Shared experience, performance pressure and performance: evidence from sports data

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1. Introduction

"Alone we can do so little, together we can do so much." ~ Helen Keller

There has been a steady increase of team-based structures within firms from 20% in 1980 to over 80% in 2000 (HOLLENBECK/BEERSMA/SCHOUTEN 2012). In the 21st century, teams have become the strategic choice in order to increase performance beyond individual performance capabilities (STEWART 2006) and to remain competitive on the market (MEYER ET AL. 2017). Yet, firms more and more switch from static to dynamic teams – where team members dynamically join and leave teams and even have multiple team memberships (AVGERINOS/GOKPINAR 2017; EDMONDSON/NEMBHARD 2009; HUCKMAN/STAATS 2011; HUCKMAN/STAATS/UPTON 2009; KANE 2010; KANE/ARGOTE/LEVINE 2005; O'LEARY/MORTENSEN/WOOLLEY 2011). Thus, firms face increasingly complex team-structures resulting in *why* and *when* some teams outperform other teams being a core puzzle within the literature on small teams (HUCKMAN/STAATS 2011; HUCKMAN/STAATS/UPTON 2009).

Further, firms are confronted with increasing levels of performance pressure – defined as "the importance of performing well on a particular occasion" (BAUMEISTER 1984: 610) – due to more and more demanding customers, non-stop Mergers & Acquisitions, tougher financial targets and highly competitive global markets (LOCHMANN/STEGER 2002). Performance pressure is a ubiquitous phenomenon and a practically important construct in the 21st century (KUNDI/SARDAR/BADAR 2021; MITCHELL ET AL. 2019), deeply rooted in economic literature, and has consequently been analyzed at team-level (BAUMEISTER/STEINHILBER 1984; BECHKY/OKHUYSEN 2011; DRISKELL/SALAS/DRISKELL 2017; DURHAM ET AL. 2000; GARDNER 2012b; PEPINSKY/PEPINSKY/PAVLIK 1960; SALAS/DRISKELL/HUGHES 1996) as well as at individual-level (DOHMEN 2008; EWEN 1973; HALL/LAWLER 1970; MITCHELL ET AL. 2018; MITCHELL ET AL. 2019; ORGAN 1975; SUTTON/RAFAELI 1988; TRIANDIS 1959). The implications of performance pressure on performance are yet less clear as performance pressure represents a double-edged sword inducing positive and negative behavioral effects (GARDNER 2012b). Until today, it still remains a puzzle *why* some individuals can handle performance pressure better than others and *how* it affects behavioral decision making (GONZÁLEZ-DÍAZ/GOSSNER/ROGERS 2012; MITCHELL ET AL. 2019; OTTEN 2009).

Acknowledging the challenges of the 21st century, this thesis tackles the raised puzzles trying to answer them from an outcome-based performance perspective. While chapter 2 & 3 center around team performance, chapter 4 & 5 focus on individual performance.

One construct that has been brought forward by the team literature from a resource-based perspective (BARNEY 1991) in order to explain *why* some teams outperform other teams is the previous experience of its team members with the task and with the other team members (HUCKMAN/STAATS 2011; HUCKMAN/STAATS/UPTON 2009). Chapter 2 & 3 analyze the performance implications of previous (shared) experience with the task and the team members. Chapter 2 analyzes the mediating mechanisms that might explain *why* previous experience with the task and the team members (positively) relates to team performance: team coordination and team cooperation. Chapter 3 deepens the performance implications of previous shared experience by analyzing it as a moderating boundary condition on the links between the team's levels of pay dispersion – the level of pay differences within a team (BLOOM 1999) – and team performance. In addition to analyzing shared previous experience as a boundary condition, chapter 3 also examines performance pressure as a moderating boundary condition that affects the strength of these links. Chapter 4 advances the previous chapter on performance pressure and takes a different perspective by analyzing performance pressure on an individual level trying to answer *why* some individuals perform better under performance pressure compared to others. Chapter 5 is also settled in the context of performance pressure and analyzes the decision making of individuals evaluating misconduct (arguably their performance) while constantly facing high levels of performance pressure. Lastly, Chapter 6 summarizes the main implications of this thesis.

The following paragraphs provide more detailed overviews about the respective chapters and its linkages.

The modus operandi of today's organizations is to rely on dynamic, project-based team structures (O'LEARY/MORTENSEN/WOOLLEY 2011) and thus, distinguishing between team and task familiarity becomes crucial as those will fall more and more apart in practice (HUCKMAN/STAATS 2011). Still, research largely remains silent on potential mechanisms behind team and task familiarity on the one hand and team performance on the other hand. Thus, "future research could provide a more in-depth and vivid account of how team familiarity influences team operations and task dynamics" (AVGERINOS/GOKPINAR 2017: 25). Chapter 2 focuses on this gap in the literature by theoretically and empirically distinguishing between team familiarity and task familiarity and proposing two intermediate mechanisms that link team and task familiarity on the one side with team performance on the other side: *team coordination* and *team cooperation*. We theoretically propose that while team familiarity positively links to team performance through both team coordination and team cooperation, task familiarity positively links to team performance through team coordination and negatively through team cooperation. Using data from the National Basketball Association (NBA) - a context which has proven suitable for analyzing team performance, team and task familiarity (BERMAN/DOWN/HILL 2002; SIEWEKE/ZHAO 2015) as well as team coordination (GRIJALVA ET AL. 2020) and team cooperation (UHLMANN/BARNES 2014) - we find support for our derived hypotheses. Our results thus contribute to a better understanding of *why* some teams are more effective than other teams by highlighting the importance of team familiarity and showing that task familiarity indeed negatively links to team performance through team cooperation, yet positively through team coordination.

While Chapter 2 focuses on the mediated direct effect of previous shared experience in form of team familiarity on team performance, chapter 3 analyzes previous shared experience in form of shared team task experience[1] as a potential moderator on the links between (un)explained pay dispersion and team performance. (Un)explained pay dispersion refers to differences in pay that are (not) tied to performance indicators (TREVOR/REILLY/GERHART 2012) and represents an increasingly relevant construct as organizations face a push for pay transparency (FRIEDMAN 2014) – a situation where coworkers are aware of each other's' wages (MARASI/BENNETT 2016) – as a result of legal regulations and cultural changes (SMIT/MONTAG-SMIT 2019). The literature on pay dispersion still seeks for answers explaining conflicting empirical results ranging from positive (e.g. HEYMAN 2005; MAIN/O'REILLY/WADE 1993) to negative (e.g BLOOM 1999; SIEGEL/HAMBRICK 2005), representing a highly important economic puzzle. We hypothesize that high levels of explained pay dispersion is positively

[1] Shared team task experience is distinct from team familiarity, yet both relate to previous shared experience. Team familiarity is a broader construct theoretically also capturing experience with the team members on different tasks or even on non-work-related experiences. Shared team task experience is a narrower construct solely capturing shared experience of team member's on one specific task (LUCIANO ET AL. 2018). The relation of both constructs is explained in more detail at in chapter 3.

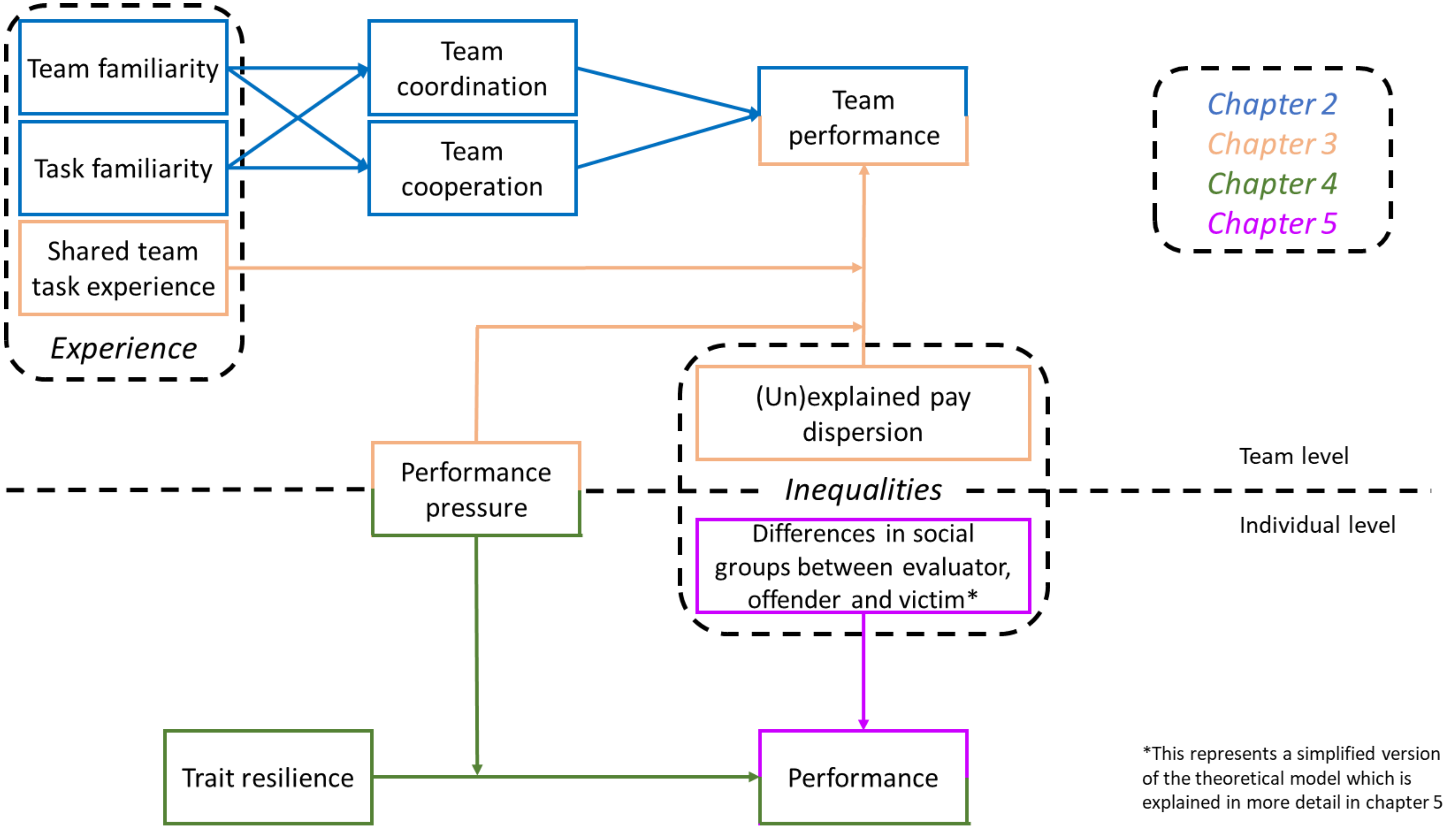
linked to team performance referring to expectancy theory (VROOM 1964) and high levels of unexplained pay dispersion is negatively linked to team performance referring to equity theory (ADAMS 1963) as well as referring to the fair wage-effort hypothesis in both cases (AKERLOF/YELLEN 1990). Further, we propose that these links are strengthened by shared team task experience as team members get a better feeling for the fairness of each other's wages by working together on the same task. Thus, while chapter 2 analyzes a direct effect of previous shared experience, this chapter contributes by also taking an indirect, moderating perspective. Lastly, we contribute to the literature on performance pressure and theorize that performance pressure acts as a strong motivator, making team members more self- and less team-focused, weakening the effects of (un)explained pay dispersion on team performance. Again, using data from the NBA on play-by-play (possession) level we predominantly find support for our hypotheses – a positive (negative) effect of (un)explained pay dispersion on team performance that is strengthened (weakened) by shared team task experience (performance pressure). Once more, the NBA has proven to be suitable for analyzing puzzles associated with pay dispersion (FRICK/PRINZ/WINKELMANN 2003; SIMMONS/BERRI 2011), shared team task experience (BERMAN/DOWN/HILL 2002; GRIJALVA ET AL. 2020; SIEWEKE/ZHAO 2015), performance pressure (CAO/PRICE/STONE 2011; DEUTSCHER/FRICK/PRINZ 2013; TOMA 2017) and team performance (ARCIDIACONO/KINSLER/PRICE 2017; GRIJALVA ET AL. 2020). Our results contribute to a more nuanced understanding of previous shared experience as it incorporates also indirect, moderating effects besides its direct effect of chapter 2. Further, our results shed light on potential moderating effects of the practically highly relevant construct of performance pressure. Potentially, performance pressure acts as a strong motivator outweighing, concealing and cannibalizing any (de)motivational effects of (un)explained pay dispersion.

While chapter 2 & 3 set teams in the focus, chapter 4 & 5 focuses on individual performance and individual behavior. Chapter 4 advances the previous chapter 3 by focusing on performance pressure and trying to answer the empirical puzzle of *why* some individuals can handle pressure better than others (MOSLEY/LABORDE 2015; OTTEN 2009). Being able to perform under pressure has become one of the most prevalent required characteristics of employees (GASKELL 2019; PERNA 2021) and not being able to withstand the obstacles of performance pressure has resulted in estimated health care costs in the US that amount to 190 billion dollars (KHAN ET AL. 2020) rendering this puzzle highly important. The previous literature has identified trait resilience as one potential trait-like characteristic that positively affects performance under performance pressure (MOSLEY/LABORDE 2015). While previous research has analyzed trait resilience either with a focus on subjective behavioral outcomes such as incivility or citizenship (MITCHELL ET AL. 2019) or in an experimental setting (TUGADE/FREDRICKSON 2004), chapter 4 links trait resilience to objective performance outcomes while incorporating objective measures for performance pressure. In particular, we propose that trait resilience positively relates to individual performance and that this relationship is stronger under high levels of performance pressure. We use performance data from the German table tennis league which has proven to be suitable for analyzing trait-like psychological constructs (VAGHEFI/TOJARI/GANJOUEI 2012) and find support for our hypotheses. Our results thus shed light on individual differences in the ability to perform well under performance pressure and potentially inform managers to assign individuals to tasks in such a way that employees scoring high on trait resilience should be assigned to tasks associated with high levels of performance pressure.

Chapter 5, in contrast to chapter 4, analyzes individual performance in a setting that is arguably constantly characterized by high levels of performance pressure. In particular this chapter analyzes in how far evaluation decisions of evaluators are biased towards people that share similarities with themselves while simultaneously facing high levels performance pressure due to heightened scrutiny of their evaluation decisions (GARDNER 2012b). Previous literature has shown that evaluation decisions are biased towards individuals that share similarities with themselves (e.g. (PRICE/WOLFERS 2010; SHAYO/ZUSSMAN 2011) but also that they are not (DEUTSCHER 2015; POPE/PRICE/WOLFERS 2018). This renders an important research puzzle and one potential reason generating these inconsistencies might arise from previous studies only incorporating characteristics from the evaluator and the person being evaluated in their analyses ignoring characteristics of third parties that are also involved. I analyze this puzzle in the context of evaluating misconduct in the NBA which has proven to produce reliable results concerning discrimination in evaluation decisions (POPE/PRICE/WOLFERS 2018; PRICE/REMER/STONE 2012; PRICE/WOLFERS 2010). In particular, I analyze referee decisions (the evaluator) on foul calls by incorporating not only characteristics of the alleged offender (the player that allegedly committed the foul) but also the alleged victim (the player that allegedly got fouled) into my analysis. I hypothesize that the evaluators discriminate against an out-group alleged offender (i.e. an alleged offender that *does not* share similarities with the evaluator) and that this effect is stronger if the alleged victim belongs to the evaluator's in-group. I predominantly find support for my hypotheses. Specifically, I do not find a direct effect of out-group discrimination independent of the characteristics of the alleged victim, yet I do find out-group discrimination if the alleged victim belongs to the evaluator's in-group. Thus, my results contribute to solving the above-mentioned research puzzle and show the importance of incorporating all involved parties into one's consideration when analyzing out-group discrimination. These results are in particular interesting as the evaluators in the NBA face constantly high levels of performance pressure due to being constantly scrutinized by fans, sport experts, academia or journalists (GARDNER 2012b) and potentially adjusted their behavior to veil biases. The results thus contribute to the scare literature on how performance pressure potentially affects biases (PARSONS ET AL. 2011).

The closing Chapter 6 provides a conclusion, gives practical implications and proposes directions for future research. Figure 1.1 give a graphical representation of all 4 chapters.

Figure 1.1: Theoretical conceptualization of chapter 2, 3, 4 & 5.



2. (Shared) experience, team coordination, team cooperation and team performance[2]

2.1 Introduction

"Winning is about having the whole team on the same page." Bill Walton

Firms increasingly rely on teams (LAZEAR/SHAW 2007; LEPINE ET AL. 2008; PARK/SPITZMULLER/DESHON 2013; SALAS/COOKE/ROSEN 2008) in response to the growing complexity and increasingly challenging demands of nowadays' tasks (MATHIEU ET AL. 2000). Because team members are often part of several teams at the same time and team composition varies over time, managers are frequently challenged with the task of assigning workers to teams in a way to maximize team performance (AVGERINOS/GOKPINAR 2017; EDMONDSON/NEMBHARD 2009; HUCKMAN/STAATS 2011; HUCKMAN/STAATS/UPTON 2009; KANE 2010; KANE/ARGOTE/LEVINE 2005; MORTENSEN/HAAS 2018; O'LEARY/MORTENSEN/WOOLLEY 2011).

One core assumption when appointing workers to teams is that team members' familiarity with one another (*team familiarity*) and with the task (*task familiarity*) do have positive team performance implications through enhanced team processes. By conceptually distinguishing between team and task familiarity on the one hand and by focusing on two different team processes that link team and task familiarity with team performance (team coordination and team cooperation), we argue and show that this assumption holds only partially true for the relationship between task familiarity and team performance.

Theoretically, we take a resource-based perspective to complement existing research on the direct effect of task and team familiarity on team performance (BERMAN/DOWN/HILL 2002; DOKKO/WILK/ROTHBARD 2009; ESPINOSA ET AL. 2007; HUCKMAN/STAATS/UPTON 2009; REAGANS/ARGOTE/BROOKS 2005; TIAN/HALEBLIAN/RAJAGOPALAN 2011). We expand this literature by focusing on the indirect effects through *team coordination*, i.e. the effective sequencing of interdependent taskwork (ARGOTE 1982; GRIJALVA ET AL. 2020; OKHUYSEN/BECHKY 2009; RICO ET AL.

[2] *This chapter is based on the manuscript "Being on the same page! How team and task familiarity affect team coordination and team cooperation", written by Philip Yang, Julian Nüßle and Kerstin Pull.*

2008; SALVATO/REUER/BATTIGALLI 2017) and *team cooperation*, i.e. the willful contribution of personal resources to the accomplishment of a common goal (CHUA/INGRAM/MORRIS 2008; SALVATO/REUER/BATTIGALLI 2017; WAGNER III 1995) Specifically, we argue that team familiarity improves team performance through enhanced team coordination and team cooperation, whereas task familiarity effects team performance positively through team coordination, yet negatively through team cooperation.

Following our theoretical analysis, we test our hypotheses with empirical data from the National Basketball Association (NBA) which has proven to be a suitable setting when analyzing team familiarity, task familiarity, team coordination, team cooperation or team performance (BERMAN/DOWN/HILL 2002; GRIJALVA ET AL. 2020; HALEVY ET AL. 2012; SIEWEKE/ZHAO 2015; SMITH/HOU 2015; UHLMANN/BARNES 2014). Using data of 12,896 performance episodes aggregated from 136,679 players in game-level data while simultaneously holding the team, the opponent and the season constant, we find that both *team* and *task familiarity* positively relate to *team coordination.* Also, our results imply that *team familiarity* positively links to *team cooperation*, but that *task familiarity* negatively links to *team cooperation*. Further, both team coordination and team cooperation both associate positively to team performance and mediate the relation between team and task familiarity and team performance. Whereas the indirect effect of team familiarity on team performance is positive through both mediators, team coordination and team cooperation, the indirect effect of task familiarity on team performance through team coordination is positive, but negative through team cooperation. Last and exploratively, we also include the interaction between team familiarity and task familiarity into our analyses and thus also contribute to the scarce literature that analyzes the interactive effects of team and task familiarity (ESPINOSA ET AL. 2007). In line with ESPINOSA ET AL. (2007), we find that the interaction between team and task familiarity relates negatively to team performance indicating a substitutive effect between the two. Interestingly and consistent with our theoretical analysis, we find that the interaction positively links to team coordination and negatively relates to team cooperation.

We contribute to the literature in three major ways – both theoretically and empirically: *First*, we explicitly take into account that team and task familiarity are conceptually different and thus contribute to the scare literature that has analyzed task and team familiarity simultaneously (HUCKMAN/STAATS/UPTON 2009;

REAGANS/ARGOTE/BROOKS 2005). With firms increasingly relying on project-based team structures, team and task familiarity will rather *not* fall together than fall together in practice. *Second*, we conceptually differentiate between team coordination and team cooperation as two intermediate processes that link team and task familiarity to team performance. As a result, we present a more holistic picture of the interplay between team familiarity, task familiarity, team coordination, team cooperation and team performance that allows to explain why the link between task familiarity and team performance does not necessarily have to be positive. *Third*, we empirically contribute to the literature using data from the NBA to analyze the antecedents and effects of team coordination and team cooperation by suggesting two clearly delineated measures for analyzing these constructs (GRIJALVA ET AL. 2020; SMITH/HOU 2015; UHLMANN/BARNES 2014).

