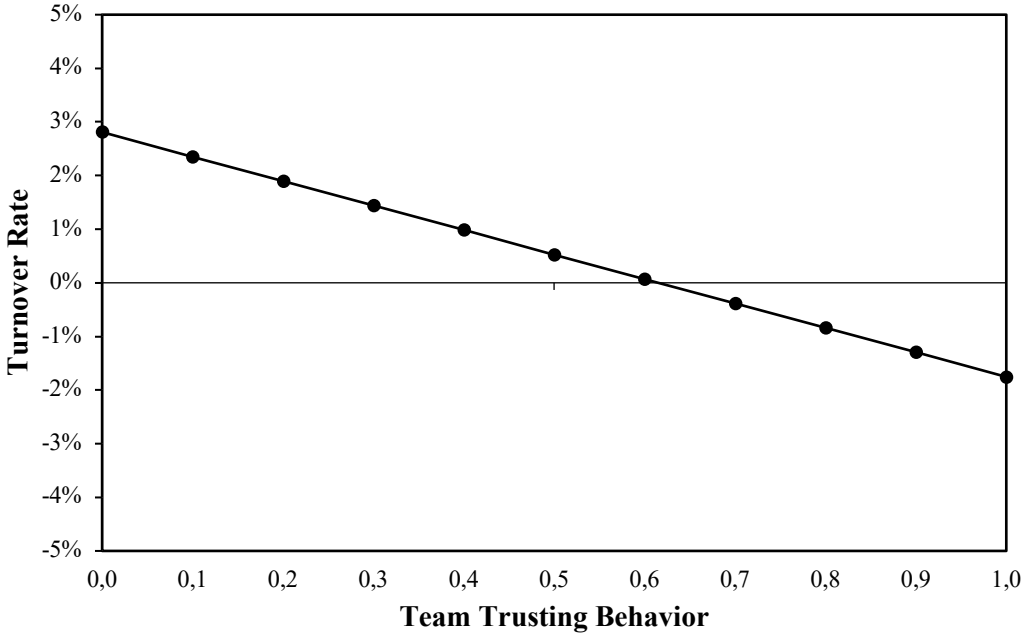


Figure 4.40: Predicted Team Turnover as a Function of Team Trusting Behavior in Portugal

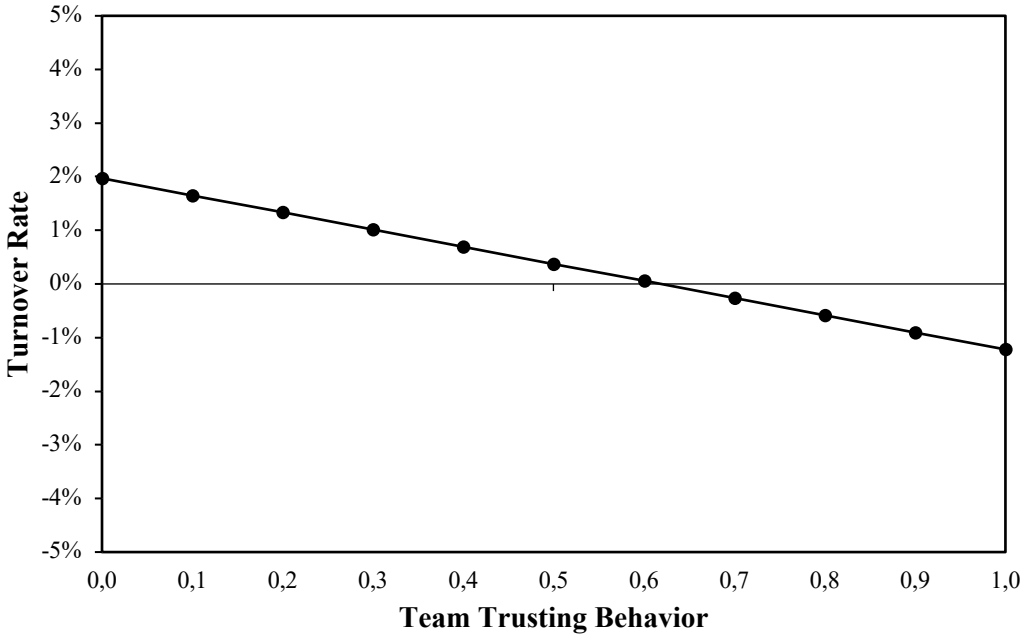


Figure 4.41: Predicted Team Turnover as a Function of Team Trusting Behavior in Russia

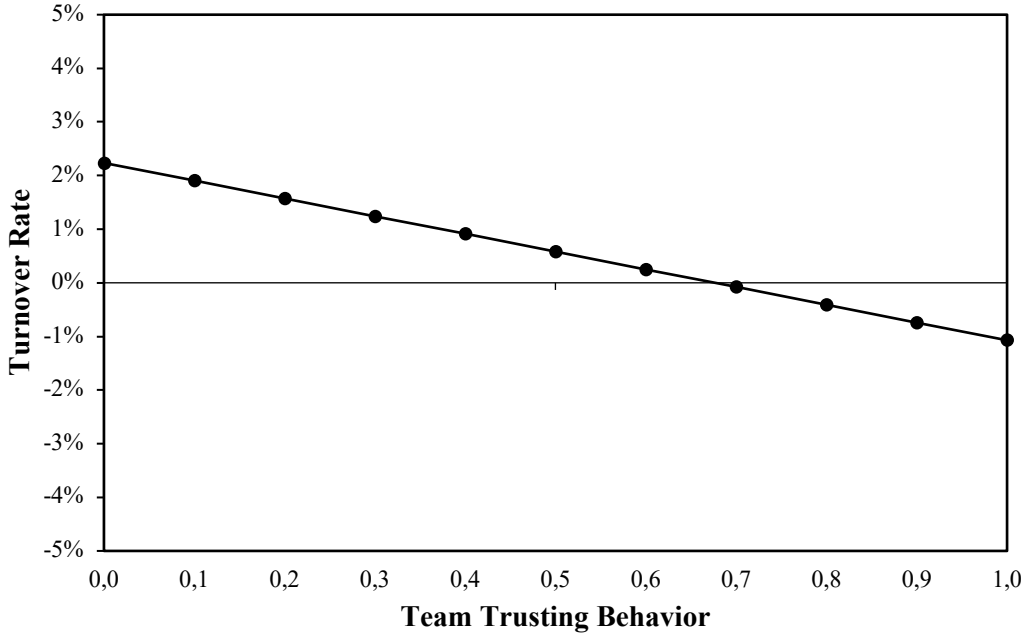


Figure 4.42: Predicted Team Turnover as a Function of Team Trusting Behavior in Serbia

