Summer 2019

Human Capital Resource Development in Teams: Antecedents, Consequences, and Scale Development of Human Capital Resources

Jieun Park

Human Capital Resource Development in Teams: Antecedents, Consequences, and Scale Development of Human Capital Resources

by

Jieun Park

Bachelor of Arts
Ewha Womans University, 2003

Master of Arts
Ewha Womans University, 2006

Master of Arts
Ohio State University, 2011

Submitted in Partial Fulfillment of the Requirements

For the Degree of Doctor of Philosophy in

Business Administration

Darla Moore School of Business

University of South Carolina

2019

Accepted by:

Sherry M. B. Thatcher, Major Professor

Mark A. Maltarich, Committee Member

Robert E. Ployhart, Committee Member

Kathleen M. Whitcomb, Committee Member

Cheryl L. Addy, Vice Provost and Dean of the Graduate School

DEDICATION

This dissertation is dedicated to my family—my dad, mom, brother, and sister—for their unfailing love, inspiration of my spirit, as well as moral and emotional support.

ACKNOWLEDGEMENTS

I sincerely thank my advisor Sherry Thatcher, committee members Mark Maltarich, Robert Ployhart, and Kathleen Whitcomb, as well as Elizabeth Ravlin and DJ Schepker, for their valuable and professional direction, patience, and encouragement during my doctoral studies. I am also grateful to my fellow doctoral students Xing, Jason, Dee, Mike, Ormonde, Matt, Ray, Patrick, Jon, Christina, Spenser, William, and Silvia, for their friendship, cooperation, and emotional companionship. Finally, I would like to thank my mentor, Barbara Bolt, for her constant guidance and assistance.

ABSTRACT

Although a large body of human capital research supports the critical role of human capital resource (HCR) in unit performance, very little research has paid attention to how to measure HCR, where HCR originates, and how HCR influences team performance. Given the lack of a measure that reflects the unique characteristics of HCR (e.g., transformation of individual KSAOs through emergence processes), I develop and validate a new comprehensive HCR scale. I test a 14-item scale with a sample of 97 undergraduate students in 24 teams. Results show this scale is internally consistent, reliable, and valid. In addition, drawing on human capital, faultlines, and multilevel theories, I build on two forms of a team's KSAOs that capture the level and configuration of the KSAOs (i.e., the mean level of KSAOs and KSAO-based faultlines). I examine how both the mean level of KSAOs and KSAO-based faultlines influence HCR, how team processes (i.e., communication, transactive memory system, and team positive affect) affect these relationships, and how HCR impacts team performance. Using a sample of 268 undergraduate students in 66 teams, I find that the mean level of KSAOs and KSAO-based faultlines significantly interact to influence HCR. The conceptual arguments and empirical findings developed in this dissertation contribute to the human capital literature by building knowledge about a team's KSAOs, HCR, team processes, and team performance.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Human capital has long been recognized as a correlate of individual and unit[1] performance (Crook, Todd, Combs, & Woehr, 2011; Hatch & Dyer, 2004; Wright & Boswell, 2002; Wright & McMahan, 2011). However, the recognition that human capital does not always influence unit performance has led researchers to draw a distinction between human capital and human capital resource (HCR). While human capital is a subset of an individual's knowledge, skills, abilities, and other characteristics (KSAOs), HCR is an emergent, collective construct based on the combination and utilization of individuals' KSAOs (Ployhart & Moliterno, 2011; Ployhart, Nyberg, Reilly, & Maltarich, 2014). Although both human capital and HCR originate in individuals' KSAOs, only HCR can increase unit performance as well as determine a unit's competitive advantage (Ployhart et al., 2014). This implies that knowledge about *what* HCR is, *where* HCR comes from, and *how* HCR exerts an influence on teams is crucial to understanding the strategic implications of human resources.

Recently, scholars have clarified several relevant concepts including individual differences, KSAOs, human capital, and HCR, to provide an in-depth understanding of what HCR is (Ployhart et al., 2014). Although the construct of HCR is now clearly defined, studies on HCR are still limited, perhaps, due to the construct validation issue of

[1] The term *unit* indicates collective levels of individuals, such as teams, departments, and organizations.

HCR (Nyberg, Moliterno, Hale, & Lepak, 2014). Previous research has shown there are many different ways to operationalize HCR, using proxies for KSAOs (e.g., education or tenure) and survey items about individual human capital. However, each proxy reflects only a limited part of HCR, and the survey items do not fully capture the nature of HCR as developed through team dynamics. Thus, it is important to develop a comprehensive scale that represents the multiple aspects of HCR and the nature of a collective team-level construct.

In addition to the construct validation issue, it is critical to address the origin of HCR to improve overall understanding of it. Given that individuals' KSAOs can provide a basis for creating HCR, it is important to consider how the KSAOs are composed in teams. Drawing on a multilevel perspective, I focus on two forms of KSAOs found in teams: the mean level of KSAOs and KSAO-based faultlines. Based on compositional emergence, prior research on human capital has generally used the mean level of KSAOs across individuals in a team to examine the effect of human capital on outcomes. As an additive construct, the mean level of KSAOs reflects the degree to which team members, in general, possess KSAOs. In contrast, a recent study has asserted there are various ways individuals' KSAOs work interdependently to lead to outcomes (Ployhart et al., 2014). To reflect this, I introduce the concept of *KSAO-based faultlines* based on compilational emergence and faultlines research. KSAO-based faultlines are defined as dividing lines that split a team's set of KSAOs into subsets based on the KSAOs of its members. As a configuration of KSAOs, KSAO-based faultlines represent the extent to which team members' KSAOs are aligned. Therefore, the mean level of KSAOs and KSAO-based faultlines can explain different aspects of KSAOs within a team context.

Building on this, I reason that these two distinct forms of a team's KSAOs interactively influence HCR. Team studies have generally supported the notion that level and configuration have a joint effect on team processes and consequences (Boies & Howell, 2006; Colquitt, Noe, & Jackson, 2002). For instance, the level of procedural justice climate was positively associated with team performance and team absenteeism when teams had a strong procedural justice climate (Colquitt et al., 2002). These findings imply that results based on only one form of a team's KSAOs (i.e., either the mean level of KSAOs or KSAO-based faultlines) may not fully explain HCR. Given that both the level and configuration of KSAOs are important aspects of HCR, I investigate the joint effect of the mean level of KSAOs and KSAO-based faultlines on HCR.

Along with the two forms of a team's KSAOs, team processes can also contribute to the development of HCR. HCR derives from the KSAOs of individuals and develops through complex task-related and social interactions within a team context (Ployhart & Moliterno, 2011), such as those that occur in teams. Because teams experience unique interaction patterns that are a source of social complexity, causal ambiguity, and path dependency (e.g., Wright, McMahan, & McWilliams, 1994), each team's HCR is unique, making it difficult to duplicate. Thus, even though two competing teams may have individuals with the same underlying KSAOs (e.g., the same mean levels of KSAOs and same KSAO-based faultlines), one team may develop better HCR than the other team, leading to higher performance. Based on the importance of these contextual effects, I explore how three team processes—communication, transactive memory system (TMS), and team positive affect (team PA)—exert an influence on the relationship between the

mean level of KSAOs, KSAO-based faultlines, and HCR, as well as how the HCR, in turn, affects team performance.

My dissertation contributes to the extant literature on human capital by integrating knowledge about faultlines and a multilevel perspective into theories of HCR. First, recent works have conceptually improved understanding of HCR, yet it remains unclear how to measure its unique features. Acknowledging the need for construct validation of HCR (Nyberg et al., 2014), I develop and validate a new comprehensive scale of HCR that reflects its unique features. Second, previous research has mainly focused on the mean level of KSAOs but often ignored their configuration. To resolve this issue, I introduce a new construct of KSAO-based faultlines to represent the alignment of team members' KSAOs within a team context. As the mean level of KSAOs and KSAO-based faultlines capture distinct components of a team's KSAOs, I illustrate how they jointly influence HCR. Third, given the essential effect of social environments on HCR development (Ployhart & Moliterno, 2011), I examine how three team processes (i.e., communication, TMS, and team PA) interact to influence the relationship between the mean level of KSAOs, KSAO-based faultlines, and HCR. I further investigate how HCR ultimately promotes team performance. Therefore, this dissertation can help explain why some teams perform better than other teams in terms of their distinct HCR. Fourth, from a practical perspective, this dissertation can help managers understand what HCR is, where HCR originates, and how HCR works in teams. To that end, managers can strategically deploy HCR by adding new members and retaining or moving existing members to increase team performance.

This research reflects two boundary conditions. First, I focus on the work team, in which members work interdependently on a consistent basis and experience their own distinct dynamics that influence HCR (Kozlowski & Klein, 2000). Second, HCR can exist at both the individual and team levels (Ployhart et al., 2014). Drawing upon the multilevel model of HCR emergence (Ployhart & Moliterno, 2011), I consider only collective, team-level HCR developed within a team context, rather than individual-level HCR, such as star performers.

I begin this dissertation by providing a theoretical background of HCR and faultlines research. I then develop and validate a new scale of HCR through the process of item generation, scale development, and scale evaluation. I also examine how the mean level of KSAOs and KSAO-based faultlines interact to influence HCR. Next, I develop theoretical insights into how team processes affect the relationship between the mean level of KSAOs, KSAO-based faultlines, and HCR, as well as how HCR influences team performance. I further note theoretical and practical insights for formation and maintenance of HCR with a view to enhancing team performance. Lastly, I discuss the limitations of this dissertation and directions for future research.

CHAPTER 2

THEORETICAL BACKGROUND

2.1. HUMAN CAPITAL RESOURCE

2.1.1. *History of Human Capital Research*

Human capital has been widely examined in diverse disciplines. These disciplines have relied on different assumptions and investigated different aspects of human capital. In the following section, I provide a brief overview of human capital research in four important disciplines: economics, psychology, sociology, and strategy.