The remainder of the paper is structured as follows. First, we propose a conceptual model on how team and task familiarity, team coordination, team cooperation and team performance are related. We then confront our hypotheses with empirical evidence and subsequently discuss our results and derive implications.

2.2 Literature, theory & hypotheses

2.2.1 Task and team familiarity as a critical resource

From a resource-based perspective, one crucial source of competitive advantage roots in a firm's capacity to acquire, hold, and utilize "critical resources", i.e. resources that are valuable, rare, not easily substitutable, and non-imitable (BARNEY 1991; PETERAF 1993; WERNERFELT 1984). Familiarity, as a specific cognition-based and work-related knowledge that is built over time via repeated interaction with the task and/or with one another (ESPINOSA ET AL. 2007; GOODMAN/GARBER 1988), represents such a critical resource.

Familiarity with the team and/or the task might either be implicit (i.e. hard to articulate) or explicit (i.e. easy to codify) (BERMAN/DOWN/HILL 2002; HADJIMICHAEL/TSOUKAS 2019; NONAKA/KROGH 2009; OSTERLOH/FREY 2000; POLANYI 1966; SHAMSIE/MANNOR 2013). Arguably, the higher the team's familiarity with the task and/or with one another, the more the team might rely on implicit cognition structures (FITTS/POSNER 1967) that are bound to experience (COOK/BROWN 1999; PISANO 1994). As familiarity with the team members and the task needs time to develop (ESPINOSA ET AL. 2007) it constitutes a valuable and rare resource that is hard to substitute or imitate (SUMMERS/HUMPHREY/FERRIS 2012) thus representing a critical organizational resource from a resource-based perspective (BARNEY 1991; REED/DEFILLIPPI 1990).

The literature on familiarity at team level mainly focuses on two types of familiarity: *team familiarity* and *task familiarity* (ESPINOSA ET AL. 2007; LITTLEPAGE/ROBISON/REDDINGTON 1997). Team familiarity relates to the experience of the team members with one another (HINDS/CRAMTON 2014; HUCKMAN/STAATS/UPTON 2009; KATZ 1982; LITTLEPAGE/ROBISON/REDDINGTON 1997; ZHENG/DEVAUGHN/ZELLMER-BRUHN 2016), whereas task familiarity captures the aggregated level of experience of the individual team members with the specific task under consideration (BERMAN/DOWN/HILL 2002; BROWN/DUGUID 1991; GOODMAN/GARBER 1988; REN/ARGOTE 2011; SHAMSIE/MANNOR 2013).

Even though both concepts are clearly interrelated and partly overlapping, they are conceptually different, and they often also fall apart in practice. For example, the members of a project team might be experienced with the task itself (high task familiarity) while none of them might have worked together before (low team familiarity). Vice versa, a project team that has worked together before on another task and is now entrusted with a new one will be characterized by a low task familiarity but a high team familiarity. With firms increasingly relying on project-based, 'fluid' team structures (MORTENSEN/HAAS 2018) where team members join and leave the team during the course of the project and often have multiple team memberships (AVGERINOS/GOKPINAR 2017; EDMONDSON/NEMBHARD 2009; HUCKMAN/STAATS 2011; HUCKMAN/STAATS/UPTON 2009; KANE 2010; KANE/ARGOTE/LEVINE 2005; O'LEARY/MORTENSEN/WOOLLEY 2011), it is crucial to conceptually differentiate between task familiarity on the one hand and team familiarity on the other.

2.2.2 Team coordination, team familiarity and task familiarity

Team coordination: Linguistically, coordination comes from the Latin "*cum ordinare*", i.e. putting in order (SALVATO/REUER/BATTIGALLI 2017). Accordingly, definitions of team coordination refer to people working together on an interdependent task to achieve a common goal (ARGOTE 1982; OKHUYSEN/BECHKY 2009; RICO ET AL. 2008) with the focus being on how effectively the goal is achieved, by, e.g., organizing inputs in a proper way (SALVATO/REUER/BATTIGALLI 2017) or "orchestrating the sequence and timing of an interdependent team workflow" (BREUER/HÜFFMEIER/HERTEL 2016: 1152). To effectively coordinate, team members need to "be on the same page" (AGGARWAL/WOOLLEY 2013; DECHURCH/MESMER-MAGNUS 2010; OBORN/BARRETT 2021): by encoding, storing, and retrieving information about the other team members' expertise in so-called *transactive memory systems* (ARGOTE/MIRON-SPEKTOR 2011; REAGANS/ARGOTE/BROOKS 2005; REN/ARGOTE 2011), by having overlapping and accurate *shared mental models*, i.e. "cognitive representations of task requirements, procedures, and role responsibilities" (CANNON-BOWERS/SALAS/CONVERSE 1993) which might refer to the team or to the task. Lastly, team coordination might also improve via *cognition-based trust* (MCALLISTER 1995; MCEVILY/PERRONE/ZAHEER 2003; OKHUYSEN/BECHKY 2009), i.e. team members' trust in the ability of their teammates to perform the specific task at hand.

Team familiarity and team coordination: When gaining team familiarity irrespective of the level of task familiarity, team members learn "who knows what" (ELLIS 2006; LIANG/MORELAND/ARGOTE 1995; REN/ARGOTE 2011), i.e. they generate a strong *transactive memory system* and will coordinate more effectively (BALKUNDI/HARRISON 2006; SIEWEKE/ZHAO 2015) . Further, a more accurate *shared team mental model*, i.e. a „shared, organized understanding and mental representation of knowledge about key elements of the team's relevant environment" (MOHAMMED/DUMVILLE 2001) is developed (ELLIS 2006; MOHAMMED/FERZANDI/HAMILTON 2010; RICO ET AL. 2008; SIEWEKE/ZHAO 2015), thus also enhancing team coordination (CANNON-BOWERS/SALAS/CONVERSE 1993; MOHAMMED/FERZANDI/HAMILTON 2010; ROUSE/CANNON-BOWERS/SALAS 1992; SIEWEKE/ZHAO 2015; STOUT ET AL. 1999). Concluding, we propose:

Hypothesis 2.1: Team familiarity is positively linked to team coordination.

Task familiarity and team coordination: When a team is characterized by a high level of task familiarity, team members will more likely recognize and value their teammates' expertise and there will be less variability concerning how the task should be performed (BARON/ENSLEY 2006; DREYFUS/DREYFUS 2016) – also for teams whose members are not (yet) familiar with one another. This "expertise recognition" is part of a strong *transactive memory system*, and thus links to a better team coordination (OKHUYSEN/BECHKY 2009; REN/ARGOTE 2011). Likewise, team members will have a more accurate *shared task mental model* i.e. "knowledge about how the task is accomplished in terms of procedures, task strategies, likely contingencies or problems, and environmental conditions" (MATHIEU ET AL. 2000), and will thus be more likely to successfully coordinate their activities (CANNON-BOWERS/SALAS/CONVERSE 1993; KLIMOSKI/MOHAMMED 1994; MATHIEU ET AL. 2000; MOHAMMED/FERZANDI/HAMILTON 2010). Lastly, team members with a high task familiarity are also more likely to trust their teammates' expertise (AVGERINOS/FRAGKOS/HUANG 2019; COLQUITT ET AL. 2011; MAYER/DAVIS/SCHOORMAN 1995; MCALLISTER 1995; MCEVILY/PERRONE/ZAHEER 2003; OKHUYSEN/BECHKY 2009), i.e. they develop *cognition-based trust* which also enhances team coordination because, for example, team members need to allocate less resources to ensure that the tasks of the other team members are performed properly (AVGERINOS/FRAGKOS/HUANG 2019; MCALLISTER 1995; MCEVILY/PERRONE/ZAHEER 2003; OKHUYSEN/BECHKY 2009). Concluding, we propose:

Hypothesis 2.2: Task familiarity is positively linked to team coordination.

2.2.3 Team cooperation, team familiarity and task familiarity

Team cooperation: Linguistically, cooperation originates from the Latin "*cum operare*", i.e., helping one another and contributing to the accomplishment of a common goal (SALVATO/REUER/BATTIGALLI 2017). Team cooperation hence refers to "the willful contribution of personal effort to the completion of interdependent jobs" (WAGNER III 1995). In contrast to team coordination, team cooperation will be fostered by *affect-based trust* rather than cognition-based trust: While cognition-based trust "comes from the head", affect-based trust "comes from the heart", i.e. arises from one's feelings and emotions (CHUA/INGRAM/MORRIS 2008) and involves empathy and a concern for the welfare of the other team members (Rempel, Holmes, & Zanna, 1985). Further, *group cohesion*, i.e. "group members' affinity for one another and their desire to remain part of the group" (KIDWELL/MOSSHOLDER/BENNETT 1997) will also enhance team cooperation (NG/VAN DYNE 2005) as members of cohesive groups are more likely to help one another and contribute resources to achieve a common goal (KIDWELL/MOSSHOLDER/BENNETT 1997; RUTKOWSKI/GRUDER/ROMER 1983; SCHACHTER ET AL. 1951).

Team familiarity and team cooperation: A higher team familiarity reduces social distance (ALLPORT 1954), and team members are thus more likely to develop *affect-based trust* (LEWIS/WEIGERT 1985; REMPEL/HOLMES/ZANNA 1985) and help one another (DROLET/MORRIS 2000; NG/CHUA 2006). Further, teams with a high team familiarity will be characterized by a stronger *group cohesion* (CHASKIN 1997; EVANS/DION 1991; FESTINGER/SCHACHTER/BACK 1950; GREITEMEYER/COX 2013; GULLY/DEVINE/WHITNEY 2012; KASARDA/JANOWITZ 1974; MULLEN/COPPER 1994; SIMONS/VERMEULEN/KNOBEN 2016; ZHENG 2012) which will again enhance team cooperation. Therefore, we propose:

Hypothesis 2.3: Team familiarity is positively linked to team cooperation.

Task familiarity and team cooperation: Unlike the link between team familiarity and team cooperation, we argue the relationship between task familiarity and team cooperation to be negative because a high task familiarity will enhance *cognition-based* rather than affect based trust and cognition-based trust might in fact reduce rather than enhance team cooperation by inducing free-riding (NG/CHUA 2006). When members of a team have a high level of trust in each other's expertise and capabilities, they might conclude that they need to contribute less to achieve the common goal, and might thus be led to free ride on their teammates' efforts. Consider as an intuitive example a research team consisting of three renowned and very experienced researchers that have each shown the capability of publishing high quality research. All team members then might have an incentive to contribute fewer personal resources to the team accomplishment, trusting that less of their own effort is needed to achieve the common goal. Hence, teams that have high levels of task familiarity might in fact show less team cooperation compared to teams with lower levels of task experience.

While our theoretical prediction might seem counter-intuitive at first sight, there is tentative empirical evidence that supports our argumentation: For instance, GARDNER/GINO/STAATS (2012) show that "experiential resources", similarly to task familiarity defined as "the accumulated practical skill or expertise" (VON HIPPEL 1988: 6) hinder a team's "knowledge integration capability" which is also held to capture "supportive, concise, truthful and non-confrontational information sharing" (GARDNER/GINO/STAATS 2012: 1007) and thus might also negatively affect team cooperation. Further, CASTANEDA ET AL. (2016) found that "experts", i.e. team members with high stocks of task familiarity, displayed a more self-focused and less team-focused, i.e. less cooperative behavior compared to their team members with a lower level of task familiarity. Further, the findings by CHEN/GARG (2018) likewise point to cooperative behavior being less effective in the presence of "stars" (i.e. team members with an arguably high task familiarity). They show that a temporary absence of stars induces a deviation from routines of the remaining (non-star) team members (with arguably lower levels of task familiarity) and that they behave more cooperatively in the aggregate during the star's absence when the team is characterized by lower levels of task familiarity. In sum, we propose the following:

Hypothesis 2.4: Task familiarity is negatively linked to team cooperation.

2.2.4 The indirect effects of team coordination and team cooperation on team performance

Because both *team coordination* and *team cooperation* have repeatedly been argued to be key antecedents of subsequent team performance (for *team coordination* see: FISHER 2014; GRIJALVA ET AL. 2020; HEALEY/VUORI/HODGKINSON 2015; LEPINE ET AL. 2008; MOHAMMED/FERZANDI/HAMILTON 2010; REAGANS/ARGOTE/BROOKS 2005; STEWART 2006; for *team cooperation* see: COSTA/BIJLSMA-FRANKEMA/JONG 2009; DREU 2007; JOHNSON ET AL. 2006; KISTRUCK ET AL. 2016; KRAUS/HUANG/KELTNER 2010; MATHIEU ET AL. 2008; PINTO/PINTO/PRESCOTT 1993; PUCK/PREGERNIG 2014; STEWART/BARRICK 2000), in a last step, we put the effects of team and task familiarity on team coordination and cooperation into a broader perspective by including team performance as a final outcome.

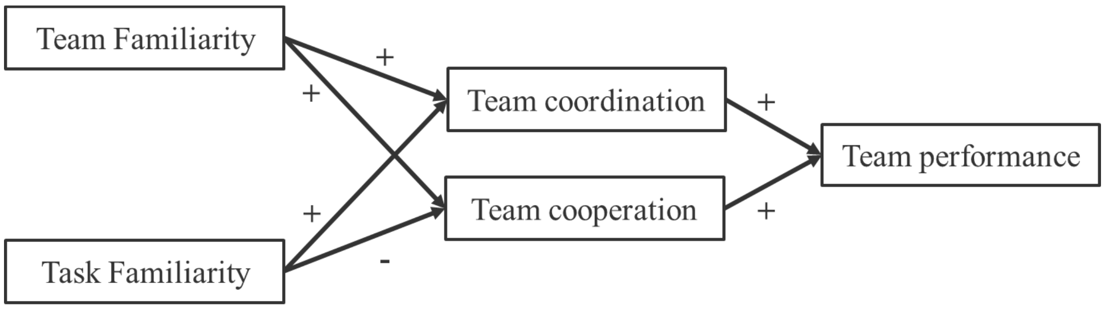
We hypothesize:

Hypothesis 2.5: The effect of team familiarity on team performance is mediated by (a) team coordination and (b) team cooperation.

Hypothesis 2.6: The effect of task familiarity on team performance is mediated by (a) team coordination and (b) team cooperation.

Concerning the link between team or task familiarity and performance, we expect team familiarity to be positively linked to team performance (via enhanced team coordination and team cooperation, Hypotheses 2.1, 2.3 and 2.5), whereas the link between task familiarity and team performance is theoretically indeterminate, because a higher task familiarity enhances team coordination, but reduces team coordination (Hypotheses 2.2, 2.4 and 2.6). Figure 2.1 provides a graphical representation of our model.

Figure 2.1: Theoretical conceptualization of the relation between team familiarity, task familiarity, team coordination, team cooperation and team performance.



2.3 Data and methods

2.3.1 Sample & setting

We test our hypotheses using team-in-game-level data for every game from the 2013-14 to the 2018-19 regular seasons and playoffs of the National Basketball Association (NBA). We restrict our analysis to this sample as the data for our team coordination and team cooperation measures is not available prior to the 2013-14 season. Because team and task familiarity are yet established over many years before the 2013-14 season, we use data to generate our familiarity variables back to 2007-08 in order to avoid censoring problems. The NBA is the premier professional basketball league of the world and consists of 30 teams, which play 82 regular games in one season followed by the playoffs. Each team in the NBA can carry up to 15 players on their roster during regular season. 13 of those 15 players can participate in each game. In total, our sample consists of 12,896 performance episodes (approx. 82 games for each season · 30 teams · 6 seasons) aggregated from 136,679 players-in-game-level data.

NBA data has proven to be especially useful when analyzing organizational questions in the context of interdependent project teams (CANNON-BOWERS/BOWERS 2006) such as leadership (ERTUG/MAORET 2019; GIAMBATISTA 2004; SIEWEKE/ZHAO 2015), performance pressure (CAO/PRICE/STONE 2011; DEUTSCHER/FRICK/PRINZ 2013;

TOMA 2017), team familiarity (BERMAN/DOWN/HILL 2002; SIEWEKE/ZHAO 2015), team narcissism composition (GRIJALVA ET AL. 2020), newcomer performance adjustment (BEUS ET AL. 2014), key member absence (CHEN/GARG 2018), productivity spillover (ARCIDIACONO/KINSLER/PRICE 2016), status and reputation (ERTUG/CASTELLUCCI 2013), team heterogeneity (SMITH/HOU 2015) and discrimination (ERTUG/MAORET 2019; POPE/PRICE/WOLFERS 2018; PRICE/WOLFERS 2010; ZHANG 2017a, 2019a).

Several features make the NBA data particularly compelling to address our hypotheses. *First*, the NBA context ”can serve as a living laboratory for organizational inquiry” (KEIDEL 1987: 608) in which players are embedded in the same, homogenous and standardized context where team histories are well-documented (DAY/GORDON/FINK 2012; KATZ 2001; KEIDEL 1984, 1987; WOLFE ET AL. 2005). *Second*, NBA data provides an objective measure to analyze the coordination as well as cooperation implications from (team and task) familiarity and thus is to a lesser extent subject to common method bias or social desirability (GRIJALVA ET AL. 2020). *Third*, the detailed employment records of each team member enable us to calculate our variables of interest in a very detailed and objective manner (SIEWEKE/ZHAO 2015), which is highly important to eliminate measurement error from team member mobility, selection, and absence. These measurement errors are particularly relevant for the data we use because NBA players frequently change teams within the season (GRIJALVA ET AL. 2020), NBA coaches vary the minute distribution of players (ZHANG 2017a), and key members of teams are rested or injured (CHEN/GARG 2018). The detail of the data yet allows us to account for individual contributions to the team, effectively solving these problems (GRIJALVA ET AL. 2020).

We obtain our main data from the official NBA website (nba.com).

2.3.2 Measures

Team performance. We measure team performance by whether a game was won or not. Winning is the ultimate goal of NBA teams and reflects a measure often used to display team performance (ARCIDIACONO/KINSLER/PRICE 2016; BERGER/POPE 2011; BERMAN/DOWN/HILL 2002; BRANDES/BRECHOT/FRANCK 2015; FONTI/MAORET 2016; GRIJALVA ET AL. 2020; LEFGREN/PLATT/PRICE 2015; SMITH/HOU 2015). Our team performance variable equals one if the respective team won the game and zero otherwise.

Team coordination. We measure team coordination using the NBA team's overall share of uncontested shots in the focal game (GORMAN/MALONEY 2016; VAN MAARSEVEEN/OUDEJANS 2018). An uncontested shot is a shot on the basket without any opponent team members contesting it as for example by trying to block the shot (ROJAS ET AL. 2000). The creation of an uncontested shot is highly dependent on all team members on the court, involving the player that passes to the uncontested player, the player that is uncontested but also the three other players that misdirect or block the opponent team members. Further, uncontested shots are not directly related to team performance as an uncontested shot can either be made or missed. Our team coordination variable equals the share of uncontested shots relative to the overall amount of shots in a game.

As a robustness check, we also run our regression model using assists as a measure of coordination because assists have been put forward by the literature as a measure for team coordination (GRIJALVA ET AL. 2020; SIEWEKE/ZHAO 2015). Our assist measure reflects the share of assist for all shot made (i.e., is associated with "how many of the shots made were assisted").

Team cooperation. We measure team cooperation using the NBA team's overall number of passes in the focal game (CHEN/GARG 2018; GRYKO ET AL. 2020). Whenever a player passes to another player, the passing player effectively gives the opportunity to another player, and thus the overall number of passes adequately reflects the amount of cooperation in the team. The counterfactual of passing would be to engage into an individual, non-cooperative behavior as the player then decides to try scoring by himself (ZHANG ET AL. 2019b). Thus, the less passes the more a team has engaged in individual behaviors and because of that we argue that the overall number of passes reflects a good approximation for the team's overall cooperation. Our team cooperation variable equals the total number of passes between players of the same team within a game.

Team familiarity. In line with previous literature (ESPINOSA ET AL. 2007; GRIJALVA ET AL. 2020; SIEWEKE/ZHAO 2015; ZHENG/DEVAUGHN/ZELLMER-BRUHN 2016), we calculate the game specific level of team familiarity in three steps. *First*, we measure the number of seasons that each player has played in the respective team. *Second*, we construct the average number of shared seasons among every dyadic teammate combination for each player ($\frac{N(N-1)}{2}$ combinations for a team of N players). *Third*, we multiply each player's dyadic season familiarity value with the share of seconds played in the game under consideration to aggregate and average it to the game specific level of team familiarity (an illustrating example can be found in the appendix). We follow the minutes weighting approach in the third step to account for team members contributing differently to team coordination, team cooperation and team performance (BERMAN/DOWN/HILL 2002; SIEWEKE/ZHAO 2015), to account for core and peripheral roles of team members within the team (FONTI/MAORET 2016) and to account for measurement problems related to team member mobility, coaching decisions, and injuries (CHEN/GARG 2018; GRIJALVA ET AL. 2020; ZHANG 2017a).