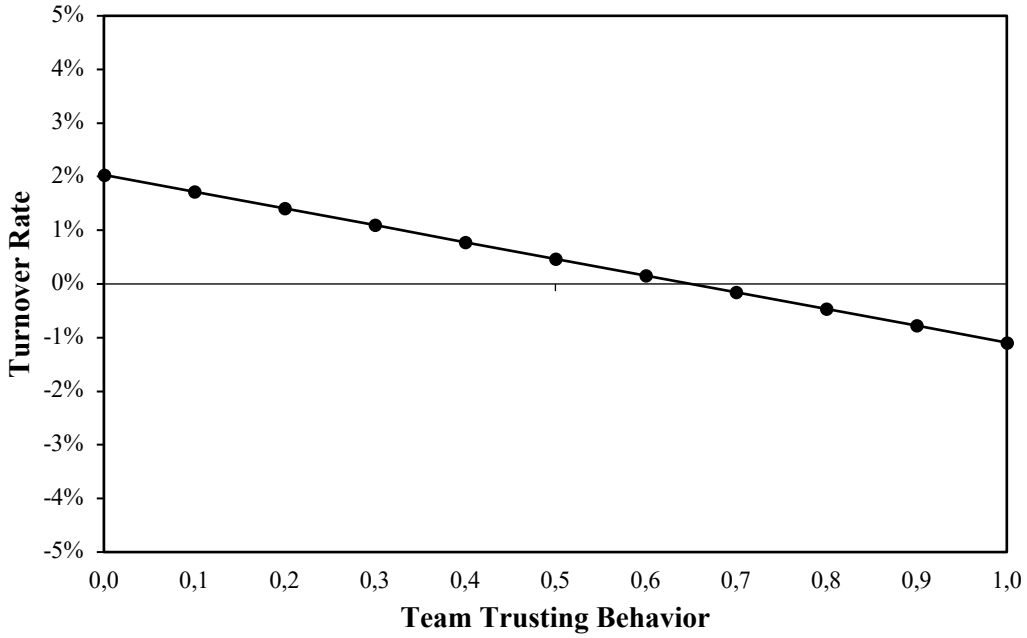


Figure 4.43: Predicted Team Turnover as a Function of Team Trusting Behavior in Spain

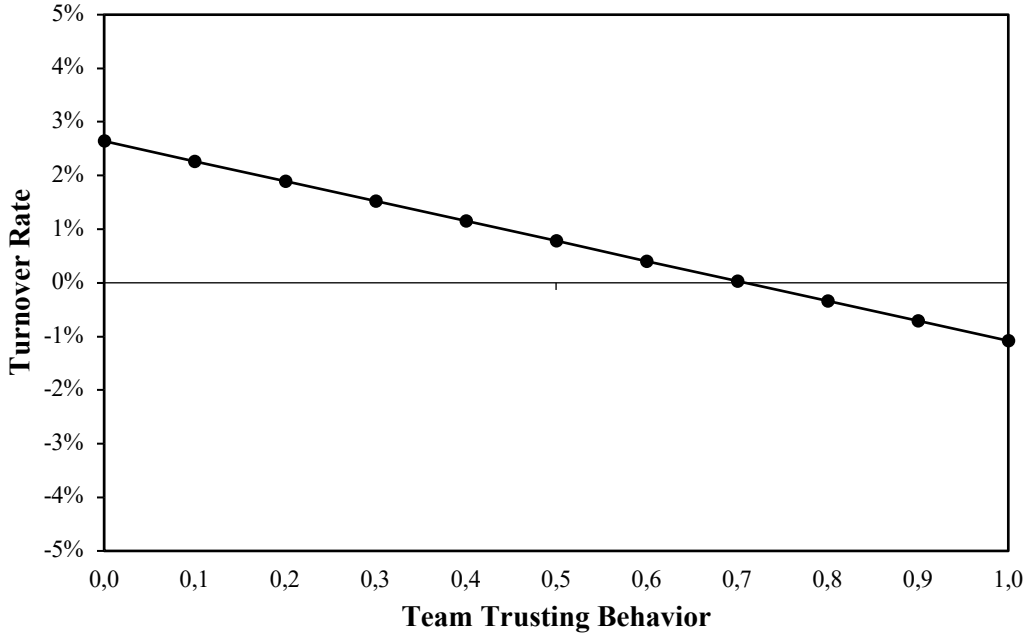


Figure 4.44: Predicted Team Turnover as a Function of Team Trusting Behavior in Turkey