First, economics scholars have investigated the role of human capital to solve the question of wage differences between individuals (e.g., Becker, 1964; Schultz, 1961). In economics, human capital is defined as an individual's knowledge, information, ideas, skills, and health (Becker, 2002), and the different levels of human capital possessed by each individual can determine wage differences. This view focuses on the supply side of the labor market and individual investment decisions rather than the demand side, which includes managers' actions. Building on this, economics researchers argue that education improves individuals' economic capabilities, which positively influence productivity and ultimately the earnings of employees.

Second, psychology scholars have emphasized the importance of individual differences, such as cognitive ability, personality traits, knowledge, interests, and self-evaluation, and examined how various types of individual differences influence income

and performance (e.g., Ackerman, 1996; Murphy, 2012; Schmitt, 2014). They argue that general KSAOs (e.g., cognitive ability and personality) and specific KSAOs (e.g., task-relevant knowledge and skills) play an important role in determining outcomes.

Third, sociology scholars have focused on interactions among individuals and their environments, and introduced social capital, defined as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (Nahapiet & Ghoshal, 1998, p. 243). They assume the sum of human capital is not the same as social capital because social capital derives from the relational structures of individuals (Coleman, 1988).

These three views reflect different aspects of human capital. Some strategy researchers have attempted to connect these different perspectives of human capital studies via the concept of resource. A resource-based view (RBV) provides a theoretical framework for understanding human capital as a resource (Barney, 1991; Wernerfelt, 1984). In this view, human capital can be an efficient resource affecting a firm's performance and competitive advantage along with other various resources (Barney, 1991; Coff & Kryscynski, 2011). Penrose (1959) suggested that firms are bundles of resources and that the configurations of these resources ultimately lead to performance. Barney (1986) explained how these resources are often acquired in strategic factor markets, defined as markets "where the resources necessary to implement a strategy are acquired" (p. 1231). Since all resources would be available to all competitors, firm homogeneity would result in perfect factor markets (i.e., markets are well functioning). Because firms possess resources that set them above their competitors, firm heterogeneity exists in imperfect factor markets. In particular, if these resources are valuable, rare,

inimitable, and nonsubstitutable, they could be a driver of firm performance and a competitive advantage (Barney, 1991; Peteraf, 1993; Wernerfelt, 1984). Firms value resources but make commitments to strategies before the values are known. Firms can have both heterogeneous expectations of the strategic value of resources in factor markets and differences in the mobility of resources. Therefore, human capital, which is valuable, rare, inimitable, and nonsubstitutable, can be a strategic resource for firms to increase performance and achieve a competitive advantage.

Taken together, these disciplines have taken interest in human capital based on their own distinct perspectives and assumptions, and their different approaches have led to considerable confusion over different issues, such as levels of focus, measurement, and terminology. To avoid this confusion, recent scholars have sought to integrate human capital research across various disciplines and provide a systematic and holistic view of human capital (Burton-Jones & Spender, 2011; Fulmer & Ployhart, 2014; Molloy & Ployhart, 2012; Nyberg et al., 2014; Nyberg & Wright, 2015; Ployhart & Moliterno, 2011; Ployhart et al., 2014; Wright, Coff, & Moliterno, 2014; Wright & McMahan, 2011). Because the focal concepts of this dissertation are based on recent advancements in human capital research, I focus my review on human capital in terms of HCR.

2.1.2. *Concepts of HCR*

Until recently, there was no agreement on the definition of HCR due to each discipline approaching the topic with their own unique assumptions and levels of focus (e.g., Campbell, Coff, & Kryscynski, 2012; Ployhart et al., 2014). Additionally, some researchers pointed out that HCR as a construct lacked clarity (Molloy & Ployhart, 2012) and that different conceptualizations and operationalizations of HCR had been used in

prior studies (Nyberg et al., 2014). For example, Nyberg and colleagues (2014) argued that disciplines focused on distinct levels for analysis (e.g., individual and firm), employed different theoretical backgrounds (e.g., KSAOs and resources), centered on unique content (e.g., education and skills), and investigated different types of outcomes (e.g., firm performance and value-creating). To build a holistic and integrated view of what HCR is across diverse disciplines, Ployhart and colleagues (2014) distinguished HCR from four other related concepts, such as individual differences, KSAOs, human capital, and strategic HCR. Because this dissertation aims to improve understanding of HCR at the team level, I compare and contrast all five concepts.

Ployhart and colleagues (2014) clarified five HCR-relevant concepts with respect to structure, function, and level: individual differences, KSAOs, human capital, HCR, and strategic HCR. Individual differences are the distinct capabilities an individual possesses, and KSAOs are a part of the individual differences. While individual differences can be stable characteristics (e.g., ability) or malleable characteristics (e.g., attitude), KSAOs focus on intrapsychological characteristics that are relatively static over time—knowledge, skills, abilities, and other characteristics. Knowledge refers to information that is essential to completing a task and a basis for skill development; skills represent the individual's competence and expertise in completing specific tasks; abilities are relatively long-lasting capabilities regarding various job-related tasks; and other characteristics are personality traits that influence performance of diverse tasks (Noe, Hollenbeck, Gerhart, & Wright, 2006; Schmitt & Chan, 1998). KSAOs are generally categorized as generic KSAOs, which are valuable and applicable to a broad range of contexts (e.g., cognitive ability and education), and specific KSAOs, valuable and

applicable to only limited targets (Ackerman & Heggestad, 1997; Jensen, 1998; Ployhart & Moliterno, 2011).

Different from KSAOs, human capital refers to a subset of an individual's KSAOs that are valuable in achieving an economic end. Whereas KSAOs may not achieve such ends, human capital should lead to individual-level economic outcomes. Human capital is mainly classified into generic human capital and specific human capital (Pil & Leana, 2009; Wright & McMahan, 2011). Like generic and specific KSAOs, generic human capital is based on KSAOs that are valuable and relevant to a wide range of firms and industries, such as general mental ability and work experience, whereas specific human capital is based on KSAOs that are valuable and relevant to only focal firms and industries, such as tenure in a focal organization and task-specific skills. Further, previous research has shown human capital is associated with individual outcomes such as performance and turnover (e.g., Wright & Boswell, 2002).

In contrast to KSAOs and human capital, HCR refers to "individual or unit-level capacities based on individual KSAOs that are accessible for unit-relevant purposes" (Ployhart et al., 2014, p. 374). Based on this conceptualization, HCR has two important characteristics. First, HCR is not limited to one level where it exists; that is, HCR can exist across multiple levels. Some previous studies have argued HCR exists only at the unit level, while human capital exists at the individual level. However, as studies on star performers, CEOs, and top management teams have shown, individuals can contribute to unit or organizational performance (e.g., Carpenter, Sanders, & Gregersen, 2001; Hess & Rothaermel, 2011; Rosen, 1981; Sanders & Hambrick, 2007). As such, HCR can also exist at the individual level. Thus, a level-based distinction between human capital and

HCR may not be appropriate. Second, HCR can be accessed for unit-relevant outcomes, while human capital contributes to individual-level economic outcomes. HCR does not comprise all capabilities at the individual and unit levels, but it exists when individual- and unit-level capabilities are used for unit outcomes. Therefore, HCR is unique to a specific unit and contributes to a unit's purpose.

Furthermore, HCR can be classified as HCR and strategic HCR according to the nature of unit-level performance. When considering competitors' performance, a focal unit can perform better than or similarly to competitors. In the case of a unit that generates more economic value as compared to competitors, the unit achieves a competitive advantage (Peteraf & Barney, 2003). In the case that it generates a normal level of performance or performs similarly to competitors, the unit attains comparative parity (Barney & Wright, 1998; Powell, 2003). With respect to this difference in performance, HCR contributes to comparative parity, while strategic HCR contributes to a unit-relevant competitive advantage (i.e., supranormal performance).

In summary, it is important to clarify diverse HCR-relevant concepts to avoid confusion. Individual differences are distinct capabilities a person has; KSAOs are knowledge, skills, abilities, and other characteristics that comprise a set of relatively enduring individual differences; human capital is a subset of individual KSAOs that gives rise to economic outcomes; originating from individual KSAOs, HCR is individual- or unit-level capabilities that lead to unit-level outcomes; and strategic HCR is individual- or unit-level capabilities that generate a unit-relevant competitive advantage. Based on these distinctions of HCR-relevant concepts, I focus on HCR at the team level.

2.1.3. *HCR Dimensions*

A recent systematic review of HCR studies has provided three important dimensions of HCR: type, context, and antecedent (Nyberg et al., 2014). Type reflects what KSAOs were used in the HCR studies (e.g., knowledge and skills/abilities), context represents the settings where HCR was studied (e.g., organizational activity and leadership context), and antecedent indicates factors that determine the nature of HCR (e.g., human resource management and turnover). Because this dissertation develops a new scale for HCR, it is important to note what type of KSAOs previous research used to operationalize HCR. In addition, as this dissertation explores how the level and configuration of KSAOs influence HCR, it is also crucial to note what antecedent is associated with HCR. Thus, of the three dimensions, I focus on type and antecedent.

HCR type represents the specific KSAOs that studies have considered as unit resources (e.g., knowledge-based HCR and ability-based HCR; Ployhart & Moliterno, 2011). A large body of HCR research has focused on particular KSAOs, such as only knowledge or only skills/abilities, as HCR. Some studies have used knowledge to capture HCR, such that HCR is defined with respect to the extent that a unit has the essential information to complete a task and a basis for skill development (e.g., Berman, Down, & Hill, 2002; Carpenter et al., 2001). Others have used skills/abilities, such that HCR is defined with respect to an individual's competence and expertise or relatively stable capabilities to perform tasks. To measure this specific type of HCR, scholars have mainly used tenure, experience, education, training, and skills. Given the focus on particular HCR types, studies may reflect different aspects of HCR, such as only knowledge or only skills/abilities (Nyberg et al., 2014).