Task familiarity. We measure the level of a team's *task familiarity* in a given game by the following three steps: *First*, we calculate the individual number of minutes played in the NBA for each player throughout the whole career up until the game under consideration *Second*, we weight this amount by the number of seconds the player played in the respective game and *third*, we average the numbers across the team to get the game specific level of task familiarity for a given team (SIEWEKE/ZHAO 2015). The amount of time played in the NBA determines how many contextual settings a player has seen and thus, in how many different settings a player has accumulated task-specific knowledge, skills, and abilities (SHAMSIE/MANNOR 2013; SIEWEKE/ZHAO 2015).

Control Variables:

Player efficiency rating (PER) is an acknowledged and standardized measure of individual ability of NBA players developed by HOLLINGER (2009). PER accounts for positive and negative accomplishments of a player and sets it in relation to time; hence the rating is an ability as well as an efficiency measure which is of high relevance to team performance (ARCIDIACONO/KINSLER/PRICE 2016; ERTUG/CASTELLUCCI 2013). It is highly important to empirically disentangle ability from our familiarity variables to reduce endogeneity problems caused by selection bias and reversed causality (ANTONAKIS ET AL. 2010). We follow a similar procedure as for our familiarity variables and weight the individual season PER of each player with the share of minutes played in the respective game and aggregate it at the team level (GRIJALVA ET AL. 2020).

We control for the number of players potentially available to play in each respective game. Thus, *team size* does not measure the actual number of players that played in the game but the number of players that were available to play. The implications of our team size variable are different from (ESPINOSA ET AL. 2007), who use team size to control for the overall number of team members, implying that a larger number of team members decreases team coordination. We consider team size as the team roster of players that could have potentially played.

We control for the number of *possessions* of the specific game (GRIJALVA ET AL. 2020). Because NBA games vary in the speed, it is necessary to adjust for the overall number of possessions as more possessions might be related to especially the overall number of passes (team cooperation).

Similarly, we hold constant the effect of overtimes. If NBA games are tied at the end of the regulation, these games are extended to overtimes, which increases the number of shot attempts and passing opportunities. To avoid any overtime-related measurement errors, all our regressions are estimated with overtime-fixed effects.

Further, we account for the psychological state of the team by controlling for *win-loss-streak*, i.e., the number of consecutive previous wins or losses of a team, where the win-loss-streak for the first game of the respective season is defined as zero. The idea is as follows: Imagine two teams that have the same current statistics of 10 wins and 5 losses. Further, assume the extreme case that the one team has won the previous five games whereas the other team has lost the previous five games. One could easily imagine that the psychological state of the two teams is different although they have the exact same statistics, which might in turn influence the team's coordinative and cooperative behavior. Specifically, we would expect the team with the previous winning streak of five games to be in a better psychological state than the one with a previous loss streak of five games which might influence their team coordination, team cooperation and team performance. Accounting for the team's previous win-loss record is a common procedure in empirical research using NBA data (ZHANG 2017a).

Lastly, we include *home game* as an additional control variable. Literature has shown a home bias in terms of home teams winning significantly more games than away teams (POPE/PRICE/WOLFERS 2018; RIBEIRO/MUKHERJEE/ZENG 2016) which might also influence a teams' coordination and cooperation pattern. Especially, players might feel more secure at home than away which might foster team coordination. Home game is a dummy variable that equals one if the respective game was a home game and zero if the respective game was an away game. All variables including a variable description are summarized in Table 2.1.

Table 2.1: Overview of all study variables

Variable	Measure Description
Team performance	1 = if the respective game was won, 0 = otherwise
Team coordination	Share of uncontested shots (i.e. total number of uncontested shots divided by total number of shots (contested shots + uncontested shots)) by the team in the game under consideration
Team cooperation	Total number of passes by the team in the game under consideration.
Team familiarity	The game-specific team level of team familiarity aggregated from individual seasons in the respective team among each player dyad present in the game weighted by the share of seconds of each player in the game under consideration.
Task familiarity	The game-specific team level of task familiarity aggregated from individual team members' overall playing time in the NBA weighted by the share of seconds of each player in the game under consideration.
PER	The game-specific team level of ability aggregated from individual team member PER weighted by the share of seconds of each player in the game under consideration.
Team size	The number of players that were available to play for the team in a given game (team roster).
Possessions	The overall number of possessions in the game under consideration.
Win-loss streak	Measure for the psychological state of the team. Approximated by the number of previously cumulated wins (or losses) that reflects the win (loss) streak in the game under consideration. A value of +5 indicates that the last 5 games were won, and the game before these 5 games was lost.
Home game	1 = home game, 0 = otherwise

2.3.3 Estimation strategy

We conduct fixed-effect linear regressions simultaneously holding the team and the opponent constant. Further, we include season and overtime fixed effects. As a result, the estimated coefficients refer to the within treatment effects that account for any time invariant team and opponent characteristics within a season (ZHANG 2017a). By holding the team, the opponent and the season constant we effectively control for e.g. rule changes between seasons, financial endowment of teams or coach characteristics. We thus examine our questions of interest analyzing the same teams playing against each other in the same season using different levels of team and task familiarity. We test our indirect, mediating hypotheses using structural equation modeling. Further, prior to the regression analysis and prior to calculating the interaction terms, we standardize all non-dummy variables in order to make the coefficient sizes comparable and to avoid problems of artificially generating multicollinearity (DAWSON 2014; JACCARD/WAN/TURRISI 1990). All standard errors are robust and clustered at the team and opponent level.

2.4 Results

Table 2.2 reports the descriptive statistics and correlations for all variables. Because of the high correlations among our familiarity variables and their strong association with PER, we tested for multicollinearity by estimating the variance inflation factor for all variables. The average variance inflation factor for all regression models was around 2 with the largest factor being 2.55 for team familiarity indicating no problems with respect to multicollinearity.

Table 2.2: Summary statistics and correlations among all variables of interest

N=12,896	Mean	SD	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Team performance	.5	.5	0	1	-								
(2) Team coordination	.56	.07	.30	.85	0.09*	-							
(3) Team cooperation	296	34.14	172	451	0.05*	0.14*	-						
(4) Task familiarity	9877	4466	568.4	25097.64	0.16*	0.06*	-0.03*	-					
(5) Team familiarity	1.74	.53	1	5.11	0.16*	0.05*	0.03*	0.41*	-				
(6) PER	15.09	1.35	7.01	19.59	0.25*	0.01	-0.09*	0.50*	0.49*	-			
(7) Team size	1.56	1.30	6	13	0.02	0.09*	0.08*	0.11*	0.07*	0.03*	-		
(8) Possessions	96.90	5.95	78	125	-0.01	0.07*	0.14*	-0.11*	-0.05*	0.00	0.02	-	
(9) Win-loss streak	.02	3.17	-26	24	0.12*	0.05*	-0.01	0.24*	0.23*	0.36*	0.09*	-0.00	-
(10) Home game	.50	.5	0	1	0.17*	-0.01	0.04*	0.01	0.01	0.02	0.00	-0.01	-0.02*

* denotes bivariate correlations with p<.01

Our main results are reported in Table 2.3. In Model 2.1, we report estimates of a regression with team coordination as the dependent variable and team and task familiarity as the main independent variables. In Model 2.2, we use team cooperation as the dependent variable. In Model 2.3, we report results when using team performance as the outcome and in Model 2.4 we add the mediators to Model 2.3.

Table 2.3: Team familiarity and task familiarity on team coordination and team cooperation and the indirect effects on team performance

Dependent variable=	Model 2.1 Team coordination	Model 2.2 Team cooperation	Model 2.3 Team performance	Model 2.4 Team performance
Control variables				
PER (Team quality)	-0.080**	-0.079**	0.082**	0.088**
	(0.014)	(0.014)	(0.006)	(0.006)
Team size	0.047**	0.050**	-0.007†	-0.011*
	(0.008)	(0.008)	(0.004)	(0.004)
Possessions	-0.022†	0.056**	0.003	0.002
	(0.012)	(0.014)	(0.006)	(0.006)
Win-loss streak	0.025**	0.008	0.008†	0.006
	(0.009)	(0.009)	(0.004)	(0.004)
Home game	-0.011	0.080**	0.164**	0.162**
	(0.016)	(0.012)	(0.008)	(0.008)
Main independent variables				
Team familiarity (TEF)	0.061**	0.109**	0.012†	0.006
	(0.015)	(0.016)	(0.007)	(0.007)
TEF * TEF	-0.025**	0.020**	-0.002	-0.002
	(0.006)	(0.006)	(0.003)	(0.003)
Task familiarity (TAF)	0.082**	-0.085**	0.029**	0.029**
	(0.017)	(0.020)	(0.008)	(0.008)
TAF * TAF	0.008	0.008	-0.004	-0.005
	(0.012)	(0.011)	(0.005)	(0.004)
Two-way interaction				
TEF * TAF	0.050**	-0.018	-0.007	-0.008
	(0.014)	(0.014)	(0.006)	(0.006)
Mediator				
Team coordination				0.038**
				(0.005)
Team cooperation				0.036**
				(0.005)
Team & Opponent FE	Yes	Yes	Yes	Yes
Season & Overtime FE	Yes	Yes	Yes	Yes
Observations	12,896	12,896	12,896	12,896
R-squared	0.197	0.333	0.148	0.157

Robust standard errors clustered at the team & opponent-level in parentheses
** p<.01, * p<.05, † p<.1

Model 2.1 of Table 2.3 implies a positive and significant link between team familiarity and team coordination (β =0.061; p=0.000) of a non-linear type with a significant negative coefficient for the squared term (β =-0.025; p=0.000). Further, we find a positive and significant relationship between task familiarity and team coordination (β =0.082; p=0.000). The functional form of this relationship is of a linear type as suggested by the insignificant effect of the squared term (β =0.008; p=0.495). Thus, we find support for Hypothesis 2.1 (positive effect of team familiarity on team coordination) as well as for Hypothesis 2.2 (positive effect of task familiarity on team coordination). These results are in line with previous findings (ESPINOSA ET AL. 2007; SIEWEKE/ZHAO 2015). Our results further imply a complementary relationship between team familiarity and task familiarity as the interaction term in Model 2.1 of both variables is significant and positive (β =0.050; p=0.001). Hence, our results provide first evidence of a complementary effect of team and task familiarity on team coordination.

In Model 2.2, we regress team cooperation on the same independent variables from Model 2.1. Our results suggest a positive significant effect of team familiarity on team cooperation (β =0.109; p=0.000). This link is convex as the squared term effect of team familiarity is positive (β =0.020; p=0.002). In contrast, we find a negative, linear relationship between task familiarity and team cooperation (β =-0.085; p=0.000). This finding implies that for a team with an average level of team familiarity, an additional standard deviation of task familiarity decreases team cooperation by 0.085 standard deviations. Thus, we find support for Hypothesis 2.3 (positive effect of team familiarity on team cooperation) as well as for Hypothesis 2.4 (negative effect of task familiarity on team cooperation). In sum, these empirical findings support our notion to conceptually differentiate between team coordination and team cooperation which associate distinctively with team and task familiarity. The interaction term between team familiarity and task familiarity on team cooperation is negative and insignificant (β =-0.018; p=0.212).

In Model 2.3, we replicate the findings of previous literature that has considered team and task familiarity as antecedents of team performance (ESPINOSA ET AL. 2007). In line with this literature, we find positive team performance implications from team (β =0.012; p=0.084) as well as from task familiarity (β =0.029; p=0.000). Both estimates become substantially larger and significant when excluding PER (team ability) as a control variable in Table 2.5.

In Model 2.4, we include both mediator variables. Both team coordination (β=0.038; p=0.000) and team cooperation (β=0.036; p=0.000) relate positively to team performance.

Finally, we estimate the indirect effects using structural equation modelling. Table 4 reports the estimates of the indirect effects of team and task familiarity on performance through team coordination as well as team cooperation. The results of Table 4 include bootstrapped standard errors of 200 replications and 95% confidence intervals. We find that both indirect effects of team familiarity on team performance, through team coordination (β=0.001; p=0.013) and through team cooperation (β=0.001; p=0.000) are positive and statistically significant. Further, we find a positive and significant indirect effect of task familiarity on team performance through coordination (β=0.002; p=0.000). In contrast, the indirect effect of task familiarity on team performance through cooperation is negative and significant (β=-0.001; p=0.000). Thus, we find support for our mediating hypotheses (H5a/b & H6a/b).

Table 2.4: Indirect effects of team and task familiarity on team performance

				95% CI	
	β	Bootstr. s.e.	p-value	Lower	Upper
TEF→Team Coordination→Performance	.0010	.0004	.012	.0002	.0018
TEF→Team Cooperation→Performance	.0012	.0003	.000	.0006	.0018
TAF→Team Coordination→Performance	.0024	.0005	.000	.0014	.0033
TAF→Team Cooperation→Performance	-.0012	.0003	.000	-.0018	-.0006

2.5 Robustness

For robustness we re-estimate Table 2.3 without any control variables. Results stay robust with respect to direction and significance. Notably, team familiarity is a significant predictor of team performance in Model 2.7 & 2.8 (Table 2.5) whereas it isn’t in Model 2.3 & 2.4 in Table 2.3. Empirically, this effect is driven by the comparably large overlap between team ability (PER) and team familiarity (and also task familiarity). This effect can be explained by the fact that team familiarity assignments are non-random, and rather good teams might stay together and bad teams don’t. Thus, a part of the explanation could be reversed causality in a sense that team performance might also explain team familiarity. Still, by applying team-opponent fixed-effects on a dyadic level and by further applying season-fixed effects and including team ability (PER), we are confident that reversed causality does not explain the whole effects.

Table 2.5: Re-estimating Table 2.3 without controls

Dependent variable=	Model 2.5 Team coordination	Model 2.6 Team cooperation	Model 2.7 Team performance	Model 2.8 Team performance
Main independent variables				
Team familiarity (TEF)	0.040**	0.090**	0.038**	0.033**
	(0.015)	(0.017)	(0.007)	(0.007)
TEF * TEF	-0.024**	0.021**	-0.005†	-0.005†
	(0.006)	(0.007)	(0.003)	(0.003)
Task familiarity (TAF)	0.055**	-0.118**	0.067**	0.069**
	(0.016)	(0.018)	(0.008)	(0.008)
TAF * TAF	0.005	0.006	-0.004	-0.004
	(0.012)	(0.011)	(0.005)	(0.005)
Two-way interaction				
TAF * TEF	0.051**	-0.018	-0.008	-0.009
	(0.015)	(0.014)	(0.007)	(0.006)
Mediator				
Team coordination				0.032**
				(0.005)
Team cooperation				0.036**
				(0.005)
Team & Opponent FE	Yes	Yes	Yes	Yes
Season & Overtime FE	Yes	Yes	Yes	Yes
Observations	12,896	12,896	12,896	12,896
R-squared	0.191	0.324	0.106	0.114

Robust standard errors clustered at the team & opponent-level in parentheses
** p<.01, * p<.05, † p<.1

Table 2.6 displays our results using assists as an alternative measure for team coordination (GRIJALVA ET AL. 2020; SIEWEKE/ZHAO 2015). Our results stay robust and are highly similar to our results using uncontested shots as a measure for team coordination. Thus, our results support the view of assist as approximation of team coordination (GRIJALVA ET AL. 2020).

Table 2.6: Robustness using assists as mediator and measure for team coordination

Dependent variable=	Model 2.9 Team coordination	Model 2.10 Team performance
Main independent variables		
Team familiarity (TEF)	0.042**	0.031**
	(0.015)	(0.007)
TEF * TEF	0.002	-0.006†
	(0.007)	(0.003)
Task familiarity (TAF)	0.055**	0.058**
	(0.016)	(0.007)
TAF * TAF	-0.005	-0.003
	(0.010)	(0.004)
Two-way interaction		
TAF * TEF	-0.009	-0.007
	(0.015)	(0.006)
Mediator		
Team coordination = Assists		0.160**
		(0.004)
Team & Opponent FE	Yes	Yes
Season & Overtime FE	Yes	Yes
Observations	12,896	12,896
R-squared	0.180	0.190

Robust standard errors clustered at the team & opponent-level in parentheses
** p<.01, * p<.05, † p<.1

2.6 Discussion

As teams have become the strategic choice to cope with complex tasks (PARK/SPITZMULLER/DESHON 2013), how to compose a team is a question of utmost importance. Managers can choose how to compose a team from a given pool of employees and thus decide to which degree to rely on team and task familiarity. While the links between team and task familiarity and team performance have already been studied (ESPINOSA ET AL. 2007), less is known about the mediating mechanisms that link team and task familiarity to team performance: team coordination and team cooperation (ZHENG/DEVAUGHN/ZELLMER-BRUHN 2016).

Theoretically, this paper offers a first attempt to give a more explicit and holistic mapping of how team and task familiarity, team coordination, team cooperation and team performance are linked. We theoretically elaborate on *why* team and task familiarity render important variables for team performance. We suggest that teams characterized by high levels of team familiarity and task familiarity do perform better because of a better team coordination, yet only those teams with high levels of team familiarity do so because of an increased team cooperation. To the contrary, task familiarity does negatively influence team performance through a reduced team cooperation - besides its positive effect on team performance through an enhanced team coordination. In fact, the link between task familiarity and team performance might even be negative if team performance is highly dependent on teams to cooperate while other factors (like team coordination) are of less importance. We are able to derive these partly counter-intuitive predictions by being explicit on the (often implicit) emergent states (MARKS ET AL. 2002) that explain the relation of team and task familiarity on the one hand and team coordination and team cooperation on the other hand.

Empirically, we find that team familiarity and team performance are positively linked via an enhanced team coordination and team cooperation. Likewise, task familiarity and team performance are positively linked. This is despite the fact that task familiarity reduces team cooperation. However, the negative effect of task familiarity on team performance via a reduced team cooperation is compensated by the positive effect of task familiarity on team performance via an enhanced team coordination.

Further, our results also shed light on the interrelation between team and task familiarity. In our explorative analysis, we find that team and task familiarity relate to one another in a complementary manner when it comes to explaining team coordination. When it comes to explaining team cooperation or team performance, however, team and task familiarity rather seem to be linked in a substitutive manner, though our results are not statistically significant. Our results concerning team performance are in line with ESPINOSA ET AL. (2007) who find that the interaction between team and task familiarity *negatively* relates to team performance in locally distributed software teams. They argue that one possible explanation might be that both constructs are "improving [a] common ground for member communication, thus making team and task familiarity somewhat substitutable" (ESPINOSA ET AL. (2007: 618). A corresponding argument might explain why both variables *positively* relate to team coordination. Although both variables in general might create a common ground for communication, high task familiarity might rather be associated with a task-related common ground and high team familiarity might rather relate to a team-related common ground. Thus, when a team is characterized by high levels of task familiarity, team members will have overlapping task-related models (such as a common understanding of task strategies, task contingencies, procedures and environmental conditions), yet not per se overlapping team-related models (such as an understanding of team members' responsibilities, norms, preferences, attitudes, strength or weaknesses) (LIM/KLEIN 2006). Yet, when coordinating, having both common grounds for communication (task-related and team-related), might lead the team to develop a *cross-understanding* defined as the "group member's understanding of each other member's mental models" (HUBER/LEWIS 2010: 6), which might be particularly valuable for team coordination (BRANDON/HOLLINGSHEAD 2004; HUBER/LEWIS 2010; REAGANS/ARGOTE/BROOKS 2005; Sharma/Yetton 2007; WEGNER 1987, 1995; WEGNER/GIULIANO/HERTEL 1985; WILSON/GOODMAN/CRONIN 2007). Thus, high levels of team and task familiarity might generate a cross-understanding that is highlighted in team coordination as team members "are more able to anticipate other members' behaviors and thereby more effectively coordinate their own actions with the actions of other" HUBER/LEWIS (2010: 11).

2.7 Practical implications

When firms face the question on how to compose a team, they must take various considerations into account. Our findings suggest that managers should include the familiarity with one another (team familiarity) as well as the individual team members' familiarity with the task (task familiarity) into their decision making as both positively influence team performance. If the project is highly dependent on team members coordinating their tasks well, these suggestions might be of particular importance as team and task familiarity increase team performance through increased team coordination. Yet, when the overall success of a project highly depends on team members' cooperation with one another, firms should be careful with overly relying on task familiarity and rather focus on team familiarity when composing the team.