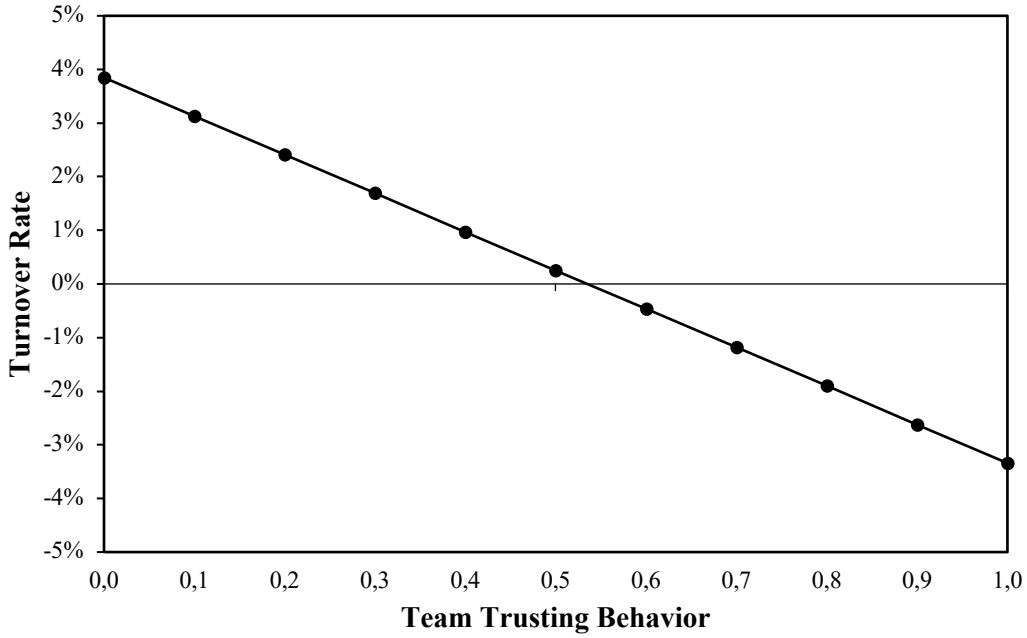


Figure 4.45: Predicted Team Turnover as a Function of Team Trusting Behavior in the United Arab Emirates

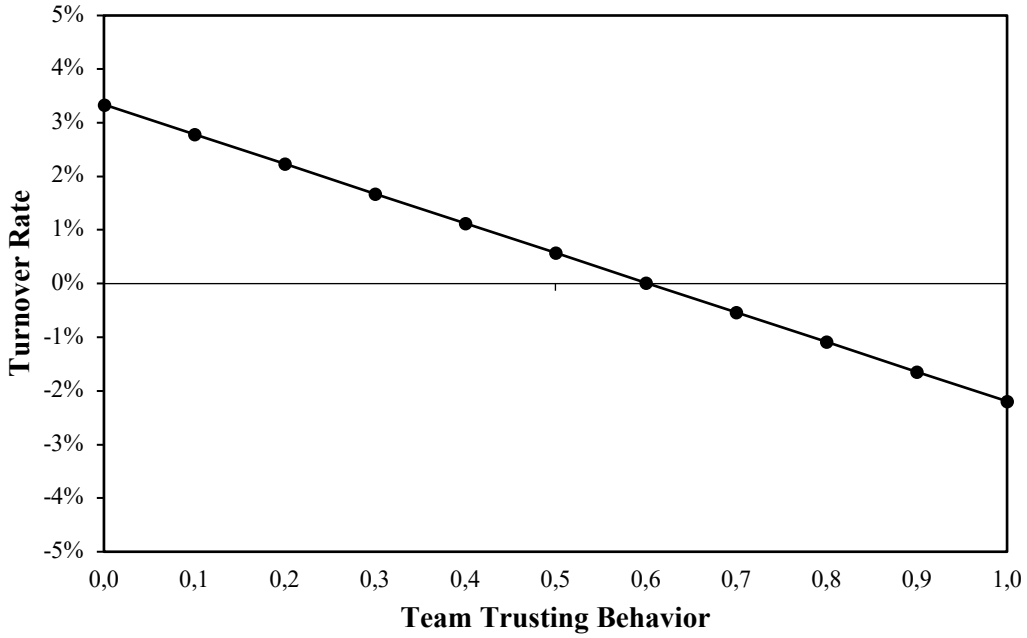
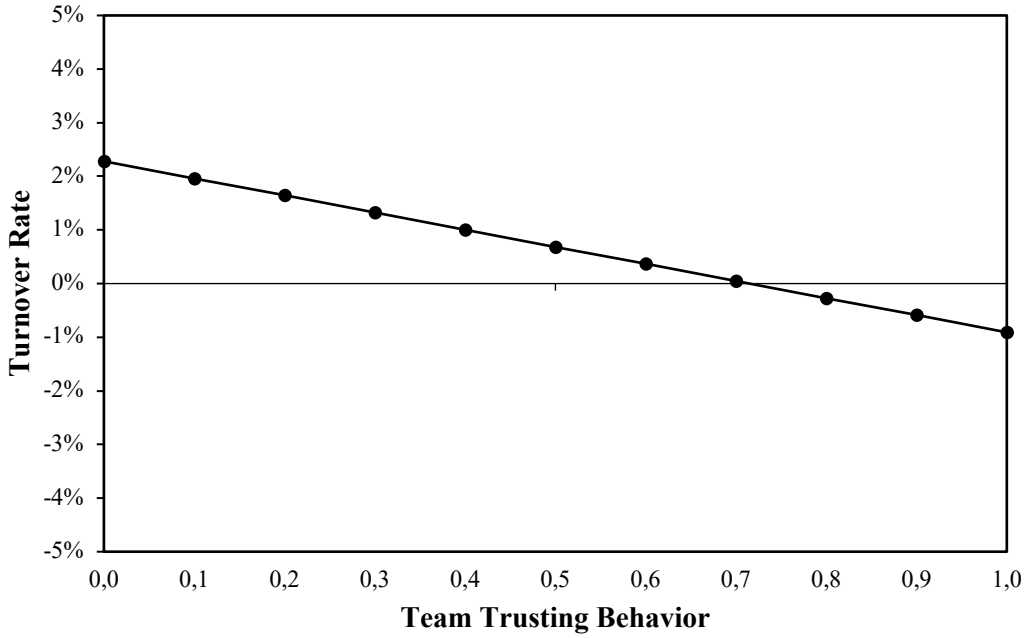


Figure 4.46: Predicted Team Turnover as a Function of Team Trusting Behavior in the United States of America



4.5 Discussion

After more than a century of research, turnover remains a crucial issue in research (Hom et al., 2017). Scholarly work has identified a plethora of predictors amongst which trust has been found to be a key contributor to turnover in organizations (Dirks & Ferrin, 2002). However, literature is sparse on both the temporal and cultural factors influencing the development of turnover in work teams (Mathieu et al., 2017) and its relationship with team trust. Based on Blau's (1964) social exchange theory, I develop a model explaining the development of turnover in work teams and its relationship with team trusting behavior in a variety of different cultures. To do so, I utilize longitudinal data from 1,766 teams in 22 countries from an online simulation game called *Travian* and establish three-level multilevel growth models (Aguinis et al., 2013; Bliese & Ployhart, 2002) to interpret and compare the resulting models.