HCR antecedent reflects factors that determine the nature of HCR. Previous research has investigated human resource management policies (Bae & Lawler, 2000; Huselid, 1995; Messersmith & Guthrie, 2010; Wright, McCormick, Sherman, & McMahan, 1999), investment in HCR (Galunic & Anderson, 2000), turnover (Glebbeek & Bax, 2004), and strategic decision (Linnehan & De Carolis, 2005) as important antecedents of HCR. Although previous research has argued how these antecedents influence HCR, the causal relationship between antecedents and HCR has often been presumed instead of actually examined. For example, some studies have argued human resource management policies and practices (e.g., training and reward system) influence performance in any given unit by developing the unit's own HCR, but they tested only the relationship between human resource management policies and practices and performance. This implies it is necessary to measure HCR more comprehensively and examine its association with antecedents, as well as how HCR directly influences performance in any given unit.

2.1.4. *Emergence of HCR*

HCR originates in the KSAOs of individuals but is developed through complex task-related and social interactions in units (Ployhart & Moliterno, 2011). Alchian and Demsetz (1972) argued that a team's overall production is not the same as the aggregate output of its individual resources. Since each unit experiences its own task-related and social interactions, unit processes can influence how individuals' KSAOs change into HCR, leading to unique, inimitable HCR. Ployhart and Moliterno (2011) used a multilevel perspective to explicate how individual KSAOs can be amplified and transformed into HCR through the emergence enabling process, which is suggested by

Kozlowski and Klein (2000) and Kozlowski and Ilgen (2006). The emergence enabling process is determined by both task-related and social aspects: the complexity of the task environment and three emergence enabling states (i.e., behavioral processes, cognitive mechanisms, and affective psychological states).

The complexity of the task environment is the extent to which unit tasks demand interactions among members. It is important to consider a task-related aspect because the nature and structure of tasks determine interdependence and interaction patterns among members (Bell & Kozlowski, 2002; Marks, Mathieu, & Zaccaro, 2001; McGrath, 1984; Steiner, 1972; Thompson, 1967; Van De Ven, Delbecq, & Koenig, 1976). Specifically, temporal pacing, dynamism of the task environment, strength of member linkages, and workflow structure can influence the complexity of the task environment. The task environment influences HCR development through its effect on the emergence enabling states.

As the social aspect that contributes to the process, the emergence enabling states contain a unit's behavioral processes, cognitive mechanisms, and affective psychological states (Kozlowski & Ilgen, 2006; Ployhart & Moliterno, 2011). Comprising how unit members behave, perceive, and feel, these three states build the social environment in the unit, which affects interdependence and interaction patterns among members. Behavioral processes indicate actual behaviors through which members respond to task environment complexity, such as communication, coordination, and regulation. Cognitive mechanisms represent members' shared perceptions or knowledge to meet the requirements of task complexity, such as unit climate, memory, and learning. Affective psychological states reflect members' affective bonds as a group (e.g., cohesion, trust, and affect) that form to

satisfy the demands of task complexity. HCR is more likely to emerge when tasks are complex and a unit manifests appropriate behavioral, cognitive, and affective states.

In sum, through this emergence enabling process, individual KSAOs can become a new and unique set of HCR, thus making it difficult to imitate and transfer. HCR can be differentiated from the average individual human capital because HCR is amplified and transformed from individual KSAOs through the emergence enabling processes. Therefore, even though a competing team has individuals with the same human capital as the focal team, it could be difficult to imitate the focal team's performance or competitive advantage that arises from the emergence enabling process. Based on the significant roles of task-related and social interactions in the emergence enabling process, it is critical to consider interaction patterns among team members to better understand HCR. Thus, I consider the impact of team processes to examine how HCR works in teams.

2.2. FAULTLINES

2.2.1. *History of Faultlines Research*

Faultlines research is a branch of the broader diversity literature. Over the past thirty years, many team composition scholars have investigated diversity—the extent that an individual is similar or dissimilar to other team members based on relevant attributes (Tsui, Egan, & O'Reilly, 1992; Tsui & O'Reilly, 1989). Diversity has been linked to various team processes (e.g., relationship conflict; Shemla, Meyer, Greer, & Jehn, 2014; Tekleab & Quigley, 2014) and outcomes (e.g., performance; Bell, Villado, Lukasik, Belau, & Briggs, 2011; Horwitz & Horwitz, 2007; Joshi & Roh, 2009). Although diversity research has shown significant relationships between diversity and team processes and outcomes, empirical evidence has suggested there is no clear consensus on

how diversity influences team processes and outcomes (van Knippenberg, De Dreu, & Homan, 2004; Williams & O'Reilly, 1998). While some studies have shown that diversity negatively influences teams (e.g., Leonard, Levine, & Joshi, 2004), others have found diversity to have a positive effect (e.g., Van der Vegt, Van de Vliert, & Huang, 2005).

For a better understanding of team composition, Lau and Murnighan (1998) introduced *faultlines* as a new concept in team composition. Faultlines refer to dividing lines that can potentially split a team into subgroups based on multiple attributes of team members (adapted from Lau & Murnighan, 1998). Research has shown that faultlines provide additional explanations beyond the diversity approach in predicting team processes and outcomes (e.g., Lau & Murnighan, 2005; Thatcher & Patel, 2012). While diversity researchers focus on the degree of distribution in a team and assume that attributes are independent, faultlines researchers emphasize the importance of the alignment of multiple attributes. Therefore, at a minimum or maximum level of diversity, faultlines are absent or weak; they are strong at a moderate level of diversity in a team.

Considering these differences between diversity and faultlines, this dissertation relies on faultlines to enhance understanding of HCR. Recent research on human capital has argued that an individual's KSAOs can be interdependent with other members' KSAOs within a context, and there are a variety of ways to combine and maximize KSAOs for building HCR within a context (Ployhart et al., 2014). Because this dissertation focuses on a team's KSAOs, it is important to capture their interdependence. Thus, the alignment of KSAOs within a context may be more appropriate to explain the development of HCR than the extent that KSAOs are distributed within a context.

2.2.2. *Concepts of Faultlines*

Prior research has mainly focused on *fautline strength* to examine the role of faultlines in teams. Faultline strength refers to the extent that team members' attributes are aligned (Thatcher, Jehn, & Zanutto, 2003) and is determined by the number of attributes and their alignment (Lau & Murnighan, 1998). A strong faultline occurs when all attributes of team members are clearly aligned into two or more subgroups. For instance, if a team consists of two 20-year-old American males and two 30-year-old Canadian females, it has an extremely strong faultline based on age, nationality, and gender. A weak faultline occurs when team members' attributes are not clearly aligned. For example, if a team consists of one 20-year-old American male, one 20-year-old Canadian female, one 30-year-old Canadian male, and one 30-year-old American female, the team has a weak faultline based on age, nationality, and gender. No faultline occurs when all relevant attributes are not aligned within a team (e.g., all homogeneous or heterogeneous attributes). For example, if a team consists of all 20-year-old American males, it has no faultline based on age, nationality, and gender.

As mentioned above, faultlines are dividing lines that split a team into subgroups based on two or more attributes. These dividing lines are usually called *dormant* (or *potential*) faultlines, which refer to objective alignments of individual attributes (Lau & Murnighan, 1998). Along with dormant faultlines, some faultlines researchers have acknowledged the importance of *activated* (or *perceived*) faultlines (e.g., Antino, Rico, & Thatcher, in press), defined as the perception of subgroups by team members based on alignments of individual attributes (Jehn & Bezrukova, 2010; Pearsall, Ellis, & Evans, 2008). Strong activated faultlines are characterized by members' perceptions of high

similarity within subgroups and low similarity between subgroups. It is important to note that activated faultlines are more influential in team processes and outcomes than dormant faultlines (e.g., Jehn & Bezrukova, 2010; Pearsall et al., 2008).

Dormant faultlines are activated when team tasks or contexts make social categorizations salient (Jehn & Bezrukova, 2010; Lau & Murnighan, 1998; Pearsall et al., 2008). Some studies have shown that diverse external factors, such as informal networks (Ren, Gray, & Harrison, 2015) and organizational crises (Meyer, Shemla, Li, & Wegge, 2015), play a key role in triggering faultlines. One study suggested five key categories of faultline triggers that include differential treatment, different values, assimilation, insult or humiliating action, and simple contact (Chrobot-Mason, Ruderman, Weber, & Ernst, 2009). Furthermore, prior research on categorization salience has argued the salience of social categorization depends on three features: cognitive accessibility, normative fit, and comparative fit (e.g., Oakes, Haslam, & Turner, 1994; van Knippenberg et al., 2004). Cognitive accessibility is defined as how readily team members recognize a social categorization, normative fit refers to the degree of meaningfulness of the categorization to team members, and comparative fit is defined as the extent to which the categorization indicates the similarities and differences among members. These three features of categorization salience are the basis for subgroup formation (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987).

Further, researchers have determined types of faultlines depending on different sets of attributes. Traditionally, the majority of previous research has paid attention to faultlines based on demographic attributes, like age, gender, and race (Chung et al., 2015; Lau & Murnighan, 2005; Schölmerich, Schermuly, & Deller, 2016, 2017). Recent studies

have further explored other types of faultlines based on various individual attributes, like goal differences, language proficiency, functional background, educational background, and personality trait (e.g., Bezrukova, Thatcher, Jehn, & Spell, 2012; Carton & Cummings, 2012, 2013; Ellis, Mai, & Christian, 2013; Hinds, Neeley, & Cramton, 2014; Kulkarni, 2015; Molleman, 2005).