2.8 Limitations

Because our study is based on sports data, it is important to mention the potential limitations that refer to the generalizability of our empirical results. Tying in with previous research, we suggest that our results are especially applicable and transferrable to teams operating in environments described by the four main characteristics of NBA teams (GRIJALVA ET AL. 2020). *First*, NBA teams operate in a very competitive and dynamic setting where performance is highly visible. Thus, we assume our results to hold in industries with comparable visibility of performance such as, for example, orchestras, the entertainment industry, or firefighting teams. *Second*, the NBA is characterized by strong monetary incentive schemes and publicly known earnings. Working teams that share this context, at least partly, might be Wall Street traders, hedge fund managers or executive boards of publicly traded firms (GRIJALVA ET AL. 2020). *Third*, NBA teams are characterized by low member stability (HOLLENBECK/BEERSMA/SCHOUTEN 2012). Comparable teams may be found in many project team contexts, for example, consulting teams, research teams, cockpit crews or surgery teams (AVGERINOS/FRAGKOS/HUANG 2019). *Fourth*, NBA teams are characterized by a strong degree of differentiation with respect to team roles and responsibilities. Teams that share this strong differentiation of roles and responsibilities are surgery teams, research teams and cockpit crews. It is for these different kinds of teams, that our results are particularly informative.

Although we apply several fixed effects on team, opponent, overtime and season-level, we cannot completely rule out that our results are biased by non-random assignment of our team familiarity and task familiarity variables. Yet, as experimental research with random assignment of specific familiarity variables also suggests a positive relation between familiarity and team performance (MOORE/GEUSS 2020), we are confident that our results are robust. Future experimental research could further validate the results of this paper.

While contributing to a better understanding of the effects of team and task familiarity, potential contextual factors are still underrepresented in the familiarity literature, and future studies that include such contextual factors could yield potentially promising results (ESPINOSA ET AL. 2007; LUCIANO ET AL. 2018). Further, future literature might want to address potentially attenuating conditions under which task familiarity would rather not harm team cooperation.

2.9 Conclusion

We show that teams with higher levels of team and task familiarity are characterized by a better team coordination. In addition, team familiarity is also positively linked to team cooperation, while task familiarity is negatively linked to team cooperation. Both, team coordination as well as team cooperation, are positively related to team performance and they each mediate the links between team and task familiarity on the one hand and team performance on the other. Specifically, team familiarity is positively linked to team performance via an enhanced team coordination and team cooperation. Task familiarity and team performance are also positively linked, however only via an enhanced team coordination and in spite of a reduced team cooperation.

3. Shared experience, performance pressure, pay dispersion and team performance

This chapter deepens the view of previous shared experience from the previous chapter by analyzing shared team task experience (LUCIANO ET AL. 2018) as a moderator on the relationship between explained and unexplained pay dispersion and team performance. Shared team task experience is distinct from team familiarity, yet related. Precisely, shared team task experience is a sub-part of team familiarity and defined as “the extent to which team members have previously worked together on tasks that are similar to the one they are performing “ (LUCIANO ET AL. 2018: 1406). While team familiarity also captures shared team experiences that are independent from the task under consideration, shared team task experience does not. Thus, team familiarity is a broader construct that captures the team-related experience from different tasks and potentially even non-task related team experiences. In line with that, also the empirical approximations differ from one another. While team familiarity was approximated in chapter 2 on a yearly – thus broad – basis also capturing e.g. team specific training, shared team task experience is approximated on a very narrow basis capturing the accumulated number of single possessions of the five players as a whole team on court.

3.1 Introduction

Organizations face a push for pay transparency (FRIEDMAN 2014) – a situation where coworkers are aware of each other's' wages (MARASI/BENNETT 2016) – as a result of legal regulations and cultural changes (SMIT/MONTAG-SMIT 2019). On the one hand, legal regulations prohibit organizations from retaliating against employees who (anonymously) share pay information on third-party websites (FRIEDMAN 2014; SMIT/MONTAG-SMIT 2019). On the other hand, Millennials are over three times more likely to be willing to share private pay information compared to Baby Boomers indicating a cultural change (FRIEDMAN 2014; SMIT/MONTAG-SMIT 2019). Further, firms increasingly rely on interdependent teams as an answer to complex tasks which come with technological process (HOLLENBECK/BEERSMA/SCHOUTEN 2012; LAZEAR/SHAW 2007; LEPINE ET AL. 2008; PARK/SPITZMULLER/DESHON 2013; STEWART 2006). In an interdependent setting, where employees are working towards a joint group accomplishment and interacting on a day to day basis with each other, pay dispersion – "the amount of difference (inequality) in pay created by a firm's pay structure" (BLOOM/MICHEL 2002: 33) – is a topic of even greater relevance (JI ET AL. 2014; SHAW 2014; SHAW/GUPTA/DELERY 2002; VOHS/MEAD/GOODE 2006).

These reasons make pay dispersion a (practically) highly relevant research topic as a) wages are more and more publicly known to the employees due to legal and cultural changes (SMIT/MONTAG-SMIT 2019) and b) more and more work is done in interdependent teams, a setting where pay dispersion is of particular importance (SHAW/GUPTA/DELERY 2002), what resulted in pay dispersion being analyzed in a large body of academic literature including economics, psychology, sociology and business administration (BREZA/KAUR/SHAMDASANI 2018; CHIZEMA ET AL. 2015; CHOSHEN-HILLEL/YANIV 2011; DUBE/GIULIANO/LEONARD 2019; MORTENSEN 2010; OSBERG/SMEEDING 2006).

In this study, we focus on horizontal pay dispersion – i.e. pay dispersion between workers on the same hierarchical level (SIEGEL/HAMBRICK 2005) – in an interdependent team setting. We theoretically and empirically distinguish between explained pay dispersion (i.e. a pay dispersion that is linked to productivity-relevant input factors) and unexplained pay dispersion (i.e. a pay dispersion that is not linked to productivity-relevant input factors) (PARK/KIM/SUNG 2017; TREVOR/REILLY/GERHART 2012). Whereas explained pay dispersion is normatively more accepted and often argued by the compensation literature such as pay-for-performance (LAZEAR 2000) to trigger positive incentive and sorting (e.g. acquisition or retention of talent) effects (GERHART/RYNES/FULMER 2009; SHAW 2015; TREVOR/REILLY/GERHART 2012), unexplained pay dispersion is less normatively accepted and argued to often trigger negative effects such as social loafing, relative deprivation, conflict, and intra-team disunity (SHAW 2014). These arguments imply that explained pay dispersion positively relates to team performance while unexplained pay dispersion negatively relates to team performance (TREVOR/REILLY/GERHART 2012). Distinguishing between explained and unexplained pay dispersion is inevitable to account for the conflicting theoretical arguments that are set at odds against each other and potentially lead to effects being cannibalized (DOWNES/CHOI 2014). Although the literature on pay dispersion has made considerable contributions understanding conflicting empirical results ranging from positive (e.g. HEYMAN 2005; MAIN/O'REILLY/WADE 1993) to negative (e.g. BLOOM 1999; SIEGEL/HAMBRICK 2005), it still seeks concurrence explaining these conflicting results.

One potential explanation might be found in potential boundary conditions that influence the effect strength of pay dispersion, which is of high importance as under some circumstances, pay dispersion might be less impactful (for explained pay dispersion) or more tolerated (for unexplained pay dispersion) as under other circumstances (SHAW/GUPTA/DELERY 2002). In our study we focus on two boundary conditions that might impact the strength of the effects of dispersion in explained pay (DEP) and dispersion in unexplained pay (DUP) on team performance: shared team task experience (LUCIANO ET AL. 2018) and performance pressure (GARDNER 2012b). *First,* we focus on shared team task experience as a potential moderator of the link between a team's level of unexplained and explained pay dispersion and team performance, theoretically referring to the team cognition literature (WEGNER/ERBER/RAYMOND 1991). While the team's overall pay dispersion might be more and more visible due to an increased level of pay transparency (FRIEDMAN 2014), we argue that DEP and DUP are constructs that are unknown to the team members at first place when starting to work with each other as employees might have difficulties assessing whether their co-workers' wages are tied to performance indicators or not. For sure, employees might have expectations about the level of DEP and DUP within the team, yet only by working together on a specific task (i.e. gaining shared team task experience), the team members gain co-worker specific performance information and "reveal" the team's DEP and DUP levels. Thus, we argue that the positive (negative) performance effects of DEP (DUP) are strengthened (or made visible) when a team gains shared team task experience. This is especially important and might explain potential conflicting empirical results as organizations strive for project-based, fluid teams where team member's have varying levels of prior shared working experience (HUCKMAN/STAATS 2011). *Second*, we analyze performance pressure, which is defined as "a set of three interrelated factors that increase the importance of a team delivering a superior outcome: shared outcome accountability, heightened scrutiny and evaluation of its work, and significant consequences associated with the team's performance." (GARDNER 2012b: 2)[3] as a moderator on the relationship between DEP and DUP and team performance. Performance pressure represents a practically highly relevant boundary condition as it increasingly emerges due to new technologies, more and more demanding customers, non-stop Mergers & Acquisitions, tougher financial targets and highly competitive global markets (LOCHMANN/STEGER 2002). We theoretically argue that performance pressure weakens the effects of DEP and DUP on team performance as performance pressure causes team members to being more self- and less team-focused (DRISKELL/SALAS/JOHNSTON 1999) as well as team members inputs and outputs being more closely scrutinized, what might in turn lead to team members (subconsciously) suppressing any (undesired) team-related effects of pay dispersion. Last and exploratively, we analyze the joint effect of shared team task experience and performance pressure on the relation between DEP (DUP) and team performance and thus contribute to the scare literature that analyzes the effects of previous shared experience under performance pressure (ELLIS 2006).

Following our theoretical analysis, we test our hypotheses with empirical data from the National Basketball Association (NBA) which has proven to be especially useful when analyzing organizational phenomena of interdependent teams (CANNON-BOWERS/BOWERS 2006) such as salaries (ERTUG/CASTELLUCCI 2013) and the resulting level of pay dispersion (BERRI/JEWELL 2004; FRICK/PRINZ/WINKELMANN 2003; KATAYAMA/NUCH 2011; SIMMONS/BERRI 2011), team performance (PFEFFER/DAVIS-BLAKE 1986), shared team experience (BERMAN/DOWN/HILL 2002; GRIJALVA ET AL.

[3] The definition of GARDNER (2012b) has its roots in and extends the seminal definition of performance pressure by BAUMEISTER (1984: 610) who defined performance pressure as "the importance of performing well on a particular occasion" and which was used in the introduction.

2020; SIEWEKE/ZHAO 2015) as well as performance pressure (CAO/PRICE/STONE 2011; DEUTSCHER/FRICK/PRINZ 2013; TOMA 2017).

Using play-by-play level data[4] that contains over 2 million observations on possession level, we find support for our derived hypotheses and find that while DEP positively relates to team performance, DUP negatively relates to team performance. As predicted, these effects are strengthened by shared team task experience and weakened by performance pressure. Further, we exploratively find that the three-way interaction between performance pressure, shared team task experience and (un)explained pay dispersion (positively) negatively relate to team performance respectively. Thus, performance pressure tackles and weakens the strengthening effect of shared team task performance on the links between DEP (DUP) and team performance.

We contribute to the literature in several ways – both theoretically and empirically: *First*, our results highlight the need to theoretically and empirically differentiate between explained pay dispersion and unexplained pay dispersion (TREVOR/REILLY/GERHART 2012). This theoretical distinction might be able to explain varying results in the pay dispersion literature (YANADORI/CUI 2013) ranging from negative (BLOOM 1999; SIEGEL/HAMBRICK 2005; YANADORI/CUI 2013) to positive (KALE/REIS/VENKATESWARAN 2009). *Second*, we theoretically argue that DUP and DEP are unknown constructs to the team members when they start working together and these constructs are revealed over time and thus contribute to a more holistic understanding of the effects of pay dispersion, which might again explain conflicting results. *Third*, the pay dispersion literature still lacks empirical testing (SHAW 2014) and we are able to disentangle and empirically test the various effects of pay dispersion (DUP & DEP) in a very precise way by analyzing single possessions rather than aggregated organizational-level outcomes. *Last*, we contribute to the literature on shared team task experience and performance pressure as we theoretically and empirically analyze their (joint) relation to pay dispersion.

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[4] The level of observation here is on possession-level and differs from the level of observation in chapter 2 which is on game-level. This is due to empirical literature indicating that the level of analysis strongly impacts the direction of the effects of pay dispersion (BUCCIOL/FOSS/PIOVESAN 2014). The theoretical arguments concerning *horizontal* pay dispersion (which is the focus of this study) are more aligned with the possession-level data. For completeness and for clarification, the arguments concerning *vertical* pay dispersion would be more aligned with the game-level data that is used in chapter 2. The intuitive argument is that in a team roster (associated with game-level data) one has players that seldomly play and players that often play – these players are effectively on different hierarchical levels.

The remainder of the paper is structured as follows. First, we propose a conceptual model on how DUP, DEP, team performance, shared team task experience and performance pressure are linked. Within our theoretical model, we derive our hypotheses concerning the effect of dispersion in explained pay (DEP) on team performance (H3.1), the effect of unexplained pay dispersion (DUP) on team performance (H3.2), the moderation effect of shared team task experience on the links between DUP and DEP and team performance (H3.3) and the moderation effect of performance pressure on the links between DUP and DEP and team performance (H3.4). We then confront our hypotheses with empirical evidence and subsequently discuss our results and derive implications.

3.2 Literature, theory & hypotheses

3.2.1 Explained and unexplained pay dispersion and team performance

We analyze the performance effects of explained (unexplained) pay dispersion in an interdependent team context where overall team success is highly dependent on team members mutually interacting, communicating and coordinating with one another (CUMMINGS 1978; SAAVEDRA/EARLEY/VAN DYNE 1993). By doing so, we argue that a team's DEP is positively related to team performance by referring to expectancy theory (VROOM 1964) on the one hand and that DUP is negatively related to team performance referring to equity theory (ADAMS 1963) on the other hand while referring to the fair wage-effort hypothesis in both cases (AKERLOF/YELLEN 1990).

First, there are good reasons why pay within a team might be dispersed such as different team members' performances, responsibilities, stocks of human capital, effort levels, and abilities – which all refer to *explained* pay being dispersed (BLOOM 1999; LAZEAR 1989, 2000; LAZEAR/ROSEN 1981). Expectancy theory stipulates that besides expectancy, the two major factors that determine motivation are instrumentality and valence (PRITCHARD/SANDERS 1973; VROOM 1964). Instrumentality states that motivation is fostered if the perceived likelihood that performance will be rewarded is high and valence refers to motivation being fostered if the rewards are attractive (VAN EERDE/THIERRY 1996). If a team is characterized by higher levels of DEP, motivation is fostered since larger pay levels are objectively linked to performance indicators and thus the way of achieving the larger payoffs is clearly defined (instrumentality) and a larger pay is assumably more attractive than a lower pay (valence) (TREVOR/REILLY/GERHART 2012). This clear link between inputs and pay is associated with pay for performance and leads team members to be more motivated to either earn or retain higher wages. Further, the argumentation implicitly contains the argument that DEP can also act as a signal for future possible wages increasing employee effort and motivation (CLARK/KRISTENSEN/WESTERGÅRD-NIELSEN 2009; PARK/KIM/SUNG 2017). Similarly, as high levels of DEP can be explained by input differences between employees, it increases the employees' perception of fairness triggering positive incentive effects (GERHART/RYNES/FULMER 2009; PARK/KIM/SUNG 2017; SHAW 2014). Thus, when a team is characterized by high level of DEP, its team members show higher levels of motivation ultimately resulting in an increased team performance (VAN KNIPPENBERG 2000). We consequently postulate:

Hypothesis 3.1: A team's overall dispersion in explained pay is positively related to team performance.

Yet, when the pay differences between team members are not for all team members tied to performance difference, *unexplained* pay is dispersed. Reason for that might be discrimination (KAHN 2000; YANG/LIN 2012), organizational politics, lack of formal or inconsistently applied procedures, nepotism or game-playing (KEPES/DELERY/GUPTA 2009; SHAW 2015). These unexplained pay differentials harm motivation, team performance and consequently also organizational effectiveness and are associated with team-members having unequal pay-to-contribution ratios (ADAMS 1963; AKERLOF/YELLEN 1990; PARK/KIM/SUNG 2017). A team is characterized by unequal pay-to-contribution ratios (i.e. high levels of DUP) when some team members contribute a lot to team performance while earning comparatively low in comparison to other team members. As a consequence, these team members might feel that they are underrewarded in terms of what they put into a job in comparison with what other workers are getting for their contributions and adjust (reduce) their inputs to restore equity between inputs and outputs (ADAMS/FREEDMAN 1976). Also, people who are overrewarded might have negative feelings such as e.g. guilt (DAVIS/DEBODE/KETCHEN 2013) which might also negatively affect their performance (KOPELMAN/SCHNELLER IV 1987). This situation of unexplained pay dispersion triggers adverse effects that harm team performance in form of reduced team member motivation and reduced effective group functioning. First, team members might be less motivated due to feelings of distress (HUSEMAN/HATFIELD/MILES 1987), dissatisfaction (PFEFFER/LANGTON 1993) or feelings of injustice (BLOOM 1999). Second, effective group functioning is hindered as a result of reduced cooperation and withdrawal behavior (BEAUMONT/HARRIS 2003; HARDER 1992), increased competitiveness including sabotage behavior (RAMASWAMY/ROWTHORN 1991; SIMMONS/BERRI 2011) or reduced group cohesiveness (LEVINE 1991). These adverse effects ultimately harm team performance (ADAMS 1963; AKERLOF/YELLEN 1990; BLOOM 1999; LAZEAR 1989; PFEFFER/LANGTON 1993). We therefore postulate:

Hypothesis 3.2: A team's overall dispersion in unexplained pay is negatively related to team performance.

3.2.2 Moderating effect of a team's shared team task experience

We argue that a team's level of shared team task experience strengthens the positive (negative) effect of explained (unexplained) pay dispersion by referring to team cognition literature in terms of transactive memory system (MULLEN/GOETHALS 1987; WEGNER/ERBER/RAYMOND 1991). When a team starts working together, the level of explained and unexplained pay dispersion is likely to be unknown to the team members. Every team member will have expectations about each other's knowledge, skills and abilities and link them to the pay level and thus have a rough expectation about the fairness of the wages. Nevertheless, DUP and DEP are theoretical constructs that are unknown to the team members that have no shared team task experience. By starting to work with each other one a task (i.e. gaining shared team task experiences), team members will get a feeling for the fairness of the coworkers wages as they are able to relate the wages to input factors. By working with each other, the team builds a strong transactive memory system (TMS) (AKGÜN ET AL. 2005; BROWER/NYE 1996; ELLIS 2006; LEWIS 2004; LIANG/MORELAND/ARGOTE 1995; TINDALE ET AL. 1998), which is a collective system that is used by the team members to encode, store and retrieve information (REN/ARGOTE 2011). It is a cognition-based construct that is especially relevant in an interdependent setting where team performance is not simply the sum of each team member's individual performances (BRANDON/HOLLINGSHEAD 2004; ZHANG ET AL. 2007). On a meta-level, TMS is associated with "who knows what" in a team (REN/CARLEY/ARGOTE 2006). Thus, by means of gaining shared experiences, team members gain a better and more accurate knowledge about the team members' knowledge, skills and abilities (LITTLEPAGE/ROBISON/REDDINGTON 1997). As a consequence, they can better allocate and compare the inputs (skills, knowledge, abilities) with the outputs (the wages), “revealing” the team’s overall unexplained and explained pay dispersion level. Supporting our line of argumentation, (PFEFFER/LANGTON 1993) found that the (negative) effects of pay dispersion are weaker in private universities (compared to non-private universities) as the wages are more likely to be unknown there. Thus, the positive (negative) effects of explained (unexplained) pay dispersion should be strengthened with increasing shared team task experience. We therefore propose:

Hypothesis 3.3: Shared team task experience moderates the link between (un)explained pay dispersion and team performance in such a way that the effects are weaker for lower levels of shared team task experience and stronger for higher levels of shared team task experience.