Regarding the development of turnover in teams, I find an overall negative curvilinear trend in the turnover of work teams over time. Specifically, the data suggests that turnover is highest in early phases of the team, decreases rapidly, and stagnates in later stages. This is in line with social exchange theory (Blau, 1964) and corresponds with findings on the inverse relationship between commitment and turnover (Hom et al., 2017; H. J. Klein et al., 2014; Palich et al., 1995) which state that turnover should decrease over time as teams get to know each other better and become more committed to each other over time. As for the impact of culture on the development of turnover, the results propose that turnover indeed develops differently across cultures. While most countries show a negative trend in turnover over time, for some countries turnover even increases over the observation period. This difference is supported by cultural theory stating that both the interpretation and reaction to specific behaviors differ as a consequence of different cognitive scripts across cultures (Abelson, 1981).

The implications of these findings are twofold. First, practitioners and scholars alike need to take time dynamics into consideration when analyzing turnover. Team researchers have

stressed for years that past processes and outcomes have an important impact on processes and outcomes today and need to be taken into consideration (Hom et al., 2017; Mathieu et al., 2017). Recent research finds, for instance, that change in job satisfaction explains additional variance in the propensity to quit, thus, indicating, that individuals evaluate certain outcomes relative to an earlier evaluation (G. Chen et al., 2011). Given these results, I encourage future research to focus on the antecedents of these turnover dynamics. Second, cultural aspects need to be taken seriously to understand turnover. The study results propose that turnover follows a different dynamic throughout a team's lifecycle across cultures. In line with recent work by Hom et al. (2017), I encourage further research to dig deeper into the cognitive processes underlying these distinct dynamics to understand the importance of context in the development of turnover.

As for the relationship between trusting behavior and turnover, I find trust to have a negative impact on turnover. Therefore, it can be assumed that developing trust in a team can effectively reduce overall turnover based on an increased feeling of commitment to their peers. This is in line with meta-analytical work by Dirks & Ferrin (2002) who also find an inverse relationship between the two variables. Moreover, the data suggests that this relationship is not universally equal but instead differs significantly across cultures. While I find an inverse relationship between trust and turnover for all countries, the magnitude of this effect differs significantly. Specifically, I find an increase in one standard deviation in team trusting behavior to decrease turnover by 0.22 to 1.43 percentage points across cultures. These results are consistent with existing research examining cultural values and factors as moderators of the trust–turnover relationship (Arshad, 2016; Costigan et al., 2013).

These findings suggest that practitioners and scholars must be aware of the large impact of trust on team processes and outcomes such as team members' voluntary turnover (Dirks & Ferrin, 2002). Moreover, the study proposes that this impact has to be put into a cultural context to be understood correctly. The results show, for instance, that trust plays a much larger role in

Middle Eastern countries as compared to Japan. Accordingly, I also encourage future research to build on these findings and further examine moderating factors of the effect of trust on turnover in teams.

As all studies, this paper comes with several limitations. First, for my analysis, I utilize data from an online simulation game which questions generalizability of the results. Participants may not take this game seriously or behave differently in an actual work setting. However, tasks in this game show similar qualities as work tasks and, thus, are somewhat comparable to actual work teams. Moreover, prior research has stressed that group dynamics in such settings, which is at the center of this study, are surprisingly similar to a work context (Williams et al., 2006; Yee, 2006). Second, while I do investigate the dynamics of turnover development in itself, I do not specifically examine the dynamic impact of trusting behavior on turnover over time. Instead, I focus on the direct relationship between trusting behavior and turnover in order to receive comparable results on the overall impact of trusting behavior on turnover in teams across cultures. Research has shown that trust dynamics can have an impact on team outcomes beyond the actual level of trust in a team (Drescher et al., 2014). Therefore, I recommend building on this study's results and proceeding with more complex relationships between trust and turnover in future research.

4.6 Conclusion

Turnover remains an important topic in business research due to its high costs and consequences on overall productivity (Hom et al., 2017). In this study, I set out to investigate the development of turnover and its relationship with trust across cultures. The results demonstrate that culture significantly affects both the development of turnover itself as well as the impact of trust on turnover. To summarize, the findings suggest to researchers and practitioners alike that culture should be taken into consideration when investigating turnover. I discuss these findings reflecting existing research on this notion and recommend directions for future research.

5 Overall Conclusion and Discussion[2]

This dissertation investigates the development and consequences of team relationships from a dynamic perspective. As such, it explores the development of team trust and its dynamic antecedents (essay I), the dynamic consequences of specific relational climates in teams (essay II), as well as the dynamic development of turnover based on trust (essay III). More concretely, this thesis sets out to investigate the following research goals: First, it examines how team trustworthy behavior (i.e., competent behavior, integrity behavior, benevolent behavior) relates with team trusting behavior (as a behavioral manifestation of team trust) and how this relationship changes dynamically over time. Second, it aims to explore the functionality of team relational climates (i.e., communal sharing, authority ranking, equality matching, market pricing) by examining their dynamic impact on overall team performance over time. Third, it analyzes the development of turnover and its relationship with team trusting behavior across cultures.