Based on these attributes, faultline types are largely classified into *demographic* faultlines (or *social* faultlines) and *informational* faultlines (or *task-relevant* faultlines). Whereas demographic faultlines focus on alignments based on demographic characteristics (e.g., age and gender; Chung et al., 2015), informational faultlines focus on alignments based on task-relevant characteristics (e.g., work and education experiences; Cooper, Patel, & Thatcher, 2014). In response to the breadth of possible faultline types, Carton and Cummings (2012) proposed three types of faultlines to organize the literature: separation-based faultlines are formed on the basis of value-related attributes of team members, such as cultural values; disparity-based faultlines are based on resource-related attributes of team members, such as power and status; and variety-based faultlines are formed on the basis of team members' knowledge-related attributes, such as functional backgrounds.

Building on these different types of faultlines, I introduce a new construct of KSAO-based faultlines that refers to dividing lines that split a team's set of KSAOs into subsets based on the KSAOs of team members. By definition, these KSAO-based faultlines are similar to informational or variety-based faultlines in terms of the attributes that team members have. However, while informational and variety-based faultlines can be based on a wide range of task-, job-, and knowledge-based attributes, KSAO-based

faultlines are limited to the attributes of knowledge, skills, abilities, and other characteristics.

2.2.3. *Faultlines in Teams*

Diverse theories support how faultlines influence in teams. The main theories underlying faultlines are the social identity, self-categorization, similarity-attraction paradigm, categorization-elaboration model, optimal distinctiveness theory, cross-categorization models, and distance theories. The social identity theory (Bartel, 2001; Brewer, 2001), self-categorization theory (Turner, 1985; Turner et al., 1987), and similarity-attraction paradigm (Byrne, 1971) explain that individuals classify themselves and others into in/out-groups based on similar attributes and are more attracted to those who are similar to themselves. Based on these three theories, faultlines are created when the categorization of attributes splits a team into multiple subgroups and determines subgroup identification and attraction (Lau & Murnighan, 1998). In doing so, the members of a team with strong faultlines tend to identify with their subgroup rather than with the overall team (Lau & Murnighan, 2005). Given that the similarity of any number of attributes may increase attraction to members of their own subgroup, team members are less open to out-subgroup members and are also less likely to share information with out-subgroup members.

Moreover, the categorization-elaboration model (CEM; van Knippenberg et al., 2004) and optimal distinctiveness theory (ODT; Brewer, 1991; Brewer, Manzi, & Shaw, 1993; Hornsey & Hogg, 1999; Pickett & Brewer, 2001) explain how faultlines impact team processes and outcomes, with an emphasis on dynamics both within a subgroup and between subgroups. While CEM emphasizes the salience of individual attributes, ODT

suggests individuals seek to balance their need for uniqueness and need for similarity to others.

Lastly, cross-categorization models and distance theories discuss how faultlines exert an influence on teams through inter-subgroup dynamics. Cross-categorization models explain how attribute similarity across subgroups influences team processes and outcomes (Sawyer, Houlette, & Yeagley, 2006). On the other hand, distance theories (Hraba, Hagendoorn, & Hagendoorn, 1989; Jetten, Spears, & Postmes, 2004; Leong & Ward, 2000) explain how differences between subgroups intensify faultline strength.

Based on these various theories, there is a large body of studies on the important role of faultlines in teams. Researchers have explored the effect of faultlines on team processes, emergent states, outcomes, and performance. First, scholars have examined how faultline strength affects important team processes, such as team cohesion and conflict. This research has shown that strong faultlines decrease team cohesion (Molleman, 2005; Schölmerich et al., 2016) and increase intragroup conflict (Chiu & Staples, 2013; Jehn & Bezrukova, 2010; Molleman, 2005). More specifically, researchers have investigated the impact of faultlines on three types of team conflict: relationship, task, and process conflict (Jehn, 1995, 1997). Most studies have shown that strong faultlines increase relationship, task, and process conflicts (Bezrukova, Thatcher, & Jehn, 2007; Crucke & Knockaert, 2016; Li & Hambrick, 2005; Pearsall et al., 2008; Polzer, Crisp, Jarvenpaa, & Kim, 2006; Thatcher et al., 2003; Zanutto, Bezrukova, & Jehn, 2011). However, Choi and Sy (2010) revealed that, while strong gender-age, age-race, and tenure-age faultlines increase relationship conflict, strong tenure-race faultlines decrease relationship conflict. Strong faultlines have also been found to decrease

relationship conflict (Lau & Murnighan, 2005). In a conceptual study about faultlines in new venture teams, Lim, Busentiz, and Chidambaram (2013) proposed that strong faultlines between the founder and investors increase relationship conflict, but decrease task conflict.

Second, scholars have investigated the relationship between faultline strength and team emergent states, such as respect, trust, and liking (Cronin, Bezrukova, Weingart, & Tinsley, 2011; Oliveira & Scherbaum, 2015); climate perceptions of group members (Beus, Jarrett, Bergman, & Payne, 2012); and team transactive memory (Dau, 2016; Rupert, Blomme, Dragt, & Jehn, 2016). They found strong faultlines decrease respect, trust, and liking among team members (Cronin et al., 2011) and give rise to differences in climate perceptions of group members (Beus et al., 2012). Additionally, Rupert and colleagues (2016) found that strong faultlines increase team transactive memory when faultline distance is small.

Third, researchers have explored how faultline strength affects team outcomes, such as attitudes (e.g., satisfaction) and behaviors (e.g., team learning and decision process quality). Studies on the relationship between faultline strength and team attitudes have shown that strong faultlines decrease group satisfaction (Cronin et al., 2011; Jehn & Bezrukova, 2010; Rico, Molleman, Sánchez-Manzanares, & Van der Vegt, 2007; Zanutto et al., 2011), although they increase subgroup satisfaction (Bezrukova, Spell, & Perry, 2010; Lau & Murnighan, 2005). Moreover, the existing literature has provided knowledge about the negative impact of strong faultlines on behaviors involving social interactions among team members (Jiang, Jackson, Shaw, & Chung, 2012), team learning (Gibson & Vermeulen, 2003; Jehn & Rupert, 2008; Lau & Murnighan, 2005),

information elaboration (Meyer, Shemla, & Schermuly, 2011), task-relevant information sharing (Jiang et al., 2012), decision process quality (Chiu & Staples, 2013), organizational citizenship behaviors (Choi & Sy, 2010), managerial employees' loyal behavior (Chung et al., 2015), and decision quality (Rico et al., 2007). One study also proposed faultline strength is negatively associated with knowledge exchange (Lim et al., 2013). However, some studies have demonstrated strong faultlines have a positive effect on cooperation within subgroups (Bezrukova et al., 2010; Phillips, Mannix, & Neale, 2004).

Fourth, many studies have found strong faultlines have negative effects on team performance (Bezrukova, Spell, Caldwell, & Burger, 2016; Homan, Hollenbeck, Humphrey, Van Knippenberg, Ilgen, & Van Kleef, 2008; Jehn & Bezrukova, 2010; Jiang et al., 2012; Li & Hambrick, 2005; Meyer & Schermuly, 2012; Thatcher et al., 2003; Zanutto et al., 2011), board performance (Veltrop, Hermes, Postma, & de Haan, 2015), board service performance (Crucke & Knockaert, 2016), bonuses and stocks (Bezrukova et al., 2007; Bezrukova et al., 2012), and decision-making (Spoelma & Ellis, 2017). Moreover, Ellis and colleagues (2013) showed that teams with goal faultlines (i.e., half the members have specific, difficult goals and half have do-your-best goals) perform poorer in their routine task than teams with specific, difficult goals or teams with do-your-best-goals.

In addition to the findings of the negative impact of strong faultlines, there is evidence of other types of relationships between faultline strength and team performance. Ellis and colleagues (2013) found positive impacts of goal faultlines on creative task performance. Chen and colleagues (2017) found a curvilinear relationship between

faultlines and team performance. They showed that teams with moderate faultlines perform better than teams with strong or weak faultlines.

Overall, the theoretical background and empirical evidence of faultlines imply that faultlines create social interaction patterns among team members by splitting a team into subgroups, leading to negative outcomes. Instead of focusing on team and subgroup, in this dissertation, I argue that a team's KSAOs can be divided into two or more subsets based on the KSAOs of team members. The alignment of KSAOs leads to the possibility of accessing and understanding other members' KSAOs. Thus, moving away from social interactions as a main mechanism of faultline effects, I integrate the concept of faultlines into the human capital literature to further develop knowledge about HCR in Chapter 4.

CHAPTER 3

TOWARDS A UNIFIED CONSTRUCT OF HCR: SCALE DEVELOPMENT AND VALIDATION OF HCR

3.1. CONCEPTUAL DESCRIPTION OF HCR

Human capital research is cross-disciplinary. Diverse disciplines have used different languages and focused on different aspects to investigate human capital, increasing the level of complexity of HCR as a construct. For example, economics and psychology scholars regard human capital as an individual-level phenomenon (e.g., Becker, 1964; Schmitt, 2014; Schultz, 1961), whereas strategy scholars regard it as a firm-level resource that influences a competitive advantage and firm performance (e.g., Hatch & Dyer, 2004). This lack of consensus may cause confusion about terminology and interpretation of results, calling for a holistic and systematic understanding of what HCR is across various disciplines.