3.2.3 Moderating effect of a performance pressure

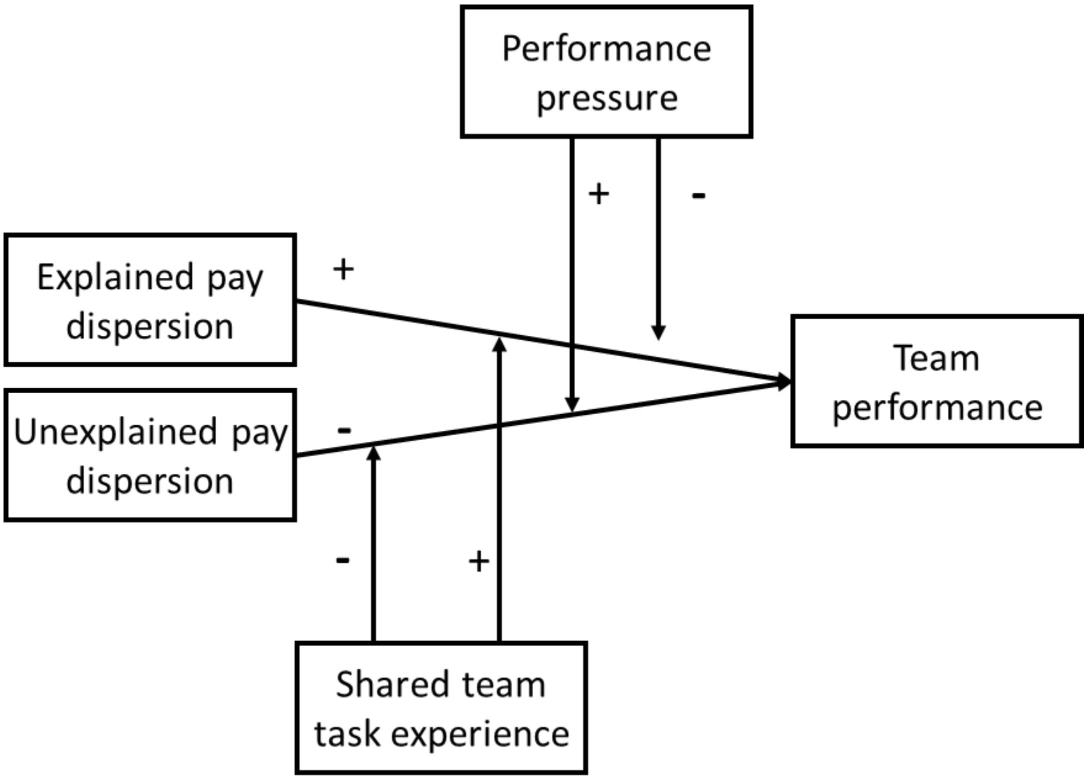
Concerning the moderating effect of performance pressure on the link between (un)explained pay dispersion and team performance, we argue that performance pressure weakens the positive (negative) effect of explained (unexplained) pay dispersion. Performance pressure in teams is defined as “a set of three interrelated factors that increase the importance of a team delivering a superior outcome: shared outcome accountability, heightened scrutiny and evaluation of its work, and significant consequences associated with the team’s performance.” (GARDNER 2012b: 2). Performance pressure is in its nature an external factor (BAUMEISTER 1984; ZHANG ET AL. 2017b) that is subjectively internalized, increasing arousal what leads to greater physical and mental effort, an increased motivation (GARDNER 2012b) and an increased task interest (EISENBERGER/ASELAGE 2009). Yet, on the other hand, performance pressure is also a unique activator and source of stress (GARDNER 2012a; GUTNICK ET AL. 2012; MITCHELL ET AL. 2018; MITCHELL ET AL. 2019). We argue that while the “significant consequences associated with the team’s performance” tackle the positive effect of DEP, the “heightened scrutiny and evaluation of its work” tackle the negative effects of DUP. DEP leads team members to be more motivated and increase their effort. Yet, when significant consequences are attached to the team’s performance, the team members might be highly motivated anyways. Hence, the positive effect of DEP might be (partly) cannibalized and concealed by performance pressure. Further, under high levels of performance pressure, employees know that their effort and behavior is scrutinized more closely, and that inadequacies are highlighted (GUTNICK ET AL. 2012; SITKIN ET AL. 2011). This should weaken both negative consequences of DUP: reduced individual effort and reduced group functioning. As the team members' behavior is scrutinized more closely, they might refrain from reduced effort, reduced cooperation, withdrawal from the team or sabotaging and thus the negative effects of DUP are weakened.

Consequently, we argue that performance pressure conceals the positive effects of DEP and outweighs the negative effects of DUP. Hence, we derive:

Hypothesis 3.4: Performance pressure moderates the link between (un)explained pay dispersion and team performance in such a way that the effects are weaker for higher levels of performance pressure and stronger for lower levels of performance pressure.

Figure 3.1 provides a graphical representation of our conceptual model.

Figure 3.1: Theoretical conceptualization of the relation between (un)explained pay dispersion, performance pressure, shared team task experience and team performance



3.3 Data and methods

3.3.1 Sample & setting

We test our hypotheses using play-by-play level data for every game from the 2005-06 to the 2015-16 regular seasons and playoffs of the National Basketball Association (NBA). The NBA is considered the premier professional basketball league of the world and consists of 30 teams, which play 82 regular games in one season followed by the playoffs. We analyze NBA games on possession level consisting of five players that are simultaneously together on the court.

Two features make the NBA data we use particularly compelling to address our hypotheses. *First*, the NBA context compares to a "laboratory" type of setting in which players are embedded in the same context, such that we measure our constructs within a relatively homogeneous and standardized setting (DAY/GORDON/FINK 2012; KATZ 2001; KEIDEL 1984, 1987; WOLFE ET AL. 2005). The setting of the NBA is associated with team performance being highly dependent on interdependencies between players (CANNON-BOWERS/BOWERS 2006; KATZ 2001; KEIDEL 1984, 1987; VAN BREUKELEN

ET AL. 2012), a context in which pay dispersion is of particular importance (BLOOM 1999; LEVINE 1991; PFEFFER/LANGTON 1993; TREVOR/REILLY/GERHART 2012). *Second*, using archival NBA data where player and team records are well-documented provides objective measures for our pay dispersion variables (FRICK/PRINZ/WINKELMANN 2003; SIMMONS/BERRI 2011; TREVOR/REILLY/GERHART 2012), shared team task experience (BERMAN/DOWN/HILL 2002; GRIJALVA ET AL. 2020; SIEWEKE/ZHAO 2015), performance pressure (CAO/PRICE/STONE 2011; DEUTSCHER/FRICK/PRINZ 2013; TOMA 2017) and team performance (ARCIDIACONO/KINSLER/PRICE 2017; GRIJALVA ET AL. 2020).

3.3.2 Measures

Team performance. We measure team performance by the means of whether a possession yielded output (i.e. was made or not)[5]. Scoring points is the ultimate goal of NBA players directly impacting the probability of winning and reflects a measure that is often previously used to display team performance (ARCIDIACONO/KINSLER/PRICE 2017; BARNES/REB/ANG 2012; BEUS ET AL. 2014).

Explained pay dispersion (DEP). In order to approximate the team's level of DEP, we estimate a Mincer-earning-like function (MINCER 1958) similar to what has been done in previous studies predicting salaries in the NBA (DEUTSCHER/FRICK/PRINZ 2013; SIMMONS/BERRI 2011). We regress the logarithmic wage in the respective year for each player on several previous year's performance indicators and predict $\hat{Y}_{it}$ what reflects the predicted wage for each player in the respective year (TREVOR/REILLY/GERHART 2012). Taking the logarithm is in line with previous studies and is done to account for (extreme) positive skewness of wages (TREVOR/REILLY/GERHART 2012). The regression equation we used is given by:

$$Y_{it} = \alpha * exp_{it} + \beta * exp_{it}^2 + \Gamma * X_{it-1} + \Lambda * Z_{it} + e_{it} \qquad (1)$$

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[5] As the level of observation differs in this chapter from the level of observation in chapter 2, also the measure for team performance differs, yet directly relates to the team performance measure used in chapter 2. While the game (level of observation in chapter 2) represents the aggregation of all possessions (level of observation in this chapter), winning a game (team performance measure used in chapter 2) likewise directly relates to the aggregation of the output of all possessions (whether they were made or not).

where Y_{it} is the logarithmic wage of player i in year t; α, β are regression coefficients; Γ and Λ are regression coefficient vectors; exp and exp^2 are experience (in years in the NBA) and the squared term respectively and represent the stock of acquired human capital which effects individual wages (BAGGER ET AL. 2014); X is a matrix of individual, NBA-specific player inputs such as the player efficiency rating (PER), the amount of (offensive and defensive) rebounds, the amount of minutes played, the player's usage rate (what reflects a measure of how "involved" a player was when he was on the court) and the player's height which all influence the players wages (BODVARSSON/BRASTOW 1998; HOFFER/FREIDEL 2014; SIMMONS/BERRI 2011); Z is a matrix of dummy variables representing years which is important to control for, as the salary cap increases from year to year (KAHN 2000) and e is the error term representing the residual wage of each player that cannot be explained by our explanatory variables. The resulting R^2 was .56 what is similar to values from previous studies (TREVOR/REILLY/GERHART 2012) indicating that more than half of the variation in individual player wages can be explained by the variation of our observable measures. As a next step, we followed the approach of TREVOR/REILLY/GERHART (2012) and approximate a team's DEP by calculating the standard deviation of the five players' predicted wages in a respective possession.

Unexplained pay dispersion (DUP). Similar to estimating the team's level of DEP, we re-estimate equation (1) and estimate the residual wages e_{it} (what is the difference between the observed and the predicted value: $e_{it} = Y_{it} - \hat{Y}_{it}$) for each player in the respective year (TREVOR/REILLY/GERHART 2012). As a next step, again following the approach of (TREVOR/REILLY/GERHART 2012), we approximate a team's level of DUP by calculating the standard deviation of the five players' residual wages in a respective possession.

Shared team task experience (STTE). We base our measure of shared team task experience on previous studies and approximate it by previous shared, task-specific working time together as a team (LUCIANO ET AL. 2018). We calculate the exact amount of previous shared possessions of the five respective players[6]. A value of zero indicates that the respective five players have not played any possession previously

[6]The reason for deviating from team familiarity (the measure used in chapter 2) is that shared team task experience exclusively represents task-related shared working experience which is necessary to assess whether the wages are tied to performance indicators or not.

and a value of 100 indicates that these five players have played 100 possessions previously (either in the same game or in another game). This measure represents a very precise measure of the previous shared task experience of the team.

Performance pressure. We approximate the amount of performance pressure based on previous studies (CAO/PRICE/STONE 2011; DEUTSCHER/FRICK/PRINZ 2013). We calculate the additive inverse absolute point difference between the two teams for every single possession and shift it by 58[7] in order to only consider positive values. Thus, the larger the value, the closer the game has been – precisely, a value of 58 indicates, that the game was tied in the respective possession and a value of zero indicates that one team led by 58 points. This reflects a very precise and intuitive measure for performance pressure, as the closer the game, the higher the importance of delivering excellent team performance (ZHANG 2017a). This measure reflects our main approximation of performance pressure and we test the robustness of our results in chapter 3.5 using different measures of performance pressure.

We include *home game* as an additional control variable[8]. Literature has shown a home bias in terms of home teams winning significantly more games than away teams (CHEN/GARG 2018; POPE/PRICE/WOLFERS 2018; RIBEIRO/MUKHERJEE/ZENG 2016). Home game is a dummy variable that equals one if the respective possession was during a home game and zero if the respective possession was during an away game. All variables including a variable description are summarized in Table 3.1.

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[7] We shift by 58, because the largest point difference between two teams playing was 58 (i.e. one team was leading with a point margin of 58).

[8] The number of control variables largely differs from chapter 2. This is due to the fact that the relevant performance indicators were used in order to explain wages (see equation (1)) and subsequently generate our dispersion variables. Adding these performance indicators as control variables into the regression model would generate an artificial collinearity between our pay dispersion variables and the performance indicators (TREVOR/REILLY/GERHART 2012).

Table 3.1: Overview of study variables

Variable	Measure Description
Team performance	1 = if the possession was made, 0 = otherwise.
DEP	The level of disparity in explained pay approximated by the standard deviation over the *predicted* wages of the five players.
DUP	The level of disparity in unexplained pay approximated by the standard deviation over the *residual* wages of the five players.
Shared team task experience	The amount of previously played possessions of the five team players until the respective possession.
Performance pressure	The inverse absolute point differential of the respective possession.
Home game	1 = for home game, 0=otherwise

3.3.3 Estimation strategy

We conduct a fixed-effects linear regression by holding the team-opponent dyad as well as the season constant. To give an illustrating example: We build a group between the team and the opponent (e.g. the Toronto Raptors and the Boston Celtics) and hold this dyad constant within our regression. We do so because team performance highly depends on individual team and opponent characteristics that are filtered out by doing so. This is possible as two teams in the NBA play several times against each other within the same season. Consequently, we also include season fixed-effects (ZHANG 2017a). When analyzing any effects of wages in the NBA, season fixed-effects are highly important, as there is a salary cap in the NBA that changes (rises) from year to year making a comparison between years infeasible (KAHN 2000). Prior to the regression analysis and prior to calculating the interaction terms to test for a potential moderation, we standardize all non-dummy variables in order to make the coefficient sizes comparable and to avoid problems of artificially generating multicollinearity (DAWSON 2014; JACCARD/WAN/TURRISI 1990). Further, when dealing with NBA specific empirical difficulties such as properly assigning points to possessions we follow previous research analyzing play-by-play data (for an overview and explanations, see (ARCIDIACONO/KINSLER/PRICE 2017)). All standard errors are robust and clustered at the team-opponent dyad.

3.4 Results

Table 3.2 reports the descriptive statistics and correlations for all variables and shows no serious problem of multicollinearity between our explanatory variables.

Table 3.2: Summary statistics and correlations

		Mean	S.d.	Min	Max	(1)	(2)	(3)	(4)	(5)
(1)	Team performance	.39	.49	0	1					
(2)	DEP	.73	.28	0	2.21	001				
(3)	DUP	.51	.25	0	3.20	-.004*	-.022*			
(4)	Shared team task experience	230	644	0	8975	.014*	-.125*	-.047*		
(5)	Performance pressure	50	6.7	0	58	-.003*	.020*	-.017*	.066*	
(6)	Home	.5	.5	0	1	.012*	-.001	-.004*	.009*	-.006*

* denotes bivariate correlation with p < 0.01

In Model 3.1 in Table 3.3, we re-estimate the results of TREVOR/REILLY/GERHART (2012). Our results display highly similar patterns to their results, namely a positive direct effect of DEP (β = .002; p<.05) and a negative direct effect of DUP (β = -.001; p<.01) on team performance, indicating support for our hypotheses 3.1 and 3.2. Further, home game (β = .012; p<.01) and shared team task experience (β = .007; p<.01)[9] display positive direct effects and performance pressure (β = -.002; p<.01) a negative direct effect on team performance, which intuitively makes sense and is in line with previous studies (CAO/PRICE/STONE 2011; ELLIS 2006; ESPINOSA ET AL. 2007; RIBEIRO/MUKHERJEE/ZENG 2016).

In Model 3.2, we add the interaction terms between shared team task experience and DEP as well as DUP to our regression in order to analyze hypothesis 3.3. In line with our predictions, shared team task experience strengthens the effect of DEP (β = .004; p<.01) on team performance. The strengthening effect of shared team task experience on the link between DUP and team performance could not be supported, yet the direction of influence is in line with our prediction (β = -.0001; insig.). Thus, we partly find support for our hypothesis 3.3.

[9] It is noteworthy to mention that this positive direct effect of shared team task experience is intuitively in line with the results of chapter 2 (Table 2.3)

As a next step we analyze our hypothesis 3.4 by additionally adding the interaction term between performance pressure and DEP, likewise DUP. The effect of performance pressure on the link between DEP and team performance is insignificant (β = -.0002; insig.), yet again in the predicted direction. Further, and in line with our prediction, performance pressure significantly weakens the effect of DUP (β = .001; p<.01). Thus, we partly find support for our hypothesis 3.4.

Table 3.3: The relation of DUP, DEP, shared team task experience, performance pressure and team performance

	(3.1)		(3.2)		(3.3)		(3.4)	
Dependent variable	Team performance		Team performance		Team performance		Team performance	
	β	s.e.	β	s.e.	β	s.e.	β	s.e.
Control variable								
Home game	.012**	(.001)	.012**	(.001)	.012**	(.001)	.012**	(.001)
Main independent variables								
Disparity in explained pay (DEP)	.002**	(.000)	.002**	(.000)	.002**	(.000)	.002**	(.000)
Disparity in unexplained pay (DUP)	-.001**	(.000)	-.001**	(.000)	-.001**	(.000)	-.001**	(.000)
Shared team task experience (STTE)	.007**	(.000)	.010**	(.001)	.010**	(.001)	.011**	(.001)
Performance pressure (PP)	-.002**	(.000)	-.002**	(.000)	-.002**	(.000)	-.003**	(.000)
Two-way-interactions								
DEP x STTE			.004**	(.001)	.004**	(.001)	.004**	(.001)
DUP x STTE			-.0001	(.000)	-.0002	(.000)	-.001	(.000)
DEP x PP					-.0003	(.000)	-.001**	(.000)
DUP x PP					.001**	(.000)	.001**	(.000)
PP x STTE							-.006**	(.001)
Three-way-interactions								
DEP x STTE x PP							-.002**	(.000)
DUP x STTE x PP							.001†	(.001)
Team-Opponent-FE	Yes		Yes		Yes		Yes	
Season FE	Yes		Yes		Yes		Yes	
Observations	2,384,418		2,384,418		2,384,418		2,384,418	
R-squared	.001		.001		.001		.001	

Robust standard errors in parentheses ** p<0.01, * p<0.05, † p<0.1

In Model 3.4, we exploratively include the triple interactions between shared team task experience, performance pressure and DEP (DUP respectively) into our regression model. The results indicate that performance pressure weakens the strengthening effects of shared team task experience on the link between DEP and team performance

(β = -.002; p<.01), as well as the strengthening effect of shared team task experience on the link between DUP and team performance (β = .001; p<.1).

Although our results are largely statistically significant and in the predicted direction, our coefficients are rather small. It is an ongoing debate whether and when effect sizes are too small and there are different reasons *why* effect sizes are small and *when* they still matter (BOSCO ET AL. 2015; DAHL/PIERCE 2020; REINWALD/KUNZE 2019; SHIN/HASSE/SCHOTTER 2017). A reason might be that the mean effect on the dependent variable is also very small. As an example, imagine a very rare disease that on average only 0.001% of the base population gets. If one finds a treatment that reduces the likelihood of getting the disease by 0.0005% points, the effect still matters as it is a reduction of the base-effect by 50%. In our case, consider the effect of shared team task experience on the link between DEP and team performance (β = .004; p<.01). The interpretation is: If a team's shared team task experience is increased by one standard deviation, the effect of DEP on team performance is increased by 0.004 percentage points (In Model 3.4, this is only true given performance pressure equal to zero (which is the mean) as Model 3.4 also includes the triple-interaction (DEP x shared team task experience x performance pressure)). This is the effect on one single possession. An NBA game has on average around 100 possessions depending on the pace of the game. The likelihood that at least one additional possession is made because of this effect is thus calculated by $1 - 0.996^{100}$ what amounts to approximately 33%. Thus, during a whole NBA game, the likelihood is around 33% that one additional possession leads to a made possession that would otherwise not have been made because of the mentioned increased in shared team task experience what is a noticeable effect as many games (in our sample ~ 30%) in the NBA end with a point margin within 3 points. Hence, we argue that although our effect sizes seem small, they might still matter.

3.5 Robustness

We apply various robustness checks to validate our findings. We built our theoretical analysis largely on incentive effects, yet another explanation of our results refers to self-selection (SHAW 2015; SHAW/GUPTA 2007; TREVOR/REILLY/GERHART 2012) where high unexplained pay dispersion leads teams to not continue working together. This would lead to our moderator (shared team task experience) being correlated to our pay dispersion variables and potentially biasing our results as only teams with low levels of DUP "survive" and reach higher levels of shared team task experience (bivariate correlation is -0.047 – indicating that the problem is less severe). Still, we restrict our sample to teams that have at least an amount of shared team task experience that is above the median in Model 3.4a in order to exclude all teams that stopped playing together after only a few possessions and thus to account for the potential survival bias. Our results largely stay robust, yet effect sizes and significances partly decrease (e.g. the effect of shared team task experience on the link between DEP and team performance drops from ($\beta = .004$; $p<.01$) to ($\beta = .001$; $p<.1$)) indicating that our overall results also partly carry sorting effects (SHAW 2015; SHAW/GUPTA 2007; TREVOR/REILLY/GERHART 2012).

Further, there are many ways to approximate the "the importance of a team delivering a superior outcome" (GARDNER 2012b) in a NBA game (CAO/PRICE/STONE 2011; DEUTSCHER/FRICK/PRINZ 2013; GOLDMAN/RAO 2012; TOMA 2017; UHLMANN/BARNES 2014; ZHANG 2019a). In order to check the robustness of our results, we further calculate three dummy variables that reflect the amount of performance pressure in the respective possession: *First*, a dummy that is one if the game was a playoff game and zero else (Model 3.4b), *second* a dummy variable that equals one if the point difference was within a five-point margin and zero else (Model 3.4c) and *third*, a dummy variable that equals one if the point difference was within a ten-point margin and zero else (Model 3.4d). Clearly, the performance pressure rising from playoff games is different than from the score margin between the two teams. Whereas the former is an ex-ante known high level of performance pressure that can be planned and prepared for (UHLMANN/BARNES 2014; ZHANG 2017a), the latter is rather a dynamic in-game evolving performance pressure that is not known in advance. Still, all measures clearly reflect a high importance for delivering superior performance and are in line with our previous theoretical argumentation. Our results stay robust using different approximations for performance pressure, especially as performance pressure by the means of playoff games in comparison to tight games represent different sources of a high importance of superior performance what indicates a strong overall robustness of our results.

In Model 3.4e, we restrict the sample to free-throws only (free-throws are excluded and not part of our main estimation sample). We do so as free-throws are considered a measure for individual performance in the NBA (BUCCIOL/FOSS/PIOVESAN 2014) and our theoretical arguments are also related to individual behavior. We do also find support for individual performance changes, as our results mostly hold true when analyzing individual performance, again implying strong robustness of our results.