All three essays in this dissertation contribute to our understanding of relationships in organizational work teams but differ in both their conceptualization of relationship quality as well as their center of attention on either the consequences or antecedents of their respective relationship indicator. They do, however, share their prime focus on the dynamics underlying the investigated relationships, which have been highlighted by scholars for years (e.g., Cronin et al., 2011; Marks et al., 2001; Mathieu et al., 2014). As a whole, this dissertation makes two major contributions. First, by investigating the development and consequences of team relationships from a dynamic perspective, this thesis addresses recent calls emphasizing the importance of time for research on team processes and emergent states (e.g., Mathieu et al., 2017). They add to this research stream by investigating long-term teams over a significant amount of time and examining the dynamic influential factors and consequences over multiple observations. Second, from a practitioner standpoint, the empirical findings propose that organizations

[2] This section is partly based on Uhlemann, Drescher, & Korsgaard (2020).

should be aware of their teams' relationships and actively manage them due to their measurable impact on overall team effectiveness. The results also provide evidence for specific behavioral patterns that can be utilized to improve team relationships, which are in line with theoretical work in this area (Mayer et al., 1995; Schoorman et al., 2007).

5.1 Discussion of Main Findings and Contributions

Essay I provides support for a curvilinear development of trusting behavior in teams, such that team trusting behavior increases in early stages and decreases in later stages again. As for the antecedents of team trusting behavior, it finds evidence for a dynamic relationship between team trustworthy behavior (i.e., competent behavior, integrity behavior, benevolent behavior) with team trusting behavior. Specifically, the results indicate a general positive relationship between all three trustworthy behaviors and team trusting behaviors, thus, supporting existing theoretical and empirical work on the development of trust (see Colquitt et al., 2007). When allowing these positive relationships to vary across time, the results suggest both the team competent behavior – team trusting behavior as well as the team benevolent behavior – team trusting behavior relationship to significantly change as teams age. While the results suggest team competent behavior to increase in effect size on team trusting behavior in a linear manner, it even finds evidence for quadratic growth in effect size for team benevolent behavior on team trusting behavior. In turn, no evidence for significant change in the effect size of team integrity behavior on team trusting behavior over time is found. Overall, these results indicate that trust is a dynamic state in teams and develops as members interact and get to know each other over multiple interactions and observations, which is largely consistent with existing conceptualizations in the trust literature (e.g., Korsgaard et al., 2018; Lewicki & Bunker, 1995, 1996; Mayer et al., 1995). The results also propose that the determinants of trust differ across time. In line with early theoretical work by Mayer et al. (1995), the essay finds trustworthy behavior, which affects trust via perceptions of the trusted party's trustworthiness, to increase

in relevance for the decision to trust once the team has accumulated sufficient information. However, this only seems to hold for competent and benevolent behavior. Instead, integrity behavior appears to be a consistent and stable determinant of team trust independent of the accumulated knowledge about the team. Consequently, essay I contributes to trust development and team literature by extending our understanding of the dynamic antecedents of team trust. Thereby, the essay also responds to recent calls to investigate the relative importance and dynamics of trust cues (Dietz, 2011; Li, 2012b; Schoorman et al., 2007).

The results of essay II provide evidence of the existence of relational climates in interdependent teams and indicates that these relational climates function differently within this context. More concretely, the data suggests the existence and shared perception of all four relational climates (i.e., communal sharing, authority ranking, equality matching, market pricing) in interdependent teams. The findings further indicate that both an authority ranking and a communal sharing climate positively affect team performance over a period of seven weeks in the essay's sample. In turn, a market pricing climate showed a significant negative impact on overall team performance while an equality matching indicated no significant effect on team performance. These findings suggest that teams establish and share perceptions of their team relationship in the shape of a team climate and, thus, support existing empirical and theoretical work on the existence of relational models on the team level (Vodosek, 2009; Wellman, 2017). The results further indicate that certain behaviors encouraged by the individual's perception of these climates tend to be more functional in a team and, more specifically, an interdependent team context. This is in line with existing empirical work finding relational models to encourage beneficial organizational behaviors, such as knowledge sharing (Boer et al., 2011), prosocial behavior (Stofberg et al., 2019), and proactive behavior (Batistič et al., 2016). Notably, the study finds the functionality of relational climates in teams to affect team performance in a dynamic manner over time, thus, supporting recent team models which foster the dynamics of team processes and emergent states (Mathieu et al., 2017). To the best of my knowledge, this

is the first study to investigate the effectiveness of relational climates in an organizational setting. Essay II, thus, contributes to our understanding of the dynamic role of team emergent states such as relational climates for team effectiveness. In so doing, it also adds to scholarly discussion on organizational climates which have been found to affect the overall functioning of organizations (see Schneider et al., 2017, for a comprehensive review) and responds to calls on investigating various climates simultaneously in a team context (Kuenzi & Schminke, 2009).

The findings of essay III are twofold. First, it suggests turnover in teams to develop curvilinearly over time. More concretely, it proposes turnover to be highest in early phases of the teams and decrease until it stagnates (or slightly increases) in later stages. Overall, this corresponds with social exchange theory which predicts turnover to decrease as teams get to know each other better and become more committed towards each other over time (Blau, 1964, 1972). Moreover, it finds this development to differ significantly across cultures in both magnitude and direction. While most countries share the negative development of turnover time, in some cultures such as Japan turnover slightly increases over time. Consequently, these results suggest that turnover development is not a universally identical principle but rather is affected by the team's underlying culture. This is consistent with theoretical work stating that different cultures utilize different cognitive scripts to interpret events which cause them to react differently across cultures (Abelson, 1981; Hofstede, 2011). It also matches empirical work by D. C. Thomas & Au (2002) who find cultures to react differently to low job satisfaction, which is an important predictor of turnover (Tett & Meyer, 1993).