Acknowledging this issue, some researchers clarify the HCR construct by distinguishing it from several HCR-relevant concepts, such as individual differences, KSAOs, human capital, and strategic HCR (Ployhart et al., 2014). Among these relevant concepts, it is important to distinguish between human capital and HCR. Ployhart and colleagues (2014) defined human capital as “an individual’s KSAOs that are relevant for achieving economic outcomes” (p. 376). Human capital is, by definition, the KSAOs possessed by a person that influence individual-level outcomes. Differentiating from

human capital, the authors defined HCR as “individual or unit-level capacities based on individual KSAOs that are accessible for unit-relevant purposes” (p. 374). HCR includes individual KSAOs, the average of these KSAOs, as well as resources that form from units to affect unit-level outcomes.

Recent works further explicate the formation process and characteristics of HCR. Drawing on a multilevel perspective, Ployhart and Moliterno (2011) considered unit dynamics to suggest a collective construct of HCR based on the combination and utilization of individual KSAOs. They explained that individual KSAOs can be amplified and transformed into a collective unit-level HCR in the presence of emergence enabling processes. Moreover, Ployhart and colleagues (2014) emphasized the importance of *HCR combinations*, which are ways individuals’ KSAOs act interdependently at the same level or at different levels to achieve outcomes. Given that individuals have unique KSAOs, their interactions and coordination both within and between individuals can produce various types of HCR. For example, even if teams have the same individual KSAOs, their HCR can be different based on how team members’ KSAOs are combined in additive and/or multiplicative ways. That is, HCR includes unique team features produced through members’ interactions rather than solely the mean level of individual human capital. When considering the definition of HCR and its emergence, HCR may consist of three unique features: (1) collective team-level capabilities based on individual KSAOs, (2) relevance to team-level outcomes, and (3) amplification or transformation of individual KSAOs through emergence enabling processes.

3.2. HCR MEASUREMENT

Some researchers have pinpointed the issue of construct validation in HCR research, related to HCR measurement (e.g., Nyberg et al., 2014). Current research has operationalized HCR in various ways, ranging from aggregate measures of individual KSAOs (e.g., experience) to survey items of individual human capital. First, some scholars have used proxies for individual KSAOs, such as tenure, experience, and education, to measure HCR (e.g., Berman et al., 2002; Carpenter et al., 2001; Hitt, Bierman, Uhlenbruck, & Shimizu, 2006; Pennings, Lee, & Van Witteloostuijn, 1998). Given that HCR consists of multiple components, such as knowledge, skill, and ability (Ployhart et al., 2014), these studies measured limited aspects of HCR by using particular proxies of specific KSAOs. For example, to reflect the knowledge aspect of HCR, Berman and colleagues (2002) used shared knowledge among members and Carpenter and colleagues (2001) used the international assignment experience of CEOs. Each proxy reflected a different component of HCR, implying the studies may have captured fundamentally distinct aspects of HCR that were dependent on the proxies used. Although multiple proxies have been examined in the literature, reflecting more aspects of HCR, it is still unclear how the different aspects of HCR are combined (e.g., an additive or multiplicative way). Thus, it is important to develop a comprehensive scale that includes multiple aspects of HCR and represents the conceptualization of HCR as a complex combination of multiple aspects within teams.

Second, other studies on HCR have used survey items to determine aggregate scores for human capital that represent employees' overall knowledge, skill, and expertise (e.g., "Our employees are highly skilled" and "Our employees are widely

considered the best in our industry"; Subramaniam & Youndt, 2005). While human capital exists within individuals, as a team-level construct, HCR exists in teams through the interaction of individuals' KSAOs (Ployhart & Moliterno, 2011). Thus, although an aggregation of current survey items can reflect the presence of human capital at the team level, these items may not consider how the distinct KSAOs of one individual are related to the distinct KSAOs of others. In other words, these survey items may not show the process by which individual KSAOs are amplified and transformed into collective HCR.

In summary, previous research shows HCR has been measured in diverse ways, with proxies for KSAOs and survey items for individual human capital. The diverse measures may result in different explanations of HCR and a range of understandings about the relationship between HCR and outcomes (Nyberg et al., 2014). Specifically, particular proxies for individual KSAOs may reflect only a part of HCR, and the average levels of individual human capital measured through survey items may not contain the unique features of teams. The KSAOs that cause individual-level outcomes may not be the same KSAOs that are relevant for team-level outcomes, or at least they do not operate the same way. These different measures can produce different results concerning HCR's influence on outcomes. Therefore, it is necessary to develop a collective comprehensive HCR scale that captures multiple aspects of HCR as well as the extent to which the multiple aspects are integrated within teams.

To develop a new HCR scale, I use a subjective measure rather than an objective one because the current measures using objective proxies for HCR may not reflect which proxies are valuable and relevant to team outcomes and may not detect complex team dynamics regarding the amplification and transformation of members' KSAOs into a

collective HCR. As members are in a position to evaluate specific KSAOs that are relevant to team outcomes and complex team interactions, a subjective measure (i.e., perception) of members' experiences may be a better way to capture HCR.

3.3. SCALE DEVELOPMENT AND VALIDATION OF HCR

Based on the necessity of a comprehensive team-level HCR scale, I develop and validate an instrument that reflects team-level HCR following the multistep process recommended by DeVellis (1991) and Spector (1992). The procedure includes defining a construct, designing an initial scale, conducting item analysis, and validating the scale.

3.3.1. *Definition of HCR*

An HCR scale should reflect a precise definition of the construct. As noted earlier, HCR is defined as "individual or unit-level capacities based on individual KSAOs that are accessible for unit-relevant purposes" (Ployhart et al., 2014, p. 374). I use this definition of HCR in this dissertation. As a similar construct, human capital refers to "an individual's KSAOs that are relevant for achieving economic outcomes" (Ployhart et al., 2014, p. 376). Both are based on individual KSAOs, but only HCR is a collective construct to be associated with collective consequences. Given the conceptual description of HCR, the distinction between human capital and HCR, and the HCR emergence processes, I suggest that HCR consists of three unique features: (1) collective team-level capabilities based on individual KSAOs, (2) relevance to team-level outcomes, and (3) amplification or transformation of individual KSAOs through emergence processes.

As most studies use an aggregate score for individual human capital, the first feature (i.e., collective team-level capabilities) has been measured often. In addition, although previous studies have not directly measured the second feature (i.e., relevance to

team-level outcomes), some studies have examined the effect of human capital on collective outcomes. Existing research, however, has largely missed the third feature of HCR (i.e., amplification or transformation of individual KSAOs through emergence processes). Thus, I develop and validate a new comprehensive scale of HCR that includes all three of the unique features of HCR.

3.3.2. *Design of Initial Scale*

Considering the theoretical description of HCR and the previous human capital scale, I generated a new initial scale with three subscales corresponding with the three key features of HCR: (a) *HCR level*, representing collective team-level capabilities, (b) *HCR outcome*, representing relevance to team-level outcomes, and (c) *HCR emergence*, representing amplification or transformation of individual KSAOs through emergence processes.

Aggregation of the previous human capital scale (Subramaniam & Youndt, 2005) reflects HCR level, so I further created items for HCR outcome and HCR emergence. Six candidate items for HCR outcome (i.e., relevance to team-level outcomes) are “We possess the knowledge, skills, and abilities to complete our task,” “The resources that we have are valuable to help us accomplish our task,” “We are well-suited to succeed in our task,” “We often waste time by using knowledge, skills, and abilities that are unrelated to our task,” “We have valuable resources that contribute to our task,” and “Our knowledge, skills, and abilities are helpful for completing our task.”

In addition, nine candidate items for HCR emergence (i.e., amplification or transformation of individual KSAOs through emergence processes) are “Our members’ knowledge and skills create synergy,” “We make excellent use of members’ expertise in

our particular areas," "Our members' skills are complementary," "We amplify team members' abilities," "We maximize team members' knowledge," "We leverage members' knowledge, skills, and abilities," "We are able to magnify team members' information and expertise," "We maximize team members' available resources," and "We are able to accomplish tasks that we would not be able to accomplish as individuals."

I presented the candidate items to five academic colleagues with substantial experience in human capital research and asked them to assess each statement's clarity, reasonableness, and relevance to the construct of HCR. When measuring HCR, all items were assessed on a 7-point Likert-type scale (1 = "strongly disagree"; 7 = "strongly agree").

3.3.3. *Sample and Procedure*

Data for the scale development analysis was collected from 97 undergraduate students in 24 teams at a public university in the United States. The sample consisted of 64 males (66%) and 33 females (34%), the majority of students were in their twenties (M = 21.91 and SD = 1.35), and they were Caucasian (78.4%), Asian (14.4%), and African American (6.2%). The students were randomly assigned to 24 teams and worked on a team task. Performing the team task and completing the survey were voluntary and compensated with extra credit.

Student participants were asked to perform a team activity: a winter survival exercise developed by Johnson and Johnson (2003). They were instructed to provide a list of fifteen items ranked according to importance to twenty passengers who had survived an airplane crash. After they performed the team activity, they were asked to complete a

questionnaire measuring HCR (for item analysis; convergent, discriminant, and criterion-related validity), human capital (for convergent validity), TMS (for discriminant validity), team learning behavior (for discriminant validity), and team performance (for criterion-related validity). The information obtained from participants was kept completely confidential because this dissertation is not concerned with the individual responses of participants but with aggregate data only.

3.3.4. *Item Analysis*

Once candidate items were generated for the new scale, the internal consistency of the items was tested using both individual-level and team-level data. I calculated the item-total correlations and Cronbach's alpha (Cronbach, 1951) to examine whether the scale had appropriate reliability as a multiple item scale (DeVellis, 1991; Spector, 1992). The item-total correlations for all items were above .33, except one item. This item was "We often waste time by using knowledge, skills, and abilities that are unrelated to our task," and its item-total correlation was -.13. For each subscale, the item-total correlations for all items of HCR level, HCR outcome, and HCR emergence were above .51, .41 (except one item that showed a negative item-total correlation), and .54, respectively. Again, the exception was "We often waste time by using knowledge, skills, and abilities that are unrelated to our task," and the item-total correlation was -.41. These results indicated that the candidate items, excluding the aforementioned item, and their subscales were internally related at the individual level (Nurosis, 1994). As studies on scale development have often found a statistically significant percentage of error in reverse worded items (Lewis, 2003), I decided to delete this reverse worded item in the new HCR scale.