Table 3.4: Robustness checks using different a different sub-sample (3.4a), different approximations for performance pressure (3.4b) (3.4c) (3.4d) and individual performance instead of team performance (3.4e)

	(3.4)		(3.4a)		(3.4b)		(3.4c)		(3.4d)		(3.4e)	
Dependent variable	Team performance		Team performance		Team performance		Team performance		Team performance		Individual perf.	
PP proxy	Inverse absolute point difference		Inverse absolute point difference		Playoff		Point diff. < 5		Point diff. < 10		Inverse absolute point difference	
Sample	whole		STTE > median		whole		whole		whole		whole	
	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.
Control variable												
Home game	.012**	(.001)	.014**	(.001)	.012**	(.001)	.012**	(.001)	.012**	(.001)	.0003	(.001)
Main independent variables												
DEP	.002**	(.000)	.002**	(.001)	.002**	(.000)	.003**	(.001)	.002**	(.001)	.002**	(.001)
DUP	-.001**	(.000)	-.0004	(.001)	-.001**	(.000)	-.002**	(.001)	-.002**	(.000)	-.002**	(.001)
STTE	.011**	(.001)	.005**	(.001)	.011**	(.001)	.016**	(.001)	.014**	(.001)	.002**	(.001)
PP	-.003**	(.000)	-.011**	(.001)	-.010**	(.002)	-.002†	(.001)	-.004**	(.001)	.001	(.001)
Two-way-interactions												
DEP x STTE	.004**	(.001)	.001†	(.001)	.004**	(.001)	.005**	(.001)	.004**	(.001)	.002**	(.001)
DUP x STTE	-.001	(.000)	-.001	(.000)	-.001	(.000)	-.001	(.001)	-.001†	(.001)	-.001†	(.001)
DEP x PP	-.001**	(.000)	-.001*	(.001)	-.001	(.002)	-.002**	(.001)	-.0004	(.001)	-.001	(.001)
DUP x PP	.001**	(.000)	-.0001	(.001)	.0003	(.002)	.001†	(.001)	.001	(.001)	.001†	(.000)
PP x STTE	-.006**	(.001)	-.003**	(.001)	-.005**	(.001)	-.008**	(.001)	-.008**	(.001)	-.001	(.001)
Three-way-interactions												
DEP x STTE x PP	-.002**	(.000)	.0001	(.000)	-.002*	(.001)	-.002*	(.001)	-.002**	(.001)	.001	(.001)
DUP x STTE x PP	.001†	(.001)	.001*	(.000)	.002†	(.001)	.001	(.001)	.002*	(.001)	.001	(.001)
Observations	2,384,418		1,190,049		2,384,418		2,384,418		2,384,418		276,671	
R-squared	.001		.002		.001		.001		.001		.005	

Robust standard errors in parentheses ** p<.01, * p<.05, † p<.1 - Note: STTE ≙ Shared team task experience, PP ≙ Performance pressure

3.6 Practical implications & discussion

As of today, the literature on pay dispersion still seeks congruence to explain conflicting theoretical (DOWNES/CHOI 2014; LAZEAR 2000; SHAW 2015) and empirical (BLOOM 1999; KALE/REIS/VENKATESWARAN 2009; SIEGEL/HAMBRICK 2005; YANADORI/CUI 2013) findings. This dichotomy is of particular relevance as interdependent teams have become the strategic choice to cope with complex organizational problems and tasks (PARK/SPITZMULLER/DESHON 2013) and organizations face a strive for pay transparency (FRIEDMAN 2014). Thus, how to properly set wages within teams has become a question of major importance. Our results indicate that managers should carefully set wages and include the level of (un)explained pay dispersion into their decision making, opting to minimize unexplained pay dispersion as those trigger unintended adverse behavioral responses harming team performance. Properly tying wages to input factors of team members (associated with explained pay dispersion) can yet enhance team performance. Further, organizations should be aware of the fact that the effects are strengthened over time as team members get to know each other and get a better feeling about the fairness of each other's wages. Yet, when teams are facing high levels of performance pressure, higher levels of unexplained pay dispersion might be tolerated from a performance-based perspective as the negative consequences vanish. The mechanism behind this might be that performance pressure acts as a motivational force for team members that might overlap and outweigh the motivational implications of un(explained) wage dispersion.

Further, we shed light on the interrelated effects between performance pressure, shared team task experience and DEP, DEP: Besides the positive effect of performance pressure on motivational aspects, performance pressure may also undermine team processes (GARDNER 2012b). For example, when teams face high-stakes assignments, where the importance of delivering superior performance is high, team members narrow their breadth of attention (GLADSTEIN/REILLY 1985; SALAS/DRISKELL/HUGHES 1996; STAW/SANDELANDS/DUTTON 1981) and become more self-focused and less team-focused (GLADSTEIN/REILLY 1985; SALAS/DRISKELL/HUGHES 1996). This disrupts and negatively influences the encoding, storage and retrieval capabilities of the team's transactive memory system (ELLIS 2006; SALAS/DRISKELL/HUGHES 1996). Threat rigidity theory supports this argument, suggesting that teams behave rigidly in threatening situations by using less team information systems and simplifying information (STAW/SANDELANDS/DUTTON 1981). Further, under performance pressure, team members might also tend to less accurately allocate areas of competencies and confuse responsibilities (ELLIS 2006; TORRANCE 1954). When narrowing one's breadth of attention, being more self and less team-focused while also confusing competencies and responsibilities, the effects of (un)explained pay differences between team members might vanish, what might explain the effects of performance pressure on the strengthening effect of shared team task experience on the link between (un)explained pay dispersion and team performance.

3.7 Theoretical implications

We contribute to the pay dispersion literature in several ways: *First*, we highlight the necessity to conceptually distinguish between dispersion in unexplained pay and dispersion in explained pay (TREVOR/REILLY/GERHART 2012). *Second*, we theoretically argue and empirically show that the effects of (un)explained pay dispersion are strengthened by shared team task experience referring to the team cognition literature (WEGNER/ERBER/RAYMOND 1991) and weakened by performance pressure. These moderating effects might also explain (meta-analytic) findings that display effect sizes of pay dispersion being close to zero (PARK/SUNG; SHAW 2015). *Third*, we exploratively contribute by showing that performance pressure weakens the strengthening effect of shared team task experience on the links between un(explained) pay dispersion and team performance.

3.8 Limitations & future research

First, our study results rely on the assumption that the wages are known to individual team members. Although there is a rise of pay transparency (FRIEDMAN 2014), there are still many firms following a pay secrecy strategy (BELOGOLOVSKY/BAMBERGER 2014). If team members don't know each other's wages it is by definition not possible to evoke any behavioral (or also sorting) responses.

Further, because our study is based on sports data, it is important to mention the potential limitations that refer to the generalizability of the study. We agree with previous research and suggest that our results are especially applicable and transferrable to teams operating in environments that share similarities with NBA teams (GRIJALVA ET AL. 2020). These might be orchestras, the entertainment industry, firefighting teams, cockpit crews or surgery teams as for those the performance is highly visible, the teams are characterized by low member stability with changing team members and the teams have a strong role and responsibility differentiation within the team what are all also characteristics of NBA teams (GRIJALVA ET AL. 2020) .

Next, our study is essentially of correlational nature although we try to get closer to the causal effects by applying several fixed effects on team, opponent and season level (ANTONAKIS ET AL. 2010). The effects still need to be tested in an experimental setting in order make strict causal claims (CADSBY/SONG/TAPON 2007; CONROY/GUPTA 2019; HARBRING/IRLENBUSCH 2003). Further, we exploratively shed light on the triple interaction between pay dispersion, shared team task experience and performance pressure. Theoretically and empirically addressing the mechanisms of this relation is needed and might contribute to a better understanding of why (and which) teams behave differently when facing high levels of performance pressure.

3.9 Conclusion

Our study sheds light on the relation between DUP and DEP and team performance and how these effects change as team members gain shared working experience or when teams work under high levels of performance pressure. In line with previous research we find a positive (negative) direct effect of DEP (DUP) (TREVOR/REILLY/GERHART 2012). We show that these direct effects are strengthened by shared team task experience and weakened by performance pressure. Further, the strengthening effect of shared team task experience is also weakened under high levels of performance pressure.

4. Trait resilience and performance under performance pressure

While the previous chapter 3 has focused on the question to what extent performance pressure can affect *team* dynamics in form of a moderator, this chapter refrains from the team level and focuses on individual level. It advances the previous chapter 3 in such a way that it focuses on the question of why some individuals can handle performance pressure better in comparison to others. In particular it questions *who* can handle performance pressure better than others and thus focuses on individual differences.

4.1 Introduction

Organizations are more and more confronted with increased performance pressure due to tougher financial targets, more and more demanding customers and highly competitive global markets (LOCHMANN/STEGER 2002). As a consequence, employees feel the need to work harder, better and faster to meet these challenges in the fear of being demoted, placed on probation or being terminated (MITCHELL ET AL. 2019). Yet, some individuals can handle these challenges better than others what raises the question why some individuals can handle pressure-full situations while others don't (MITCHELL ET AL. 2019). A reason for people to respond differently to performance pressure can be found in individual, trait-like psychological differences (BYRNE/SILASI-MANSAT/WORTHY 2015). Literature has identified trait resilience (MITCHELL ET AL. 2019) as an important individual characteristic that helps handling the burdens of performance pressure. Trait resilience is a construct highly relevant in the health care literature (SMITH ET AL. 2010) and has been related to many health-related outcomes such as depression (SOUTHWICK/CHARNEY 2012). Yet it has often been neglected in the management literature and only recently been linked to individual behavioral outcomes such as incivility or citizenship (MITCHELL ET AL. 2019). Economic literature still lacks an empirical testing of trait resilience with objective performance outcomes (MITCHELL ET AL. 2019).

In this study we try to fill this gap by theoretically linking trait resilience, performance pressure and performance and empirically testing these relationships using data from the German table tennis leagues. Our results indicate that trait resilience is a key factor for handling performance pressure.

We contribute to the literature in several ways: *First*, we theoretically as well as empirically contribute to answering the question of why some individuals perform better than others under performance pressure and thus shed light on the equivocal and complex effects of performance pressure (EISENBERGER/ASELAGE 2009; GARDNER 2012a, 2012b; JENSEN/COLE/RUBIN 2019; MITCHELL ET AL. 2018; MITCHELL ET AL. 2019; OTTEN 2009; SCHAUBROECK/MERRITT 1997). *Second*, while previous literature might be plagued by endogeneity due to self-rated explanatory and self-rated dependent variables (ANTONAKIS ET AL. 2010), our psychological construct of trait resilience (explanatory variable) is neither endogenously related to our performance data (dependent variable) nor to our performance pressure variable (moderator variable). This is because we conduct a survey to measure trait resilience and append the survey data with historical field data on individual performance and performance pressure from the German table tennis leagues.

The reminder of the paper is structured as follows: First, we present a theoretical framework including the derivation of our hypotheses – the direct effect of trait resilience on individual performance (H4.1) and the moderating effect of performance pressure on the link between trait resilience and performance (H4.2). We then confront our hypotheses with empirical table tennis data and subsequently derive implications.

4.2 Literature, theory & hypotheses

4.2.1 Trait resilience and individual performance

There are many definitions of the highly elusive construct of "(trait) resilience" and the perspectives are thus rather diverse (CASSIDY 2015; FLETCHER/SARKAR 2013). *Resilience* has its etymological roots in the Latin "resilire" – meaning to jump back and recoil (LAPRIE 2008). Consequently, resilience is defined as a "successful adaptation to adversity" on a general level (BECKMAN/STANKO 2020) which is the focus of most definitions (for a review on the various definitions of (trait) resilience see: FLETCHER/SARKAR (2013)). Trait resilience is in its nature a "relatively enduring [psychological] characteristic" (KERLINGER 1966: 453) that does not or only hardly vary over time. Trait resilience theoretically captures the adaptive capacity which also includes a person's ability to anticipate and respond to uncertainty in a complex environment (DAHMS 2010). This positive adaption to environmental circumstances is associated with highly resilient individuals using more positive and effective emotion-management strategies such as positive re-appraisal and benefit finding (AFFLECK/TENNEN 1996; FOLKMAN/MOSKOWITZ 2000b; PICKERING ET AL. 2010) as well as utilizing more assertive and more goal-directed problem-solving strategies (BILLINGS ET AL. 2000; MOORHOUSE/CALTABIANO 2007). Positive emotions are thought to have strong adaptive benefits when interpreting the environment (for reviews see (FOLKMAN/MOSKOWITZ 2000a, 2004). Taking these arguments together, individuals scoring high on trait resilience should outperform individuals scoring low on trait resilience as they are able to better respond to different environmental circumstances ultimately increasing performance (LUTHANS ET AL. 2007; MADDI ET AL. 2006; ONG ET AL. 2006; YOUSSEF/LUTHANS 2007). Consequently, we hypothesize:

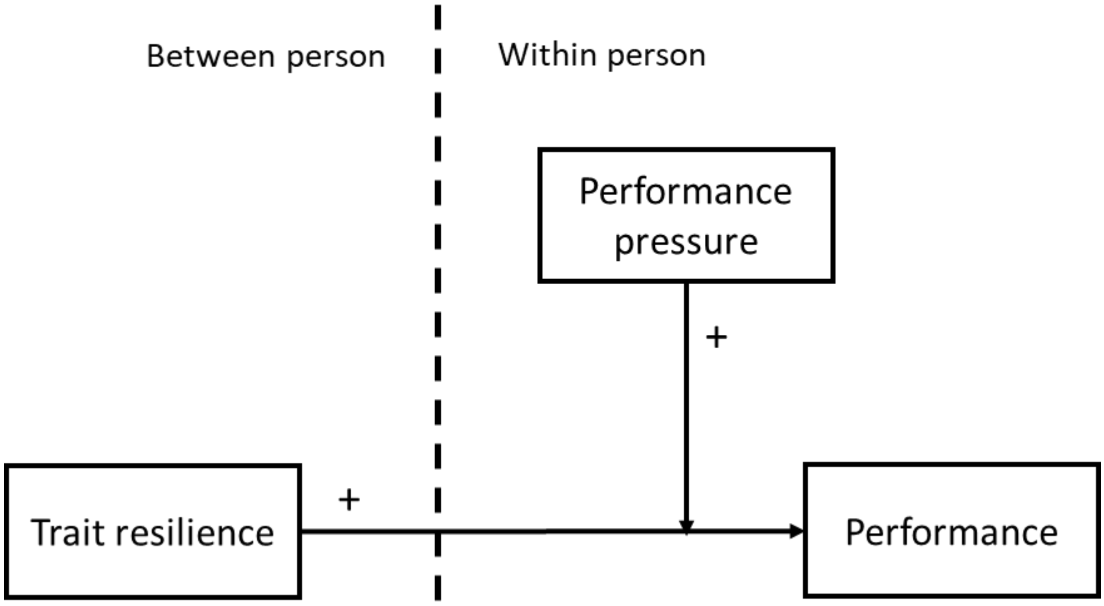
Hypothesis 4.1: Trait resilience is positively related to performance.

4.2.2 Trait resilience and individual performance under performance pressure

In the following, we will argue that trait resilience is a particularly important trait under circumstances characterized by high levels of performance pressure. Performance pressure is an external factor that increases the need for delivering a superior outcome which implies heightened scrutiny and evaluation of one's work, and significant consequences associated with one's performance (GARDNER 2012b). These characteristics imply that performance pressure might be an activator of stress (LAZARUS/FOLKMAN 1984; MITCHELL ET AL. 2019). Individuals scoring high on trait resilience rather appraise stressors as challenging, whereas low trait resilient individuals rather appraise stressors as threatening (MITCHELL ET AL. 2019; WAUGH ET AL. 2008). Thus, trait resilience captures how effectively individuals cope and adapt to stress, loss, hardship or adversity. (BLOCK/KREMEN 1996; SMITH ET AL. 2008). Individuals scoring high on trait resilience can more easily move on from negative events and bounce back from them where individuals scoring lower on trait resilience might be caught in a rut (TUGADE/FREDRICKSON 2004). It helps individuals to protect their cognitive resources allowing them to feel energetic and alive under performance pressure rather than feeling drained (RYAN/FREDERICK 1997). Thus, they might more easily withstand the stress resulting from performance pressure and even be increasingly motivated (GARDNER 2012b; MITCHELL ET AL. 2019). We thus hypothesize:

Hypothesis 4.2: The relationship between trait resilience and performance is moderated by performance pressure in such a way that the relationship is stronger under high levels of performance pressure and weaker under low levels of performance pressure.

Figure 4.1: Theoretical conceptualization of the relation between trait resilience, performance pressure and performance[10]



4.3 Data and methods

4.3.1 Sample & setting

We test our hypotheses using data on table tennis matches. The data consists of around 75,000 game-level outcomes of German (amateur) table tennis leagues. We compound the data on individual game-level outcomes with psychological constructs measured in a self-administered online survey. Thus, the sample consists of a one-shot measure of psychological constructs supplemented with historical data on table tennis games that the respective person played offering us a unique data set that consists of both: objective performance outcomes and data on individual, psychological traits.

Table tennis games are best of five games where one player wins the game as soon as she has won three sets. Each set is played until one player reaches eleven points (while having at least a two-point margin lead – if no player has at least a two-point margin lead, the set is played until one player has a two-point margin lead). Table tennis has proven to be suitable analyzing economic puzzles such as competitive balancing (TAINSKY/XU/YANG 2017; ZHENG ET AL. 2018), tournament theory (MALUEG/YATES 2010), non-verbal behavior (GREENLEES ET AL. 2005) or psychological traits (e.g. self-efficacy) (VAGHEFI/TOJARI/GANJOUEI 2012).

[10] This conceptualization also includes the empirical structure of the data set that is explained in more detail in subchapter 4.3.1 namely that the variance in trait resilience is between persons and the variance in performance pressure and performance is within persons.

4.3.2 Measures

Performance. We measure performance by whether the respective game was won or not. Winning is the ultimate goal of a table tennis match and thus reflects a suitable measure for individual performance (TAINSKY/XU/YANG 2017).

Trait resilience. We measure trait resilience using the German translation of the 10 item Connor-Davidson Resilience scale (CD-RISC) (CONNOR/DAVIDSON 2003; SARUBIN ET AL. 2015). The CD-RISC scale is one of the best-validated measures of resilience (BURNS/ANSTEY 2010; CAMPBELL-SILLS/STEIN 2007; CHMITORZ ET AL. 2018; MALTBY/DAY/HALL 2015; MATZKA ET AL. 2016). A sample item from the trait resilience scale is "When under pressure, I focus and think clearly" (1 = not true at all; 5 = true nearly all of the time). In the main regression results table (Table 4.3) we use the predicted values resulting from a confirmatory factor analysis in order to validate our psychological construct (JACKSON/GILLASPY/PURC-STEPHENSON 2009; MALTBY/DAY/HALL 2015; RUSSELL 2002). The scale produced high internal consistency with a Cronbach's alpha of .81 (TAVAKOL/DENNICK 2011).

Performance pressure. We approximate performance pressure based on the "table tennis rating" (TTR). The TTR assembles from all past table tennis games of the respective player – when winning, the TTR of the player increases depending on the opponent's TTR. More precisely, if you win against a player with a higher TTR, your TTR increases by a larger margin than if you win against a player with a lower TTR.[11] Based on these TTRs we calculate the exact ex ante winning probabilities for all games of all players within our sample. Our main measure for performance pressure is a dummy that equals one if the ex-ante winning probability was smaller than 50% and zero if the ex-ante winning probability was larger than 50%. This represents a good approximation for performance pressure, as arguably, the lower your ex-ante chances of winning a game (i.e. the better your opponent), the higher "the importance of […] delivering a superior outcome" (GARDNER 2012b: 2).

Control Variables We control for the player's *age*, as age might influences individual performance, especially in sports (GRIJALVA ET AL. 2020; TØNNESSEN ET AL. 2015). We also include *age squared* as the effect of age on individual performance might not be linear but rather curve linear (MCMURRAY ET AL. 2002).

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[11] These TTRs are publicly known to all players and players are very well aware of these ratings. This has been validated in the survey by asking participants about these ratings.

We further include *conscientiousness* and *neuroticism* as psychological traits as those two Big 5 traits were shown to be reliably influencing performance (ALMLUND ET AL. 2011).

Lastly, we include play-style fixed-effects in form of dummy variables which is table tennis specific and includes whether a player is left- or right-handed, whether the player is rather an offensive or defensive player and the material of the racket. All variables and their description are represented by Table 4.1

Table 4.1: Overview of all study variables

Variable	Measure Description
Performance	A dummy variable that is one if the respective game was won and zero else.
Trait resilience	A player's trait resilience value estimated by running a confirmatory factor analysis using the 10-item scale of CONNOR/DAVIDSON (2003).
Performance pressure	A dummy variable that is one if the ex-ante winning probability was below 50%.
Age	The player's age in years.
Neuroticism	The player's level of neuroticism estimated using a short 3-item scale (SPECHT/EGLOFF/SCHMUKLE 2011).
Conscientiousness	The player's level of conscientiousness estimated using a short 3-item scale (SPECHT/EGLOFF/SCHMUKLE 2011).