Second, the essay finds team trusting behavior to have an inverse relationship with turnover. Thus, teams that trust each other more show lower turnover in the sample which is in line with meta-analytic findings by (Dirks & Ferrin, 2002). In addition, the data proposes this relationship to significantly differ across cultures in magnitude. Thus, although trust is a useful

measure to diminish turnover in all teams, its effectiveness seems to differ across cultures. Similar to these results, existing scholarly work has found that specific cultural factors moderate the trust–turnover relationship (Costigan et al., 2013). Consequently, the results highlight that trust is an important predictor for turnover in teams but that cultural factors, which so far are inconclusively covered, play a major moderating role in this. To summarize, essay III contributes to both the trust and turnover literature. Specifically, it does so by investigating turnover from both a temporal and cultural perspective and generating results on country-specific relationships, which can be utilized in future research to examine potential moderating effects for these. Thereby, this essay also responds to recent calls to integrate a dynamic perspective on the investigation of turnover (Lee et al., 2014).

Overall, the essays of this dissertation contribute to our understanding of teams as dynamic entities and make individual theoretical contributions to concepts and theories in the organizational behavior literature. By integrating various theoretical frameworks from the literature on relationships, this thesis sheds light on the importance of interpersonal team processes and, in so doing, answers recent calls for further research on this notion (Patzelt et al., 2020). In addition, the results highlight the importance of time when investigating relationships in teams as they suggest both the development of relationships as well as the impact on team functionality to be dynamic in nature (Korsgaard, 2018; Mathieu et al., 2017, 2019). To investigate these dynamics, the essays rely on data from an online simulation game which exemplifies a new and innovative setting for research in social sciences. Specifically, participants in the team-based strategy game *Travian* are examined by tracking their actions and behaviors and enriching the data with survey data on individual perceptions of themselves and the team. This is in line with recent calls for novel measurement opportunities and provides a promising avenue for further research (Delice et al., 2019).

5.2 Practical Implications

In today's VUCA (i.e., volatile, uncertain, complex, and ambiguous) world, organizations have increasingly adopted team-based work designs to maximize the effectiveness of their employees. The utilization of teams allows organizations to profit from the complementary skill sets of their members when facing complex organizational problems while also leveraging knowledge sharing across the team (Mathieu et al., 2017, 2018). Consequently, it is not surprising that teams are considered the "basic building blocks of present day organizational designs" (Mathieu et al., 2019, p. 18).

We know from extant research that good relationships at work are a key ingredient for productivity of both individuals and teams (Grant, 2007; LePine et al., 2008; Marks et al., 2001). For instance, with regard to work motivation, research has shown that employees evaluate a positive impact of their work as one of the most important job features (Cascio, 2003) and that interpersonal relationships at work play a key role in perceiving one's job as impactful (Barry & Crant, 2000; Bradbury et al., 2000; Gersick et al., 2000; W. A. Kahn, 1990; Wrzesniewski et al., 2003). Based on this, Grant (2007) summarizes work relationships as a key work motivator for employees due to the opportunity they give to have a positive impact on other people's lives. Moreover, scholarly work has shown that interpersonal relationships positively affect opportunities and resources at work partly due to the more frequent exchange of knowledge and information as well as a more effective conflict management (see Marks et al., 2001, for a comprehensive review). The overall effect of this can be quite impressive. For instance, Zak (2017) notes that he and his team found employees in companies with strong organizational relationships in terms of trust (top 25% quartile) to be 76% more engaged, 50% more productive, 60% more satisfied with their job, and 70% more aligned with their organization's purpose when compared to companies with low trust (bottom 25% quartile). Moreover, their results indicate significant benefits in terms of employee loyalty and work-related stress. In light of these findings, practitioners need a more fine-grained understanding of how to foster

and actively manage positive work relationships – especially for the increasingly important team-based work designs. The empirical essays of this dissertation address this need by giving managers and practitioners guidance on how to develop positive relationships in work teams and providing evidence for their potential benefits.

The results of essay I show that the development of trust in teams is based to a large extent on team members engaging in trustworthy behaviors (Colquitt et al., 2007; Mayer et al., 1995; Schoorman et al., 2007). Hence, organizations are well advised to encourage their team members to engage in such behaviors. Thereby, the results highlight three different avenues through which trust can be fostered in teams: Engaging in competent behavior (i.e., indicating one's general capability to succeed in a specific job), integrity behavior (i.e., indicating one's adherence to sound moral and ethical principles) or benevolent behavior (i.e., indicating one's unconditional supportiveness, loyalty, and caring). All three are highly and uniquely related with trust development and, consequently, provide opportunities to build up a positive relationship between team members. As for competent behavior, the results highlight, for instance, the importance of employee selection processes based on job-specific capabilities as well as continuous training opportunities to maximize employee expertise (Colquitt et al., 2007). With regard to integrity behavior, organizations are encouraged to foster and incentivize behaviors such as sticking to one's word as well as general ethical guidelines among team members. Moreover, organizations may profit from designing and presenting processes, such as performance evaluations or employee selections, in a transparent manner to their team members (Colquitt et al., 2011). Regarding benevolent behaviors, practitioners could work towards building a norm for helpfulness across team members (Amabile et al., 2014) as well as incentivizing citizenship behaviors, that go beyond one's formal job description but rather benefit their peers instead (Motowidlo & Van Scotter, 1994). The findings further indicate that practitioners should be aware of the varying importance of these three behaviors for team trust over time. Specifically,

the results of essay I suggest that competent behavior and benevolent behavior increase in importance for team trust over time and, thus, gain relevance the longer the team collaborates. In turn, integrity behavior remains a stable and strong driver of team trust and, consequently, constitutes a promising avenue for practitioners to foster work relationships at all times.