In the individual-level data, the Cronbach's alpha for all items was .89, and .76, .79, and .87, respectively, for each subscale of HCR level, HCR outcome, and HCR emergence. Moreover, in the team-level data, the Cronbach's alpha for all items was .90, and .72, .85, and .91, respectively, for each subscale of HCR level, HCR outcome, and HCR emergence. These scores indicated the new multiple-item scale was reliable in the individual- and team-level data.

3.3.5. *Dimensionality: Confirmatory Factor Analysis*

As this new scale was developed to include three different dimensions of HCR, I conducted a second-order confirmatory factor analysis (CFA) using Mplus 7.4 (Muthén & Muthén, 2010) to confirm whether the scale showed a good fit to the data. The hypothesized model contained a second-order factor of HCR, indicated by three first-order factors of HCR level, HCR outcome, and HCR emergence. Each of these first-order factors were indicated by five items, five items, and nine items, respectively. I checked the overall fit of the models using chi-square tests, comparative fit (CFI), the root-mean-square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Based on the suggestions of Browne and Cudeck (1993) and Hu and Bentler (1999), a reasonably good fit level for CFI is .90 or above, and acceptable cutoffs for RMSEA and SRMR are .08 or less.

Overall, the three-factor model did not have a good fit to the data ($\chi^2 = 257.08$, $df = 149$, CFI = .85, RMSEA = .09, SRMR = .08). Although SRMR showed a good fit, CFI and RMSEA suggested a slightly poor fit (Browne & Cudeck, 1993; Hu & Bentler, 1999). Thus, I and one expert in human capital thoroughly reviewed all candidate items again and found that some items of HCR emergence did not clearly describe the

emergence processes of KSAOs. Considering the CFA results and the conceptual judgements, I decided to include only four of the nine candidate items of HCR emergence. The included items directly used the words *knowledge*, *skill*, *ability*, as well as *amplify*, *maximize*, *leverage*, and *magnify* to more clearly describe the emergence of KSAOs. The four items are "We amplify team members' abilities," "We maximize team members' knowledge," "We leverage members' knowledge, skills, and abilities," and "We are able to magnify team members' information and expertise."

Using these four items of HCR emergence, as well as the original ten items of HCR level and HCR outcome, I performed another series of CFAs to check whether a scale with three first-order factors was a good fit and better than the alternative models (i.e., two-factor and one-factor models). To do so, I specified five different models: a three-factor model (i.e., hypothesized model) that included three first-order factors of HCR level, HCR outcome, and HCR emergence; three two-factor models that combined two of the first-order factors as one factor, and a one-factor model that combined three first-order factors as one factor.

As indicated in Table 3.1, for the individual level, the fit statistics presented a good fit between the three-factor model and the data (χ^2 = 117.60, *df* = 74, CFI = .90, RMSEA = .08, SRMR = .07). Moreover, this three-factor model had a better fit than the alternative models such as the two-factor and one-factor models. For example, the three two-factor models were not estimable (no convergence) and the one-factor had a poor fit to the data (χ^2 = 241.89, *df* = 77, CFI = .64, RMSEA = .15, SRMR = .11). The chi-square difference tests also confirmed that the three-factor model statistically significantly improved the model fit as compared to the alternatives.

Table 3.1 Fit Indices of Confirmatory Factor Analysis for Dimensionality

Model	Individuals							Teams						
	χ^2	*df*	CFI	RMSEA	SRMR	$\Delta\chi^2$	Δdf	χ^2	*df*	CFI	RMSEA	SRMR	$\Delta\chi^2$	Δdf
	N = 97							N = 24						
Three-factor Model	117.60	74	.90	.08	.07			118.21	74	.76	.16	.14		
One-factor Model	241.89	77	.64	.15	.11	124.29	3	180.28	77	.45	.24	.16	62.07	3
Two-factor Model (level + outcome)	Not Estimable (No Convergence)							Not Estimable (No Convergence)						
Two-factor Model (level + emergence)	Not Estimable (No Convergence)							Not Estimable (No Convergence)						
Two-factor Model (outcome + emergence)	Not Estimable (No Convergence)							Not Estimable (No Convergence)						

Furthermore, for the team level, the CFA results showed that, overall, the three-factor model did not have a good fit to the data (χ^2 = 118.21, *df* = 74, CFI = .76, RMSEA = .16, SRMR = .14). However, the model fit indices were sensitive to diverse factors, such as sample size, number of indicators, degrees of freedom, and model complexity (e.g., Cook, Kallen, & Amtmann, 2009; Sharma, Mukherjee, Kumar, & Dillon, 2005). It is plausible this model was not an excellent fit to the data because the team-level sample size was small (*N* = 24; Cheung & Rensvold 2002; Sharma et al., 2005). In the model comparisons, the three-factor model had a better fit compared to the two-factor and one-factor models. The chi-square test showed the three-factor model resulted in a significant improvement in the fit of the model to the data. Therefore, considering all fit indices in both the individual- and team-level data, the evidence supports the scale with three factors as conceptually and methodologically reasonable, so I use this three-factor model of HCR in the validity tests.

3.3.6. *Validation of the Scale*

As a final step, the candidate scale was tested with respect to three types of validity: convergent validity, discriminant validity, and criterion-related validity (DeVellis, 1991; Nunnally & Bernstein, 1994; Spector, 1992).

Convergent validity. Convergent validity (whether the focal scale measures the intended construct) is evaluated with a comparison between the new scale and an established scale that measures the same or similar construct. I used the human capital scale (Subramaniam & Youndt, 2005), which existing studies have often used, as a comparison measure of the new scale. Sample items of human capital are “We develop new ideas and knowledge” and “We are creative and bright.” All items were measured

using a 7-point Likert-type scale (1 = “strongly disagree”; 7 = “strongly agree”). Because this human capital scale is relevant to only the HCR level subscale that I developed, I then compared the established measure (i.e., HCR level) with the two other subscales (i.e., HCR outcome and HCR emergence). The results showed the correlation between HCR level and HCR outcome was .44, and the correlation between HCR level and HCR emergence was .44. Based on Schwab’s (1980) guideline, the positive correlations between the two subscales indicate the new scale describes HCR well, supporting the convergent validity of the new HCR scale (Campbell & Fiske, 1959).

Discriminant validity. Discriminant validity (whether the focal scale differs from the scales of different constructs) is assessed by conducting CFAs of the new HCR scale and two other collective constructs: TMS and team learning behavior. TMS refers to a cognitive system shared between individual team members and used for encoding, storing, and retrieving knowledge (Hollingshead, 2001; Lewis & Herndon, 2011). Team learning behavior is defined as collective participation of all team members in decision-making and reflection (Edmondson, 1999). Although TMS and team learning behavior are also team-level collective constructs, they are conceptually different from HCR. Sample items of TMS are “Each team member has specialized knowledge of some aspect of our tasks” and “I know which team members have expertise in specific areas.” Sample items of team learning behavior are “In this team, someone always makes sure that we stop to reflect on the team’s work process” and “We regularly take time to figure out ways to improve our team’s work process.” All items were measured using a 7-point Likert-type scale (1 = “strongly disagree”; 7 = “strongly agree”). The Cronbach’s alphas for TMS and team learning behavior were .72 and .82, respectively.

I used two models for comparison with each construct using two-factor (hypothesized model) and one-factor models. The two-factor model included two distinct factors of HCR and TMS/team learning behavior. The one-factor model combined two distinct factors into one factor. As shown in Table 3.2, the results of CFA showed the two-factor model did not have a good fit to the data (TMS: χ^2 = 639.89, *df* =370, CFI = .74, RMSEA = .09, SRMR = .11; team learning behavior: χ^2 = 290.86, *df* = 185, CFI = .86, RMSEA =.08, SRMR = .08). However, considering the sample size and the number of degrees of freedom, it is reasonable the model fit was not ideal (Cheung & Rensvold 2002; Sharma et al., 2005). Further, the fit of the two-factor model improved relative to the one-factor model of both TMS (χ^2 = 876.82, *df* = 374, CFI = .52, RMSEA = .12, SRMR = .13) and team learning behavior (χ^2 = 446.47, *df* = 186, CFI = .66, RMSEA = .12, SRMR = .12). These results indicate the items of the HCR scale were distinct from the items of the TMS and team learning behavior scales (i.e., HCR items and TMS/team learning behavior items load on their own factor). This supports the discriminant validity of the new HCR scale (DeVellis, 1991).

Criterion-related validity. Criterion-related validity (whether the focal scale correlates with its theoretical antecedents and consequences) is based on a hypothesized relationship between HCR and its outcomes. HCR through team dynamics can be valuable, rare, and inimitable, so that HCR can increase team performance. Extant human capital research also largely supports a positive association between human capital and performance (e.g., Crook et al., 2011). Therefore, I expect the new HCR scale will enhance team performance.

Team performance was measured with four items adapted from Jehn and Bezrukova (2010), such as “My team, as a whole, performs well on this task” and “We are a high-performing team.” All items were measured using a 7-point Likert-type scale (1 = “strongly disagree”; 7 = “strongly agree”). The results showed the correlation between HCR (i.e., a candidate scale) and team performance (i.e., criterion variable) was .49 ($p < .01$). This positive correlation between HCR and team performance is consistent with expectations, confirming the criterion-related validity of the new HCR scale. Table 3.3 presents the means, standard deviations, Cronbach’s alpha, and correlations for variables used in scale development and validation.