4.3.3 Estimation strategy

We analyze the data running a cross-sectional linear regression model. As we have the history of games played of all players that participated in our survey, we have one measure for each personality trait and several measures of performance. Although psychological traits are defined as stable and endurable, research agrees on the changeability of psychological traits with some meta-analytic reviews even showing little stability (especially at young age) (ANUSIC/SCHIMMACK 2016; DAMIAN ET AL. 2019; ROBERTS/WALTON/VIECHTBAUER 2006; ROBERTS/WOOD/SMITH 2005). As a consequence, we restrict the sample to a 2-year period before the survey took place as suggested by previous literature (ATHERTON ET AL. 2021). Prior to regression analysis and prior to building the interaction terms we standardize all variables to receive a mean of zero and a standard deviation of one for reasons of comparability. Robust standard errors are clustered at individual player level.

4.4 Results

Table 4.2 reports the descriptive statistics (of the non-standardized and non-predicted variables) and correlations for all variables of interest and shows no serious problem of multicollinearity between our explanatory variables.

Table 4.2: Descriptive statistics and correlations among all variables of interest

		Mean	S.d.	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)
(1)	Performance	.55	.5	0	1	1					
(2)	Trait resilience	3.71	.56	1.1	5	.028*	1				
(3)	Performance pressure	.45	.5	0	1	-.480*	-.031*	1			
(4)	Age	37.18	15.07	9	81	-.052*	-.042*	.028*	1		
(5)	Neuroticism	5.36	.96	2.33	7	.013*	.210*	-.023*	-.071*	1	
(6)	Conscientiousness	5.26	1	1.33	7	.004	.250*	-.011*	.154*	.118*	1
(10)	Winning probability	54	30.4	0	100						

* denotes bivariate correlation with $p<0.01$

Note: The winning probability is used to generate the main approximation of performance pressure. Further, it is used to generate the approximations used for robustness checks in Table 4.5

In Model 4.1 in Table 4.3, we test our hypothesis 4.1 concerning the direct effect of trait resilience on performance. Results support our hypothesis and we find a positive direct effect of trait resilience (β = .01; p<.05) on performance. We further find a significant negative effect of age (β = -.03; p<.01) on individual performance which can intuitively be explained by decreasing physical capacity.

In Model 4.2 & 4.3, we test our moderating effect of performance pressure on the link between trait resilience and performance using split-sample estimations. In line with our theoretical prediction (H4.2), we find that the link between trait resilience and individual performance is stronger under high levels of performance pressure (β = .01; p<.01) and weaker under low levels of performance pressure (β = .003; insignificant). The positive direct effect of trait resilience is not present under low performance pressure indicating that the average (positive) direct effect (H4.1) is empirically driven by situations of *high* performance pressure.

Table 4.3:Trait resilience, performance pressure and performance

	(4.1)		(4.2)		(4.3)	
Dependent variable	Performance		Performance		Performance	
	β	s.e.	β	s.e.	β	s.e.
Performance pressure			High		Low	
Hypothesis	H1		H2		H2	
Control variables						
Age	-.03**	(.01)	-.01**	(.00)	-.03**	(.00)
Age-squared	-.001	(.01)	-.01**	(.00)	.004	(.00)
Conscientiousness	.003	(.005)	-.001	(.00)	.002	(.00)
Neuroticism	.004	(.005)	.004	(.00)	-.005	(.00)
Main independent variable						
Trait resilience	.01*	(.01)	.01**	(.00)	.003	(.00)
Year fixed-effects	Yes		Yes		Yes	
Playstyle fixed-effects	Yes		Yes		Yes	
Observations	74,372		33,485		40,887	
R-squared	.004		.002		.003	

Robust standard errors in parentheses
** p<0.01, * p<0.05, † p<0.1

4.5 Robustness checks

We estimate several additional regressions to check the robustness of our results. Our results largely stay robust as Table 4.4 and Table 4.5 indicate. In Table 4.4, we re-estimate Table 4.3 without any controls or fixed-effects to show that our results are not artificially created by any multicollinearity among our explanatory variables. In Table 4.5, we use different approximation for our moderator variable (i.e. performance pressure) to account for empirical literature differently measuring performance pressure (BÖHEIM/GRÜBL/LACKNER 2019; CAO/PRICE/STONE 2011; UHLMANN/BARNES 2014).

Building on the idea of our main measure for performance pressure, our *first* robustness check for performance pressure (Table 4.5, Model 4.7 & 4.8) reflects a dummy variable that is one if the ex-ante winning probability is between 30% and 80%. These cut-off points reflect the 25% and the 75% quantiles - thus 50% of all games fall into this definition of high performance pressure and 50% don’t. While acknowledging that the stronger the opponent, the higher the importance of delivering superior performance (see main measure) - there is a point where winning is nearly impossible as the opponent is too “strong”, thus negatively affecting motivation (BROWN 2011) and arguably reflecting lower levels of performance pressure. Thus, our first robustness measure reflects games where players had arguably realistic chances of winning while at the same time not being in such a superior position that the importance for superior performance decreases again. Our *second* robustness check for performance pressure (Table 4.5, Model 4.9 & 4.10) comprises a dummy variable that equals one if the game went into the final deciding 5^{th} set and zero if not. If the game goes into the 5^{th} set, there are “significant consequences associated with the […] performance” (GARDNER 2012b: 2) as losing this set leads to losing the game. Thus, the 5^{th} set in a table tennis game is characterized by higher levels of performance pressure than other sets. Our *third* and last robustness check of performance pressure (Table 4.5, Model 4.11 & 4.12) reflects a dummy variable that equals one if the player was behind at least one set in the respective game and zero if the player was never behind in sets at any point in the game (there are three possibilities of being behind at least one set: a set-score of 0:1, 0:2 and 1:2 from the perspective of the player). If you are behind in sets, the higher the consequences attached to one's performance and the higher the importance of delivering superior performance[12].

Both, Table 4.4 and Table 4.5 indicate a strong robustness of our results. While Table 4.4 shows that our results are not driven by collinearity between our independent variables, Table 4.5 shows a strong robustness using different approximations for performance pressure. The only approximation that deviates from our prediction is presented in Model 4.9 & 4.10. Here trait resilience is a positive predictor of performance, yet only in low performance pressure games that did not go into the final deciding 5th set – exactly the opposite way as predicted.

Table 4.4: Robustness – re-estimating Table 4.3 without controls

Dependent variable	(4.4) Individual performance		(4.5) Individual performance		(4.6) Individual performance	
	β	s.e.	β	s.e.	β	s.e.
Performance pressure			High		Low	
Trait resilience	.01**	(.01)	.01**	(.01)	.00	(.004)
Year fixed-effects	No		No		No	
Playstyle fixed-effects	No		No		No	
Observations	74,372		33,485		40,887	
R-squared	.001		.001		.00	

We re-estimate all three regression models from the main results table without any control variables in order to show that our results are not driven by multicollinearity.
Robust standard errors in parentheses ** p<0.01, * p<0.05, † p<0.1

[12] As the type of sport differs from chapter 3, also our measures for performance pressure differ from chapter 3, yet references between the measures can be drawn. The idea of the inverse absolute point difference in an NBA game as well as the two dummy variables which represent tight games is highly similar to the idea of the 2nd robustness check of whether a game went into the final deciding 5th set as all measures reflect a dynamic, in-game developing measure that is associated with the closeness of the game. Next the TTR is table tennis specific and a similar rating is not available for NBA games, yet is reflects an ex-ante known rating that displays the importance for delivering superior performance what is arguably also reflected in playoff games in the NBA. Deviating from the measures used in chapter 2 is the main measure (being ex-ante numerically the underdog) and the 3rd robustness check (being behind in a game) measure. As trait resilience captures the ability to bounce back from adversity or loss, these two approximations might be particularly interesting as being behind in sets in the game as well as being the underdog might especially reflect adversity.

Table 4.5: Robustness checks using different approximations for performance pressure

	(4.7)		(4.8)		(4.9)		(4.10)		(4.11)		(4.12)	
Dependent variable	Performance		Performance		Performance		Performance		Performance		Performance	
	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.	β	s.e.
Performance pressure	High		Low		High		Low		High		Low	
Approximation	Winning prob. >30% & <80%		Winning prob. <30% & >80%		5th set game		No 5th set game		Behind		Not behind	
Hypothesis	H2		H2		H2		H2		H2		H2	
Control variables												
Age	-.02**	(.00)	-.03**	(.01)	-.02**	(.00)	-.03**	(.01)	-.01**	(.00)	-.01**	(.00)
Age-squared	-.002	(.00)	.00	(.00)	.002	(.00)	-.002	(.01)	-.01†	(.00)	.002	(.00)
Conscientiousness	.001	(.00)	.01	(.00)	.003	(.004)	.003	(.01)	-.00	(.003)	.001	(.001)
Neuroticism	-.003	(.00)	.01	(.00)	.001	(.004)	.005	(.01)	.01	(.00)	-.00	(.001)
Main independent variable												
Trait resilience	.01*	(.00)	.02	(.01)	.001	(.004)	.02*	(.01)	.01†	(.00)	.001	(.002)
Year fixed-effects	Yes		Yes		Yes		Yes		Yes		Yes	
Playstyle fixed-effects	Yes		Yes		Yes		Yes		Yes		Yes	
Observations	34,204		40,168		17,292		57,080		40,761		33,611	
R-squared	.001		.01		.002		.01		.003		.001	

Robust standard errors in parentheses
** p<0.01, * p<0.05, † p<0.1

4.6 Practical implications, discussion & future research

Previous research argued that trait resilience (MITCHELL ET AL. 2019) might explain why some individuals are better in dealing with high-pressure situations than others by changing the perception of performance pressure as challenging rather than threatening. We contribute to this stream of literature by matching self-rated measures of trait resilience with objective measures of performance and performance pressure. Our results are in line with previous research (MITCHELL ET AL. 2019) and show that individuals scoring higher on trait resilience perform better in situations characterized by high performance pressure than individuals scoring lower on trait resilience. We consequently suggest that managers can screen for employees scoring high on trait resilience and assigning them to jobs that are (likely) characterized by high levels of performance pressure.

Although our different approximations for performance pressure indicated a strong robustness of our findings, the different approximations represent distinct theoretical sources of performance pressure. While performance pressure resulting from the relation of the TTRs between two players is an ex-ante known level of performance pressure, being behind or going into the final 5th set represent dynamically evolving levels of performance pressure. Although "being behind" and "5th set" both represent dynamic in-game evolving sources of performance pressure, its implications are different. While both represent situations where superior performance is needed, "being behind" captures the necessity of being able to bounce back to a stronger degree than "5th set" as being behind is by definition associated with previous poor performance. Hence, we argue that while trait resilience is an important characteristic for handling performance pressure, the external factors resulting in performance pressure differ and whether a high level of performance pressure can be planned for and is ex-ante known or not and whether poor performance precedes might be important differentiations[13]. Although the literature on performance pressure has already advanced pinning down the factors that multiplicatively determine performance pressure (GARDNER 2012b),

[13] There is also tentative evidence in chapter 3 that these distinction(s) might be important as in model 3.4b the two-way interactions between performance pressure (approximated by a playoff game - what is ex-ante known) and (un)explained pay dispersion are not statistically significant, yet they predominantly are statistically significant in all other model specifications indicating differing effects.

theoretically further deepening various (sub)-types of performance pressure might yield fruitful results.

4.7 Limitations

As with all studies, also this study has limitations. First, participation in our survey and allowing the results to be matched with the performance data was voluntary and thus there is potential for self-selection (HUDSON ET AL. 2004). Concerning participants' consent to have their performance data matched: The two populations – those that give their consent and those that don't do not differ with respect to trait resilience. Still, we cannot guarantee no self-selection potentially affecting the results in this study.

Further, table tennis is a specific context and results might not per se be applicable to other contexts. Our results might be informative for contexts that share similarities with the table tennis context. Table tennis reflects an individual sport that is associated with requiring high cognitive resources and focus. Further, table tennis requires the players to quickly react within split seconds. We argue that our results are informative for settings that share these similarities (e.g. police officers on a mission).

4.8 Conclusion

Our study analyzes the role of trait resilience on performance in the context of performance pressure. We show that the direct (positive) effect of trait resilience on performance is driven by situations characterized by high levels of performance pressure. Thus, and in line with previous research (MITCHELL ET AL. 2019) we show that trait resilience is an important psychological trait when performing under performance pressure.

5. Discrimination when evaluating misconduct under performance pressure

While chapter 4 analyzes *who* performs better under performance pressure, chapter 5 examines *in how far* decisions of evaluators (NBA referees) operating constantly under high levels of performance pressure due to their performance being closely scrutinized and monitored (GARDNER 2012b: 2) by fans, journalists, sport experts and internal reviews, are biased towards individuals that share similarities with themselves. Previous research hints that performance pressure constitutes a setting potentially reducing in-group favoritism of evaluators (PARSONS ET AL. 2011). This chapter shows that – although an average treatment effect of discrimination might not be visible – evaluators might still be biased towards their in-group dependent on contextual factors. In particular, evaluators might only display in-group favoritism when the alleged victim is an in-group member to the evaluator and not when the alleged victim is an out-group member to the evaluator. Thus, while chapter 4 analyzes in how far individuals perform differently well under pressure, this chapter gives tentative evidence that evaluators are biased (discriminate) more subtly when they are monitored closely.

5.1 Introduction

Evaluation decisions are in practice not objective and evaluators usually do have subjective discretion on their decisions (KAMPKÖTTER/SLIWKA 2018). This might lead to evaluation decisions being subjectively biased, due to the person that is evaluated being an *out-group* member – i.e. being of *different* age, gender, race, class, religion or sexual orientation (VEENMAN 2010). Although literature predominantly finds in-group favoritism (or out-group discrimination) of evaluators (for overviews, see e.g. BERTRAND/DUFLO (2017) or BAERT (2018)), there are still conflicting empirical results indicating in-group favoritism (ANTONOVICS/KNIGHT 2009; SHAYO/ZUSSMAN 2011) as well as out-group favoritism (ASAD/BANERJEE/BHATTACHARYA 2020; DEPEW/EREN/MOCAN 2017). Empirical research on discrimination in evaluation processes usually focuses on differences between the evaluator and the person being evaluated (ABRAMS/BERTRAND/MULLAINATHAN 2012) omitting other potentially important parties such as the co-worker(s) in performance evaluations, the other applicants in recruitment decisions or the victim in judicial decisions. Although the subjective evaluation decision is usually between two parties (the evaluator and the person evaluated), these third parties are found to influence the decision process while being underrepresented in the literature (ALESINA/LA FERRARA 2014; GLAESER/SACERDOTE 2003; KLECK 1981). Incorporating third parties into the subjective evaluation process might help in explaining conflicting empirical results (DEPEW/EREN/MOCAN 2017; SHAYO/ZUSSMAN 2011).

I try to answer this puzzle by analyzing racial discrimination in the context of evaluating misconduct. In particular, I analyze in how far the races of the evaluator, the person that allegedly committed the misconduct (from here on the alleged offender) and the person that was targeted by the misconduct (from here on the alleged victim) are interrelated. Thus, I explicitly take the race of the alleged victim into account in order to explain *when* evaluators display racial discrimination against out-group members and hypothesize that the evaluator discriminates against alleged offenders of the opposite race (out-group) referring to social identity theory (H5.1) and that this effect is stronger if the alleged victim is of the same race (in-group) as the evaluator referring to the literature on perspective taking (H5.2). I utilize data from the National Basketball Association (NBA) to empirically answer my hypotheses. The NBA has proven to be especially appropriate for analyzing discrimination effects (HOFFER/FREIDEL

2014; POPE/PRICE/WOLFERS 2018; PRICE/REMER/STONE 2012; PRICE/WOLFERS 2010; YANG/LIN 2012; ZHANG 2017a, 2019a). Using data on approximately 160,000 fouls, I do not find a direct discriminating effect of the in-group evaluator on the out-group alleged offender. Yet, when the alleged victim is an in-group member with the evaluator, I do find out-group discrimination of evaluators against alleged offenders.

I contribute to the literature in several ways, both theoretically and empirically. *First*, I contribute to the literature on discrimination by theoretically and empirically showing that not only the race of the evaluator and the race of the alleged offender have an impact on the decision-making process of the evaluator, but that other third parties involved (here the alleged victim) can influence the evaluator's decision making. *Second*, I contribute to social identity theory by incorporating theoretical considerations of the literature on perspective taking as perspective taking might play an important role in guiding, changing and ultimately reducing out-group discrimination (TARRANT/CALITRI/WESTON 2012). *Third*, I contribute empirically to the literature using NBA data by analyzing discrimination on foul-level, solving potential biases of previous studies resulting from not being able to identify *which* evaluator (referee) called the misconduct (foul) and *who* was targeted by the misconduct (who got fouled) (PRICE/WOLFERS 2010).

I proceed the following: First, I will derive a conceptual model on the interrelation between the evaluator's, the alleged offender's and the alleged victim's race. Specifically, I will derive how the evaluator being an in-group member affects the likelihood that the alleged offender is an out-group member (H5.1) and how the strength of this effect is influenced by the victim being an in-group member with the evaluator (H5.2). I then confront my hypotheses with empirical evidence from the NBA and subsequently discuss my results and derive implications.

5.2 Literature, theory & hypotheses

According to social identity theory (TAJFEL 1970, 1974, 1982; TURNER 1982), people belong to (different) social categories or groups (HOGG/ABRAMS 1988). In this context, a category or group is a set of individuals who share a social identification and regard themselves as belonging to the same social group (TAJFEL 1982). These categories or groups involve many different forms such as gender (e.g. female, male), nationality (e.g. Italian, German), political groups (socialist, conservative) and also race (black, white), yet also roles such as being a professor or being a mother

(HOGG/ABRAMS 1988; STETS/BURKE 2000). Thus, by the means of a social comparison process, people classify themselves into groups and people that share similarities with the self are labeled as in-group in comparison to people who do not share these similarities and who are labeled as out-group (STETS/BURKE 2000). In order to elevate self-esteem and enhance self-worth, which are fundamental human needs (TAJFEL ET AL. 1979), the in-group is generally seen and evaluated as more positive than the out-group (ABRAMS/HOGG 1988; HOGG/ABRAMS 1988; OAKES/TURNER 1980). Evaluating in-group members more positively leads to an increased self-worth, self-esteem and prestige of the group's members. In this context, social categorization is a necessary precondition of discrimination and besides a fundamental need for self-esteem and self-worth, people naturally strive for an uncertainty reduction by transforming an external categorization (e.g. being black or white) to an internal representation (i.e. self-categorization) which ultimately leads to an out-group discrimination (GRIEVE/HOGG 1999). When self-categorizing (i.e. internalizing to which categories and groups one belongs), uncertainty is systematically lowered as group-identity and group-norms describe, prescribe and guide perceptions, feelings, attitudes, cognition, and behavior (HOGG 2000; HOGG/ADELMAN/BLAGG 2010; HOGG/TERRY 2000; JETTEN/SPEARS/MANSTEAD 1996).

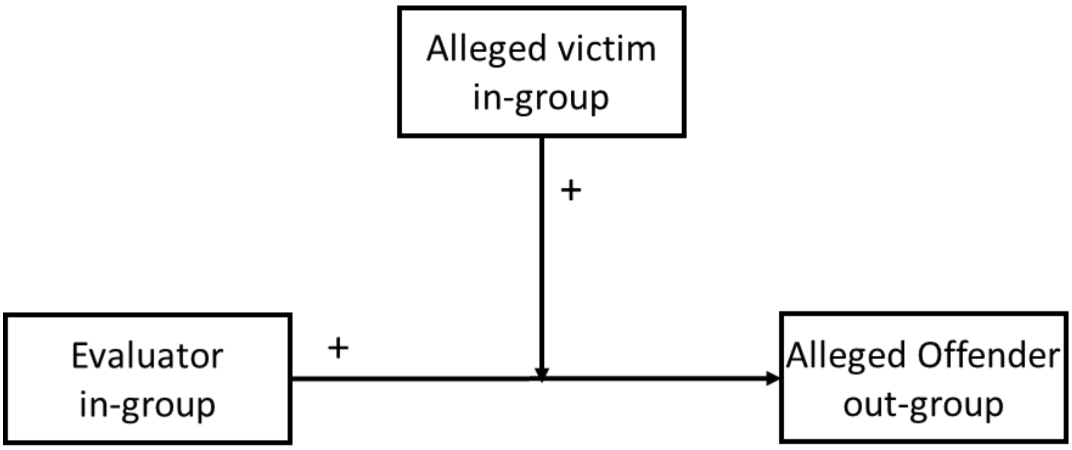
In the context of evaluating misconduct, an evaluator will defend the in-group transgressor and judge the misconduct of an alleged in-group offender less severe in order to keep a positive view of the in-group (ELLEMERS ET AL. 1997; KUNDRO/NURMOHAMED 2020; VAN VUGT/HART 2004). Also, the evaluator will evaluate an alleged out-group offender harsher in order to decrease the positive view of the out-group and thus, in comparison, increase the positive view of the in-group (SCHILLER/BAUMGARTNER/KNOCH 2014). Thus, I derive:

Hypothesis 5.1: The likelihood that the evaluator makes an unfavorable decision against an alleged offender of the out-group is higher in comparison to if the alleged offender is an in-group member.