Essay II provides important insights to practitioners and managers on the consequences of specific team climates when working in interdependent work teams. The results suggest that practitioners must be aware that team members share perceptions of a team level relational model and that this perception translates into team members collaborating more (or less) effectively. Specifically, for the context of interdependent work teams, the findings indicate that managers may choose one of two avenues to foster team effectiveness via the development of functional team climates: First, managers may want to work towards a communal sharing climate in their teams, which fosters a shared team identity as well as unconditional cooperation, helping, and supportiveness between team members. To do so, organizations are encouraged to utilize group-based reward systems, which can facilitate helping and a shared identity between team members (Bamberger & Levi, 2009). Managers may also deemphasize the importance of job titles and hierarchical structures to foster the perception as coequals in teams (Wellman, 2017). Moreover, organizations may establish selection criteria aimed towards communally-oriented employees, such as highly agreeable individuals (McCrae & Costa, 1989). Second, organizations may want to establish an authority ranking climate in their teams, which focuses on one (or more) legitimate central authorities which coordinate and redirect information and resources. To facilitate this, managers may focus on signaling their superior attributes for leadership, clearly communicating a vision to other team members to create legitimacy for their leadership position, and establishing leadership credentials early on to strengthen their central leadership position (Wellman, 2017). Notably, a common disadvantage of hierarchical structures is the increased conflict potential due to opposing interests on different hierarchy levels

(see Greer et al., 2017, for a comprehensive review). Therefore, to avoid potential dysfunctionalities, I encourage practitioners to carefully choose between the two potential team climates and integrate additional information such as team composition into the decision-making process. For instance, a team consisting of multiple agreeable individuals is likely to benefit and function well in a communal sharing climate (McCrae & Costa, 1989). In turn, teams with multiple extroverts will likely show high levels of competitiveness and increased conflict potential in an authority ranking climate (although some scholarly work hints that this may be muted by a dominant authority; see Bonner, 2000). Finally, with regard to the aspect of time, organizations are well advised to think long-term when considering team climate interventions. The results indicate that the positive effect of both communal sharing and authority ranking climates takes time to manifest in increased team performance. Practitioners should, therefore, evaluate and monitor the positive impact of team climates over an extended time period.

Essay III provides important findings on the development of turnover in teams as well as the unique trust–turnover relationship across cultures. The results indicate that practitioners must be aware of a natural development of turnover with relatively high turnover rates in earlier phases and a more stable team in later stages. However, it is important to note that this development does not hold universally: Instead, the study finds that there is significant variance in this development that managers and practitioners must be aware of. For instance, the results indicate countries such as Turkey, the United Arab Emirates, Israel, Poland, Iran, Netherlands, Spain, Italy, Serbia, Portugal, Chile, Australia, Brazil, Russia, Finland, Indonesia, and Hungary to decrease in team turnover over time. In contrast, Denmark, Germany, the United States of America, France, and Japan show the opposite development with a positive trend in turnover over time. Consequently, practitioners should be aware of the culture in their team when analyzing their team's turnover behavior. Moreover, essay III supports that trust is an important lever for managers to decrease turnover in teams in all observed cultures. Notably, the results

also suggest that the effect of trust on turnover differs across cultures in magnitude. For instance, Iran, the United Arab Emirates, Turkey, and Israel are found to react particularly favorably to change in trust. In contrast, change in trust has only a minor impact in Japan, Serbia, Denmark, and Germany. Therefore, practitioners are well advised to develop trust across team members to increase commitment towards each other and, subsequently, decrease overall fluctuation. Managers may achieve that by focusing on building empathy towards their team members. Frei & Morriss (2020) suggest, for instance, focusing on signaling interest and paying close attention to what people need to do their job properly instead of what you need. At the same time, practitioners should take note of their teams' culture when evaluating the impact of these trust measures.

5.3 Limitations and Directions for Future Research

Apart from providing valuable suggestions for further research in the team literature, this thesis as a whole has several limitations which need to be considered when interpreting the results. First, throughout this thesis, I utilize the online simulation game *Travian* as an alternative research setting to test the proposed research models. Although scholarly work highlights the "tremendous research potential of virtual worlds" (Bainbridge, 2007, p. 474) and made successful use of such contexts to study relationships in teams (e.g., G. Chen et al., 2009; Dimotakis et al., 2012; Drescher et al., 2014)., the generalizability of results in this research setting remains uncertain due to potential task or population differences (Castronova & Falk, 2009). The survey data from essay II indicate, for instance, that participants were disproportionately male (78% male) and on average rather young (31.61 years). Moreover, as an online simulation, the game itself presented some technical barriers to participants, thus, potentially inducing an additional self-selection process. While the results of this thesis provide valuable preliminary insights, future research may revisit this by investigating the dynamic development and consequences of team relationships in actual work teams.

Second, the essays in this thesis do not cover the whole array of dynamics suggested in recent theoretical conceptualizations of team functioning (Cronin et al., 2011; Kozlowski & Klein, 2000; Mathieu et al., 2017, 2019). While all essays indeed take on a dynamic perspective on team relationships and their antecedents or consequences, respectively, they mostly concentrate on a specific dynamic to keep the results measurable and interpretable. For instance, essay II focuses on investigating the dynamic consequences of specific team relational climates over time. However, multilevel theory suggests that the manifestation of relational climates as a team level construct in itself is a dynamic and time-consuming process which is interrelated with the behavior and outcomes of the team (K. J. Klein et al., 2000). Similarly, while essay I investigates the dynamically changing relationship between trustworthy behavior and trusting behavior, it neglects that a perceived change in trustworthy behavior itself may have consequences on trusting behavior above and beyond the specific relationship at that time. A team may, for example, perceive an upward trend in competent behavior as an additional positive cue (beyond the current level of displayed competence) for the decision to trust (Korsgaard et al., 2018). Lastly, essay III concentrated on the dynamics of turnover development in itself but does not examine the impact of trust trajectories on turnover. Yet, these trust trajectories have been found to be an important predictor beyond static levels of trusting behavior for team outcomes (Drescher et al., 2014). To keep the story of each essay parsimonious, these additional dynamics were neglected in this thesis. However, I encourage future research to further investigate various dynamics in teams simultaneously in order to resemble recent theoretical advancements on teams.