3.4. CONCLUSION

In this chapter, I developed and validated a new comprehensive HCR scale. To do so, I identified an HCR scale with the three subscales of HCR level, outcome, and emergence that reflect the three unique features of HCR (i.e., collective team-level KSAOs, relevance to team-level outcomes, and amplification or transformation of individual KSAOs through emergence processes). The results of the reliability and validity tests showed the 14-item scale that includes three dimensions (i.e., HCR level, HCR outcome, and HCR emergence) is internally consistent, reliable, and valid. Given these results, I use this scale to test the relationship between a team’s KSAOs, HCR, team processes, and team performance in Chapter 4.

Table 3.2 Fit Indices of Confirmatory Factor Analysis for Discriminant Validity

Model	χ^2	*df*	CFI	RMSEA	SRMR	$\Delta\chi^2$	Δ*df*
Two-factor Model	639.89	370	.74	.09	.11		
One-factor Model (HCR + TMS)	876.82	374	.52	.12	.13	236.93	4
Two-factor Model	290.86	185	.86	.08	.08		
One-factor Model (HCR + Team Learning Behavior)	446.47	186	.66	.12	.12	155.61	1

Note: N = 97. HCR = human capital resource; TMS = transactive memory system.

Table 3.3 Descriptive Statistics

Variable	Mean	SD	1	2	3	4	5	6	7
1. HCR Level	5.40	.82	(.76)						
2. HCR Outcome	5.64	.77	$.44^{**}$	(.79)					
3. HCR Emergence	5.49	.79	$.44^{**}$	$.38^{**}$	(.82)				
4. HCR	5.51	.62	$.82^{**}$	$.79^{**}$	$.74^{**}$	(.85)			
5. TMS	5.05	.59	$.35^{**}$	$.24^{*}$	$.43^{**}$	$.43^{**}$	(.72)		
6. Team Learning Behavior	4.39	.97	$.39^{**}$	$.37^{**}$	$.37^{**}$	$.48^{**}$	$.36^{**}$	(.82)	
7. Team Performance	5.79	.80	$.35^{**}$	$.46^{**}$	$.34^{**}$	$.49^{**}$	$.42^{**}$	$.48^{**}$	(.86)

Note: N = 97. HCR = human capital resource; TMS = transactive memory system. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$. Cronbach's alphas are reported across the diagonal.

CHAPTER 4

WHERE DOES HCR COME FROM? THE MEAN LEVEL OF KSAOS AND KSAO-BASED FAULTLINES

In Chapter 3, I developed and validated a new comprehensive measure of HCR based on its conceptual description. To further improve understanding of HCR, it is important to note where HCR comes from. Although previous research suggests HCR originates from individual KSAOs (Ployhart & Moliterno, 2011), it is still unclear how individual KSAOs influence HCR at the team level. Drawing on multilevel theories, I focus on two different forms of a team's KSAOs based on individual KSAOs and reason that these two forms interact to determine HCR at the team level. Multilevel theories argue that a higher-level, collective construct is based on individuals' cognition, affect, and behavior, and is manifested through compositional or compilational emergence (Kozlowski & Klein, 2000). While compositional emergence represents the coalescence of homogeneous lower-level characteristics, compilational emergence indicates the combination of relevant but heterogeneous lower-level characteristics.

Specifically, compositional emergence rests on assumptions of isomorphism and describes how the convergence of homogeneous lower-level characteristics leads to a higher-level construct (Kozlowski & Klein, 2000). An example of a construct based on compositional emergence is diversity climate, defined as individuals' shared perceptions of the degree that their unit values both fairness and member differences (Dwertmann, Nishii, & van Knippenberg, 2016). The diversity climate emerges from the shared

perceptions of work unit members and ranges from anti-diversity (low mean level) to pro-diversity (high mean level).

In contrast, compilational emergence stands on assumptions of discontinuity and describes how the patterns, distribution, and/or variability of lower-level characteristics lead to a higher-level construct (Kozlowski & Klein, 2000). For example, TMS, which refers to a cognitive system shared between individual team members and used for encoding, storing, and retrieving knowledge (Hollingshead, 2001; Lewis & Herndon, 2011), focuses more on distinct knowledge held by team members (Wegner, 1987; Wegner, Giuliano, & Hertel, 1985). In this emergent process, TMS manifests from the heterogeneous perceptions of team members. Faultlines are another example of a construct based on compilational emergence and refer to hypothetical dividing lines that split a team into multiple subgroups based on alignments of individual attributes (adapted from Lau & Murnighan, 1998). The faultlines are created by nonuniform distribution of within-team dispersion, reflecting a patterned or configural form of emergence (Kozlowski & Klein, 2000).

These lines of reasoning suggest two forms of a team's KSAOs that capture different characteristics of the KSAOs and create a basis for HCR. KSAOs based on compositional emergence capture the level of KSAOs that team members have, whereas KSAOs based on compilation emergence capture a configuration of team members' KSAOs. The existing research primarily uses the mean level of individuals' KSAOs, focusing on compositional emergence. This implies the alignment of an individual's KSAOs with other members' KSAOs may not be important in the emergence process. For example, KSAOs based on compositional emergence are the total of the individuals'

KSAOs, and the higher the level, the better. In contrast, people have different KSAOs (Murphy, 2012) that can lead to complex interactions with the KSAOs of others to affect performance. Ployhart and colleagues (2014) argued that compilational emergence captures the configuration of individuals' different KSAOs. This implies the alignment of individuals' KSAOs with other members' KSAOs may play a key role in determining the nature of KSAOs based on compilational emergence. For instance, some individual KSAOs are more important and more easily utilized than other KSAOs. Subsequently, these particularly useful KSAOs are amplified and transformed into a team's HCR. By reflecting distinct features of a team's KSAOs, both forms of KSAOs through compositional and compilational emergence may be important factors that lead to HCR.

Taken together, drawing on a multilevel perspective, I focus on a team's KSAOs through both compositional and compilational emergence as factors that influence HCR at the team level. Specifically, I label a team's KSAOs based on compositional emergence as *the mean level of KSAOs*, which ranges from poor (low mean level or low quality) to superior (high mean level or high quality). I label a team's KSAOs based on compilational emergence as *KSAO-based faultlines*, which range from weak to strong. While the mean level of KSAOs explains the degree to which team members possess KSAOs, KSAO-based faultlines reflect the extent to which team members' KSAOs are aligned along subset properties. Given that the mean level of KSAOs and KSAO-based faultlines capture unique aspects of a team's KSAOs, I investigate how they influence HCR in the next section (Figure 4.1).

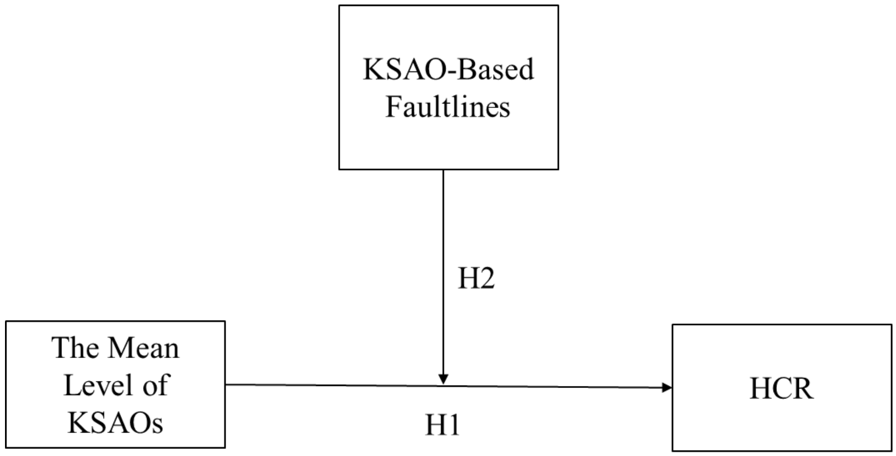

Figure 4.1 Model of the Mean Level of KSAOs, KSAO-Based Faultlines, and HCR

4.1. THE MEAN LEVEL OF KSAOS AND HCR

Prior research has mainly focused on the mean level of KSAOs (i.e., magnitude), which represents the extent to which individuals have KSAOs (e.g., Yanadori & Kato, 2007). The mean of all members' KSAOs is considered an additive construct at the team level (Chan, 1998) reflecting a continuum ranging from poor KSAOs (low mean level or low quality) to superior KSAOs (high mean level or high quality). I argue that the mean level of KSAOs influences the collective team-level HCR.

HCR is a collective capability based on individual KSAOs to achieve collective goals or outcomes (Ployhart et al., 2014). HCR is rooted in the full range of individual KSAOs within a context (Ployhart & Moliterno, 2011). It is important to note these KSAOs include a number of categories (e.g., ability, experience, and trait), and each category has an impact on HCR. In general, team members' KSAOs can be classified as generic and specific (Ployhart & Moliterno, 2011). Generic KSAOs are valuable and applicable to various teams in a general sense, such as cognitive ability, education, as well as knowledge and skills associated with broad domains. Specific KSAOs are

valuable and applicable to only certain teams, such as knowledge and skills relevant to narrow domains. These generic and specific KSAOs can provide a basis to create HCR. Generic KSAOs can provide a foundation to create and manifest specific KSAOs (e.g., Ployhart & Moliterno, 2011; Ployhart et al., 2011), and specific KSAOs, which are related to focal teams or tasks, can be rare and inimitable (e.g., Hatch & Dyer, 2004), leading to unique HCR. Given that generic KSAOs may play a foundational role in manifesting specific KSAOs, I discuss a general level of KSAOs rather than each type or category of KSAOs.