As a next step, incorporating the victim into the theoretical considerations, I argue that the effect of an evaluator discriminating against an alleged offender of the out-group is stronger if the alleged victim belongs to the evaluator's in-group. The evaluator judges the alleged out-group offender hasher in order to relatively increase the in-group's self-esteem, self-worth and prestige (ABOUD 2003; SCHILLER/BAUMGARTNER/KNOCH 2014). If the victim (i.e. the person that allegedly got offended) now shares the same group with the evaluator this effect might be strengthened. Perspective taking, defined as "an active consideration of alternative viewpoints, framings, hypotheses, and perspectives" (GALINSKY/MOSKOWITZ 2000: 708) is argued to affect in-group favoritism and biases (GALINSKY/MOSKOWITZ 2000) and is more likely to happen if the person shares similarities with the other person (DAVIS ET AL. 1996). Thus, the evaluator is more likely to take the perspective of the alleged victim if they share the same group. Assuming that the victim does want the alleged offender to be penalized, the effect of the evaluator making unfavorable decisions against out-group offenders is strengthened if the victim is an in-group member with the evaluator. Thus, I consequently derive:

Hypothesis 4.2: The likelihood of the evaluator making an unfavorable decision against an alleged offender of the out-group is higher if the alleged victim belongs to the evaluator's in-group.

Figure 5.1: Theoretical conceptualization of the relation between the evaluator's in-group, the alleged offender being out-group and the alleged victim being in-group with the evaluator.



5.3 Data and methods

5.3.1 Sample & setting

In order to test my hypotheses concerning discrimination when evaluating misconduct, I analyze data from the NBA at foul-level. The sample consists of approximately

160,000 individual fouls of the NBA regular seasons between 2015/16 and 2018/19. Each game is officiated by three referees, which are, according to the NBA, arbitrarily assigned to games without considering any characteristics of the teams or the referees (PRICE/WOLFERS 2010). The data consists of information about the player who committed the foul (i.e. the alleged offender), the player who got fouled (i.e. the alleged victim) and the referee that made the call (i.e. the evaluator). Thus, the data consists of foul calls, what is not per se associated with whether a foul call was correct or incorrect. Theoretically all 160,000 foul calls could be correct calls. Still, the skin color of the evaluator should be independent from the skin color of the alleged offender and the alleged victim even if all calls would be correct.

Several features make the NBA especially suitable for analyzing discrimination. *First*, when analyzing discrimination effects in the context of evaluating misconduct, a clear empirical identification is often hard to obtain as the alleged offender, evaluator and alleged victim often share/differ in many social categories such as age, gender, ethnicity or job (GLAESER/SACERDOTE 2003). The NBA comprises a relatively homogenous setting where players all share the *same* gender, job and a rather similar age group (WOLFE ET AL. 2005) what makes a clear identification of the skin color as a proxy for race feasible and reduces potential sources of endogeneity such as the race being systematically correlated to another social category as e.g. gender (ZHANG 2017a, 2019a) leading to intersectionality between different social categories (PERRY/HARP/OSER 2013). *Second*, research examining the evaluation of misconduct in firms is often plagued with data that is biased by self-selection as intra-organizational cover-ups to evaluate misconduct are not random and likely biased (as for example the VW emission scandal) (KUNDRO/NURMOHAMED 2020; STROUBE 2020). The NBA compiles a setting where the assignment of evaluators (referees) is arbitrary which effectively solves this issue (PRICE/WOLFERS 2010). *Third*, historical, objective NBA data is publicly available and games are stored on videotape reducing the risk of forged data (FANELLI 2009).

Skin colors were coded by three different coders who were all blind to the hypotheses. Following academic literature on discrimination in the NBA, I excluded all players/referees where at least one coder coded the race differently than the others (ZHANG 2017a, 2019a). Inter-coder reliability was 98% for the referees and 97% for the players.

The methodological approach I use does not allow a distinction and identification whether the bias stems from white or black referees – or even whether the bias stems from white referees favoring white players or punishing black players, or black referees favoring black players or punishing white players. Because of that and in order to not imply any judgmental interpretation, I use the neutral terminus “in-group” as a hypothetical group that can either be a group of black people or a group of white people. Table 5.1 gives a descriptive overview of the sample composition with respect to race.

Table 5.1: Overview of all study variables

	Observations	Mean	S.d.	Min	Max
Player black	1,391	.77	.42	0	1
Referee black	99	.37	.49	0	1
Foul-level					
Offender black	162,391	.77	.42	0	1
Evaluator black	162,391	.43	.49	0	1
Victim black	162,391	.78	.41	0	1

5.3.2 Measures

Alleged offender out-group. My dependent variable is a dummy variable that equals one if the player allegedly committing the foul is in the out-group from the perspective of the referee. In other words, if the evaluator (the referee) is white, it reflects the likelihood that the offender is black and vice versa. Thus, I predict the skin color of the player allegedly committing the foul based on the skin color of the evaluator.

Evaluator in-group. My main explanatory variable is a dummy variable that equals one if the referee that made the call belongs to the in-group in comparison to the alleged offender, approximated by the skin color of the referee (black/white). In- and out-group is always seen in comparison to the evaluator who determines the reference group.

Alleged victim in-group. The moderator variable is a dummy variable that equals one if the victim that was allegedly fouled belongs to the in-group of the referee, approximated by the skin color of the alleged victim (black/white).

5.4 Results

Table 5.2 displays bivariate correlation of the regression variables. I run an ordinary least squares model with robust standard errors clustered at the dyad between the evaluator and the alleged offender.

Table 5.2: Correlation matrix

		(1)	(2)	(3)
(1)	Offender outgroup	1		
(2)	Referee ingroup	.01*	1	
(3)	Victim ingroup	-.01*	.001	1

* denotes bivariate correlation with $p<0.05$

Table 5.3 displays the results table concerning hypothesis 5.1 (Model specification 5.1) as well as concerning hypothesis 5.2 (Model specification 5.2). Model 5.1 does not show a direct effect of the evaluator being in-group on the likelihood that the alleged offender is an out-group member ($\beta = .00$; insignificant). Thus, if the referee is white (black), the likelihood that the person allegedly committed the foul is black (white) is not increased.

Model 5.2 relates to hypothesis 5.2. Results indicate that the discriminating effect of the evaluator towards an out-group is contingent on the alleged victim belongs to the in-group of the evaluator ($\beta = .01$; $p<.1$). Thus, if the referee is white (black), the likelihood that the player who allegedly committed the foul is black (white) is only increased if the player that got allegedly fouled is white (black) and thus shares the same skin color with the evaluator. Hence, I find support for my hypothesis 5.2.

The effects are robust to several fixed-effects that might influence the likelihood of the referee discriminating such as season fixed-effects which captures all unobservables that might change from season to season and influence racial discrimination such as legal or institutional changes undertaken by the leagues commissioner to reduce discrimination.

Table 5.3: Regression results concerning the relation between the race of the alleged offender, the evaluator and the alleged victim

Dependent variable	(5.1) Alleged offender out-group		(5.2) Alleged offender out-group	
	β	s.e.	β	s.e.
Main independent variables				
Evaluator in-group	.00	(.00)	.00	(.00)
Alleged victim in-group			-.02**	(.00)
Two-way interaction				
Evaluator in-group * Alleged victim in-group			.01†	(.00)
Overtime fixed-effects	Yes		Yes	
Season fixed-effects	Yes		Yes	
Quarter fixed-effects	Yes		Yes	
Observations	162,391		162,391	
R-squared	.001		.001	

Robust standard errors in parentheses ** p<0.01, * p<0.05, † p<0.1

5.5 Discussion, limitations & future research

I do not find a direct effect of the evaluator's race on the race of the alleged offender. This is in line with POPE/PRICE/WOLFERS (2018), who find that the racial bias of referees vanished due to the publicity of a previous study because the evaluators adjusted their behavior after the study was in the media (PRICE/WOLFERS 2010). Although the results do not show an average direct effect of the in-group evaluator discriminating against alleged out-group offenders, they reveal a more nuanced and fine-graded picture in the sense that - although previous studies do not show racial discrimination for NBA referees (POPE/PRICE/WOLFERS 2018) – NBA referees might still be biased towards their in-group, but only when the alleged victim belongs to their in-group. Thus, the results highlight the importance of incorporating the group memberships of all parties involved into one's consideration when analyzing evaluation decisions.

The results are particularly interesting as the decisions of NBA referees are highly visible and as the former NBA Commissioner Stern claimed, "[NBA referees] are the most ranked, rated, reviewed, statistically analyzed and mentored group of employees of any company in anyplace in the world." (PRICE/WOLFERS 2010: 1859). One possible explanation for the results might be that NBA referees learned to adjust their behavior in order to veil potential in-group favoritism after the media hype (POPE/PRICE/WOLFERS 2018; PRICE/WOLFERS 2010). This explanation is in line with

PARSONS ET AL. (2011) who found that referees from the Major League Baseball show lower levels of in-group favoritism when they are scrutinized more closely (e.g. more fans in the stadium or cameras for TV broadcast) and higher levels of in-group favoritism when they are monitored less.

As with all studies, also this study has noteworthy limitations. *First*, the level of analysis is of correlational nature. Yet, as the assignments of referees to NBA games is random with respect to skin color (PRICE/WOLFERS 2010), I can rule out that the skin color is artificially correlated to any unobservable characteristics (ANTONAKIS ET AL. 2010). *Second*, the NBA comprises a relatively specific context where the evaluator's face high monetary incentives to be accurate and not to display any biases (PRICE/WOLFERS 2010). Their evaluation decisions are internally reviewed and these internal reviews determine which referees will officiate the playoff games leading to a substantial additional income for the referees[14]. Further, NBA referees are not only monitored by internal reviews, but also fans, sport experts and journalists and their decision making is videotaped. Thus, they face high levels of accountability for their decision making. Based on these reasons, I argue that my results are rather underestimated and potentially even larger in other settings where the visibility, the accountability and the monitoring of the evaluation decisions is reduced. Thus, I believe that my results are informative to a broader audience associated with evaluating decisions such as judicial, social or labor market decisions and potential in-group favoritism might even be stronger due to the specificity of the NBA's context.

As mentioned previously, I analyze foul calls and not incorrect or questionable calls. Advancing research on questionable foul calls could yield interesting insights (DEUTSCHER 2015). Further, besides the group membership of the alleged victim, also other contextual factors might be influencing the decision making of the evaluator and thus influencing potential in-group favoritism such as whether the guilt of the alleged offender is certain or uncertain (SOMMERS/ELLSWORTH 2000) or whether the alleged offender/victim belongs to a high status, high prestige group (KAKKAR/SIVANATHAN/GOBEL 2020; KIM/KING 2014). Incorporating these contextual factors might yield highly valuable insights.

[14] Although this should lead to a less biased decision making, these internal reviews might be biased as well, yet the NBA keeps these internal reviews under lock and key (PRICE/WOLFERS 2010). Further, assigning referees whose performance was good to playoff games makes the assignment of referees to games ironically not random as the NBA claims – at least for playoff games. For this reason, I exclude all playoff games from the analysis.

5.6 Conclusion

I analyze racial discrimination when evaluating misconduct and find that it is important to also consider the characteristics of third involved parties such as the alleged victim. Results indicate that a potential discriminating bias of the evaluator towards an alleged offender of the out-group is contingent on the group membership of the alleged victim in such a way that the effect is driven by the alleged victim belonging to the evaluator's in-group.

6. Conclusion

With firms increasingly relying on interdependent teams as a strategic answer to complex tasks (HOLLENBECK/BEERSMA/SCHOUTEN 2012; LAZEAR/SHAW 2007; LEPINE ET AL. 2008; MATHIEU ET AL. 2000; PARK/SPITZMULLER/DESHON 2013; STEWART 2006), it is key to understand its implications and challenges. Two studies explicitly address this topic: chapter 2 and chapter 3. When employees work simultaneously in different teams on different tasks and dynamically leave and join other teams and projects (HUCKMAN/STAATS 2011), they will have multiple levels of previous interactions with other employees (e.g. team familiarity or shared team task experience) as well as multiple levels of task familiarity. Further, with the modus operandi being to form interdependent, dynamic teams in order to meet the challenges of the 21st century, potential wage differences between employees will evoke stronger employee reactions than if employees solely perform individual tasks (SHAW/GUPTA/DELERY 2002). These challenges render important research questions. Several overarching conclusions can be drawn in order to contribute to these puzzles that mirror the challenges of the 21st century: *First*, the more shared previous interactions employees have due to e.g. by working together on the same project, the better they will perform. Two reasons are that these teams are more cooperative towards each other and are better in coordinating their task and team works. *Second*, the higher the team's aggregate level of individual task experience, the better the team will coordinate task and team works but the less the team will cooperate with each other. *Third*, the higher the wage differences between employees that *can* be explained by differences in performance, the higher the team performance. Yet, the higher the wage differences between employees that *cannot* be explained by differences in performance, the lower the team performance. These relationships are stronger if employees have higher levels of previous shared interactions with the other team members on the specific task at hand. *Forth*, theoretical reasons for these implications are that by working and sharing time together, team members develop a strong transactive memory system by means of "who knows what in the team", they develop trust in the other team members and develop overlapping mental models (i.e. will have overlapping interpretations of environmental circumstances such as task strategies). It is due to these theoretical reasons that teams are better in coordinating their task and cooperating more. Further, only when teams have developed these (often implicit) emergent states, they can assess the fairness of the team members' wages in relation to their performance, leading to stronger effects of wage differences of employees.

Further, organizations increasingly expect employees to increase their performance (SITKIN ET AL. 2011) due to tougher financial targets, more and more demanding customers and increasingly competitive global markets (LOCHMANN/STEGER 2002). As a consequence employees experience performance pressure and feel the need to work harder, better and faster to meet these expectations in the fear of being demoted, placed on probation or terminated (MITCHELL ET AL. 2019). Hence, performance pressure is a practically highly important topic, yet leaving academic research with many puzzles as individuals seem to respond highly diverse to the pressure and it induces positive as well as negative implications constituting a double-edged sword (EISENBERGER/ASELAGE 2009; GARDNER 2012b; MITCHELL ET AL. 2019; SHALLEY/PERRY-SMITH 2001). Three studies contribute to answering these puzzles and yield general implications: chapter 3, 4 & 5. *First*, performance pressure might act as a unique and strong motivator that outweighs potential other sources of (de)motivation such as (un)explained pay differences between employees. *Second*, more resilient individuals can handle the stressful obstacles of performance pressure better than less resilient individuals. *Third*, even when evaluators are intensively scrutinized and thus face high levels of performance pressure, they might display in-group favoritism although potentially in a more subtle, veiled way.

Based on these general conclusions, this thesis yields important practical implications. *First*, organizations should opt for composing teams with team members that have prior shared (working) experience. They should especially do so if team coordination and team cooperation requirements are key for overall success. Further, they should be careful about overly relying on task familiarity if team cooperation between team members is highly important for team performance. *Second*, organizations should tie wages to performance indicators. This does not only imply team performance enhancing effects but also prevents team performance harming effects. *Third*, organizations should entrust resilient individuals with tasks that are associated with high levels of performance pressure. *Fourth*, intensively monitoring the decisions of employees might not per se prevent any undesirable biases as they might veil their biases and only display them in certain circumstances which might result in the biases not being visible on average.

It is noteworthy to mention potential limitations that arise from using sports data. Sport athletes are embedded in a specific context and results might thus not per se be easily transferred to other settings. In particular, I suggest that the results of this thesis are informative for contexts that (partly) overlap with the following two sport-characteristics. *First*, the sports context represents a very dynamic setting where performance is highly visible. *Second*, performing in these contexts requires high cognitive concentration and involves split-second decision making. In particular, I consider the results to be informative for firefighting teams, police officers or SWAT teams, cockpit crews, orchestras but also surgery teams. Still, it is highly beneficial to reproduce these results in different contexts and circumstances.

Further, future research needs to develop theoretical consensus and depth when analyzing (performance) pressure. Pressure has been operationalized and sub-defined in many various ways (e.g. performance pressure (GARDNER 2012b), social pressure (BECKER 1998), peer pressure (ALLEN/NEWTSON 1972), regulatory pressure (DESAI 2016), compliance pressure (CARLSMITH/COLLINS/HELMREICH 1966; LEE ET AL. 2017), time pressure (MARUPING ET AL. 2015), crisis pressure (NYSTROM/STARBUCK 1984; SHEREMATA 2000), job pressure (SIMS/LAFOLETTE 1975), reputational pressure (ODY-BRASIER/SHARKEY 2019) or evaluative pressure (HARACKIEWICZ/MANDERLINK/SANSONE 1984)) and it is by far not clear whether these types of pressure do or do not evoke the same behavioral responses (SMITH 2019). Consider two sport athletes where one is performing in front of an (evaluative) audience (which might be considered evaluative pressure – or maybe also social pressure) and the other is performing without any spectators but is monetarily incentivized and gets a specific amount of money when hitting a predefined performance level – arguably, both athletes face an increased importance for delivering superior performance - thus can it also be considered performance pressure? Or consider a project team performing a project that is worth millions – can there even be performance pressure without any deadline to meet? These are open questions the literature needs to address in future research.

Further, the literature on *performance pressure* still lacks theoretical depth and seeks concurrence of a uniform definition of performance pressure (SMITH 2019). One stream of research views performance pressure as an internal representation (DURHAM ET AL. 2000; MARUPING ET AL. 2015; MITCHELL ET AL. 2018) whereas another stream of research sees performance pressure as an external force (BAUMEISTER 1984; GARDNER 2012b; MARUPING ET AL. 2015; VAN YPEREN/BLAGA/POSTMES 2015). I followed the definitions of Baumeister (1984) who defines performance pressure as an external force that highlights the importance of delivering superior output which then in turn might evoke stress as an internal consequence of performance pressure. If performance pressure would truly be an internal force, then a highly resilient individual who might not feel the heat (Mitchell et al. 2019) would be characterized as performing under low performance pressure even though the stakes of e.g. a negotiation is worth millions. This seems unlikely as the importance of delivering a high-performance outcome (good negotiation) is increased and even the highly resilient individual might agree on that. Thus, I suggest performance pressure as a truly external force that is then transformed and internalized dependent on the perceptions and characteristics of the individual and evokes internal responses such as e.g. stress (Gutnick et al. 2012) or motivation (Gardner 2012b). Thus, if a situation is characterized by high performance pressure, the performance pressure may act as a stressor (dependent on e.g. the individuals trait resilience (Mitchell et al. 2019)) and subsequently evoke stress defined as the '...relationship with the environment that the person appraises as significant for his or her well-being and in which the demands tax or exceed available coping resources'' (Lazarus/Folkman 1986: 63). (Theoretically) answering and examining these questions might yield highly informative insights and implications and can be considered important research topics.

Finally, as previously explained, team familiarity and shared team task experience are not the same constructs, yet related. Research still lacks theoretical depth on how these constructs are related and how they differ and even further incorporate other related concepts such as linked tacit knowledge (Shamsie/Mannor 2013) into the full picture as these constructs are oftentimes measured in the same way (Berman/Down/Hill 2002; Sieweke/Zhao 2015). Analyzing to what extent team familiarity and shared team task experience (differently) affects (behavioral) outcomes might be highly informative to the literature on teams.

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Appendix

Calculation example of team familiarity and task familiarity

Consider the following fictitious and stylized example: The four players Brown, Smith, White and Young played for a team in a game of the season.

Player	Seconds played in the respective game	Years of experience in team	Dyadic team familiarity of all players that played in the game	Dyadic team familiarity weighted with the seconds played	Teams average
Brown	600	1	(1+1+1)/3=1	1*(600/3,900)=0.15	1.74
Smith	1,200	3	(1+2+3)/3=2	2*(1200/3,900)=0.62	1.74
White	1,200	2	(1+2+2)/3=1.66	1.66*(1200/3,900)=0.51	1.74
Young	900	4	(1+3+2)/3=2	2*(900/3,900)=0.46	1.74

Here the total number of seconds is 3,900, in a regular NBA game without overtime the total number of seconds would be 14,400 (48 minutes * 60 seconds * 5 players).

Player	Seconds played in the respective game	Total minutes played * 10000	Total minutes played weighted with the seconds played	Teams average
Brown	600	10	10*(600/3,900)=1.54	4.23
Smith	1,200	3	3*(1200/3,900)=0.92	4.23
White	1,200	2	2*(1200/3,900)=0.62	4.23
Young	900	5	5*(900/3,900)=1.15	4.23

Here the total number of seconds is 3,900, in a regular NBA game without overtime the total number of seconds would be 14,400 (48 minutes * 60 seconds * 5 players).