Related to this notion, it is important to note that the use of correlational data throughout this thesis does not imply causality. Although the longitudinal and time-lagged data utilized in all three essays significantly reduces the possibility of alternative explanations, it is reasonable to assume (and even theoretically implied) that dependent and independent variables likely affect each other (Mayer et al., 1995). It is, for instance, likely that a team's helping behaviors

(i.e., benevolent behavior) are partially caused by their team trust in the past. A fruitful avenue for future research may be to investigate this notion by disentangling the dynamic chain of effect which likely occurs in the development of team relationships.

This dissertation enhances our knowledge of the dynamic antecedents and consequences of team relationships by investigating team trust, team relational climates, and team turnover. Although these constructs have received tremendous attention in the organizational behavior literature (De Jong et al., 2016, 2017; Hom et al., 2017; Korsgaard, 2018; Mossholder et al., 2011; Wellman, 2017), future research may benefit from utilizing different indicators for relationship quality in teams. While more traditional measures may include team cohesion, team commitment, or team identification, a more innovative approach may also include physiological measures. For instance, an array of research on marital stability found physiological measures (e.g., heart rate, pulse transmission time, skin conductance level, general somatic activity) to be potent predictors of relationship satisfaction in couples (see, for instance, Levenson & Gottman, 1985). As such data can be easily collected longitudinally throughout one or multiple sessions, this may provide a particularly fruitful area for future research and significantly extent our knowledge of the microdynamics in teams.

To conclude, this dissertation sets out to investigate the development and consequences of work team relationships from a dynamic perspective. The findings indicate that relationships are an important aspect of teams and affect their overall functionality and endurance. The results further show that team member behavior displaying various forms of trustworthiness can benefit the development of positive team relationships. Thereby, a dynamic perspective and integrating the effect of time was found essential in understanding these effects. Managers and practitioners are encouraged to be aware of and actively manage their teams' interpersonal connections to increase effectiveness.

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7 Appendix

Appendix A: Reference for the First Essay (Essay I, Chapter 2)

Uhlemann, K. F, Drescher, M. A., & Korsgaard, M. A. (2020). When Thoughts Turn Into Action: The Dynamic Relationship of Trustworthy Behavior with Trusting Behavior. *Academy of Management Annual Meeting Proceedings*, 2020.

Appendix B: Reference for the Second Essay (Essay II, Chapter 3)

Uhlemann, K. F, Strobel, M., Tumasjan, A., & Welpe, I. M. (2021). Exploring the Functionality of Fundamental Interpersonal Climates: How Relational Climates Shape Team Performance Over Time. *Submitted to Organizational Behavior and Human Decision Processes.*

Appendix C: Reference for the Third Essay (Essay III, Chapter 4)

Uhlemann, K. F. (2022). Exploring the Impact of Team Trusting Behavior on Team Turnover: A Cross-Cultural Comparative Analysis. *Working paper*.

Appendix D: Author Contributions to Essay I and II in this Dissertation

Essay I: When Thoughts Turn Into Action: The Dynamic Relationship of Trustworthy Behavior with Trusting Behavior

05/21/2021

Author contributions to dissertation paper: When Thoughts Turn Into Action: The Dynamic Relationship of Trustworthy Behavior with Trusting Behavior

Reference:
Uhlemann, K. F, Drescher, M. A., & Korsgaard, M. A. (2020). When Thoughts Turn Into Action: The Dynamic Relationship of Trustworthy Behavior with Trusting Behavior. *Academy of Management Annual Meeting Proceedings*, 2020.

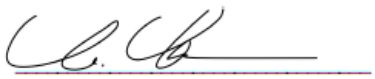
Contributions:

Kai Uhlemann developed the research question and the research design under supervision of Marcus Drescher.

Kai Uhlemann was responsible for the collection of the data. Raw data was utilized from a previous DFG funded project (WE 3584/7-1).

Kai Uhlemann was responsible for the data analysis. Throughout the analysis process, he received feedback from Marcus Drescher and Audrey Korsgaard.

The article was written in an iterative cooperative process, in which Kai Uhlemann wrote the first draft of a full paper, which was further developed through suggestions, recommendations and feedback from Marcus Drescher and Audrey Korsgaard.



Kai Uhlemann (lead author)

Prof. Dr. Marcus A. Drescher (co-author)

Prof. Dr. M. Audrey Korsgaard (co-author)

Essay II: Exploring the Functionality of Fundamental Interpersonal Climates: How Relational Climates Shape Team Performance Over Time

05/21/2021

Author contributions to dissertation paper: Exploring the Functionality of Fundamental Interpersonal Climates: How Relational Climates Shape Team Performance Over Time

Reference:

Uhlemann, K. F, Strobel, M., Tumasjan, A., & Welpe, I. M. (2021). Exploring the Functionality of Fundamental Interpersonal Climates: How Relational Climates Shape Team Performance Over Time. *Working paper.*

Contributions:

The research question was developed in an iterative process in which Kai Uhlemann, Maria Strobel, Andranik Tumasjan, and Isabell Welpe contributed.

Maria Strobel, Andranik Tumasjan, and Isabell Welpe contributed to the data collection as part of a DFG funded project (WE 3584/7-1). Kai Uhlemann was responsible for processing the raw data. Throughout this process, he received feedback from Maria Strobel, Andranik Tumasjan, and Isabell Welpe.

Kai Uhlemann was responsible for the data analysis. Throughout the analysis process, he received feedback from Maria Strobel, Andranik Tumasjan, and Isabell Welpe.

The article was written in an iterative cooperative process, in which Kai Uhlemann wrote the first draft of a full paper, which was further developed through suggestions, recommendations and feedback from Maria Strobel, Andranik Tumasjan, and Isabell Welpe.

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