A high mean level of KSAOs indicates the average team member is more likely to know how to think, perceive, and use a specific frame of reference to perform their tasks. When teams have a high mean level of KSAOs, team members have specialized knowledge and information, are highly skilled, and have a high ability to complete team tasks. Conversely, a low mean level of KSAOs indicates the average team member is less likely to have preexisting knowledge systems and a repertoire of skills, as well as specific information relevant for the task. When teams have a low mean level of KSAOs, team members have limited expertise and knowledge, possess few skills, and have difficulty performing team tasks. Given that individual KSAOs provide a foundation for HCR, teams with a high mean level of KSAOs have more foundational materials with which to build HCR. Thus, I predict a positive relationship between the mean level of KSAOs and HCR.

Hypothesis 1: The mean level of KSAOs is positively associated with HCR.

4.2. THE MODERATING ROLE OF KSAO-BASED FAULTLINES IN THE RELATIONSHIP BETWEEN THE MEAN LEVEL OF KSAOS AND HCR

4.2.1. *KSAO-Based Faultlines*

As different KSAOs across team members can work interdependently (Ployhart et al., 2014), it is also critical to investigate how the configuration of individual KSAOs within a team is associated with HCR. For example, team members have their own unique set of KSAOs; each set of KSAOs can overlap with other members' sets or be nonredundant within the team. Given the nonuniform patterns of dispersion of team members' KSAOs, the team's KSAOs can rest on complex nonlinear processes of compilation to complete its tasks (Chan, 2019; Kozlowski & Klein, 2000; Ployhart et al., 2014). However, the mean level of KSAOs, frequently used in previous studies, cannot capture the nonuniform pattern or configuration of team members' KSAOs. Thus, it is necessary to consider the configuration of KSAOs within teams (i.e., a team's KSAOs based on compilational emergence) that may have distinct effects above and beyond the mean level of KSAOs.

To examine KSAOs based on compilational emergence, I use the concept of faultlines, which refers to hypothetical dividing lines that divide a team into multiple subgroups based on individual attributes, such as age and gender (adapted from Lau & Murnighan, 1998). Since faultlines capture configurations within teams based on the alignment of members' attributes and consider nonuniform distribution or patterns of multiple attributes, KSAO-based faultlines reflect a team's KSAOs through the lens of compilational emergence. The faultlines provide a way to examine the alignment of members' underlying KSAOs within teams.

Interestingly, although the faultlines and HCR literature have developed different theories, both have paid attention to similar individual attributes. Like the HCR literature, faultlines research has often focused on informational faultlines based on individual characteristics associated with job and task (e.g., work and education experiences; Bezrukova, Jehn, Zanutto, & Thatcher, 2009; Cooper et al., 2014). Building on informational faultlines, I define KSAO-based faultlines as dividing lines that split a team's set of KSAOs into two or more subsets based on alignments of team members' KSAOs. KSAO-based faultlines can vary in their strength. The more (less) aligned the KSAOs of members are, the stronger (weaker) the faultlines will be. More strength increases the likelihood that clear divisions will form within the team. Strong KSAO-based faultlines exist when members' KSAOs are clearly aligned, resulting in distinct subsets that have high KSAO similarity within subsets and low KSAO similarity between subsets (Lau & Murnighan, 1998; Shaw, 2004). This creates a situation in which there are disconnected subsets of KSAOs in the team. In contrast, weak KSAO-based faultlines exist when members' KSAOs are loosely aligned, resulting in no clear subsets (Lau & Murnighan, 1998). This creates a situation in which there are loosely linked subsets of KSAOs in the team.

4.2.2. *Interactive Effects of the Mean Level of KSAOs and KSAO-Based Faultlines on HCR*

Diverse team research has explored the joint impact of level and configuration (e.g., agreement and dispersion) on team processes and outcomes (e.g., Boies & Howell, 2006; Colquitt et al., 2002; Dineen, Noe, Shaw, Duffy, & Wiethoff, 2007). For example, climate studies generally support that strong climate intensifies the relationship between

climate level and outcomes (Chan, 1998; Lindell & Brandt, 2000). This growing recognition implies that the relationship between only one separate aspect of a team's KSAOs (i.e., only the mean level of KSAOs or only KSAO-based faultlines) and HCR may provide an incomplete understanding of HCR. Thus, I reason that the mean level of KSAOs and KSAO-based faultlines interact to influence HCR. As predicted in the previous section, the mean level of KSAOs positively influences HCR. The beneficial effect of the mean level of KSAOs on HCR may be weaker in teams with strong KSAO-based faultlines; however, the positive impact of the mean level of KSAOs on HCR may be stronger in teams with weak KSAO-based faultlines.

As the degree to which team members' KSAOs are connected and aligned (adapted from Lau & Murnighan, 1998), the strength of KSAO-based faultlines can constrain members' opportunities to share and combine KSAOs in order to amplify and transform these KSAOs within their teams. Strong KSAO-based faultlines indicate that a team's KSAOs are clearly separated based on the alignment of members' KSAOs for task completion, leading to high levels of difference in knowledge and understanding across subsets. This implies that members in teams with strong KSAO-based faultlines are less likely to have access to KSAOs in out-subsets. On the contrary, weak KSAO-based faultlines indicate that team members' KSAOs are loosely connected, leading to no distinct divisions of KSAOs. The loosely aligned KSAOs may allow members more opportunities to access and combine relevant KSAOs, leading to deeper understanding of these KSAOs. Thus, the strength of KSAO-based faultlines determines the number of opportunities by which members' KSAOs can be combined, amplified, and transformed, influencing the development of HCR.

To illustrate, consider a four-person human capital team consisting of two strategy researchers and two psychology researchers. In this team, they are all working on human capital, but the knowledge and assumptions in strategy and psychology are quite different, leading to strong KSAO-based faultlines. While the knowledge, theoretical foundations, and modeling approaches in strategy research are based on a macro perspective, in psychology, they are based on a micro perspective. Thus, although the researchers value each other and are willing to work together, it takes them time to understand each other's KSAOs. As a result, they are less likely to effectively share and combine their clearly delineated subsets of KSAOs.

Conversely, consider a four-person human capital team consisting of one strategy researcher, one human resource (HR) researcher, one sociology researcher, and one psychology researcher. The strategy and HR researchers may share an understanding of management; the strategy and sociology researchers, macro perspectives; and the HR and psychology researchers, micro perspectives. Because of their loosely aligned KSAOs, this team has weak KSAO-based faultlines. In this team, crosscutting members understand and can bridge other members' distinct basis for their KSAOs. For example, the HR researcher understands and can link the strategy researcher's KSAOs to those of the psychology researcher using micro-based terminology. Thus, such common understandings among members provide opportunities to more effectively share and combine their KSAOs.

As mentioned above, some KSAOs are more closely related and valuable than others within a team and can create synergy to build HCR. Given that opportunities to share and combine KSAOs are especially important within teams to create HCR, the

relationship between the mean level of KSAOs and HCR is likely to depend on KSAO-based faultlines. When teams have strong KSAO-based faultlines, there are fewer opportunities to share and combine KSAOs, even if team members are highly skilled and knowledgeable. Thus, they are not able to effectively bridge their disconnected KSAOs, which means they are less likely to create synergy and maximize their KSAOs to build their own HCR. However, in teams with weak KSAO-based faultlines, the high levels of KSAOs are more likely to be shared by members and combined within teams as there are more opportunities to utilize others' relevant, valuable KSAOs as a whole. In this team, members can develop their own valuable, rare, inimitable, and nonsubstitutable HCR.

Taken together, I predict KSAO-based faultlines will moderate the relationship between the mean level of KSAOs and HCR. Strong KSAO-based faultlines mitigate the beneficial relationship between the mean level of KSAOs and HCR. Weak KSAO-based faultlines, however, reinforce the positive relationship between the mean level of KSAOs and HCR.

Hypothesis 2: KSAO-based faultlines moderate the positive relationship between the mean level of KSAOs and HCR, such that the positive relationship is weaker in teams with strong KSAO-based faultlines and stronger in teams with weak KSAO-based faultlines.

4.3. THE ROLE OF TEAM PROCESSES IN THE HCR DEVELOPMENT, AND THE EFFECT OF HCR ON TEAM PERFORMANCE

HCR as a collective team-level construct originates in individual KSAOs, and the amplification and transformation of individual KSAOs into HCR can be influenced by emergence enabling states (Ployhart & Moliterno, 2011). A team's emergence enabling

state reflects how team members relate to and interact with each other and includes behavioral processes, cognitive mechanisms, and affective psychological states (e.g., communication frequency, a team's cognitive memory, or a team's positive reactions). As HCR can be developed in multiple ways according to team members' interactions and interdependencies (Kozlowski & Klein, 2000), this emergence enabling state allows for the creation of unique HCR features above and beyond both the mean level of KSAOs and KSAO-based faultlines, making HCR difficult to duplicate by other teams. For example, even if a team has members with the same KSAOs, a distinct emergence enabling state of behaviors, cognition, and affect can make its HCR different from that of other teams (Ployhart & Moliterno, 2011). The valuable, rare, inimitable, and nonsubstitutable HCR further increases team performance (Barney, 1991; Peteraf, 1993; Wernerfelt, 1984).

Considering this line of reasoning, HCR that is influenced by the mean level of KSAOs and KSAO-based faultlines can be changed by team processes that reflect members' social relationships and interactions within a team. In the case of teams whose members are close and willing to interact with each other, increased interactions as a whole are more likely to allow amplification and transformation of KSAOs into HCR. In contrast, in the case of teams whose members are highly independent and hesitant to interact with other members as a whole, the reduced interactions are less likely to enable synergy and maximization of KSAOs into HCR.

To take into account interaction patterns among team members with respect to behavior, cognition, and affect, I focus on the team processes of communication, TMS, and team PA. I argue that communication, TMS, and team PA moderate the joint effect

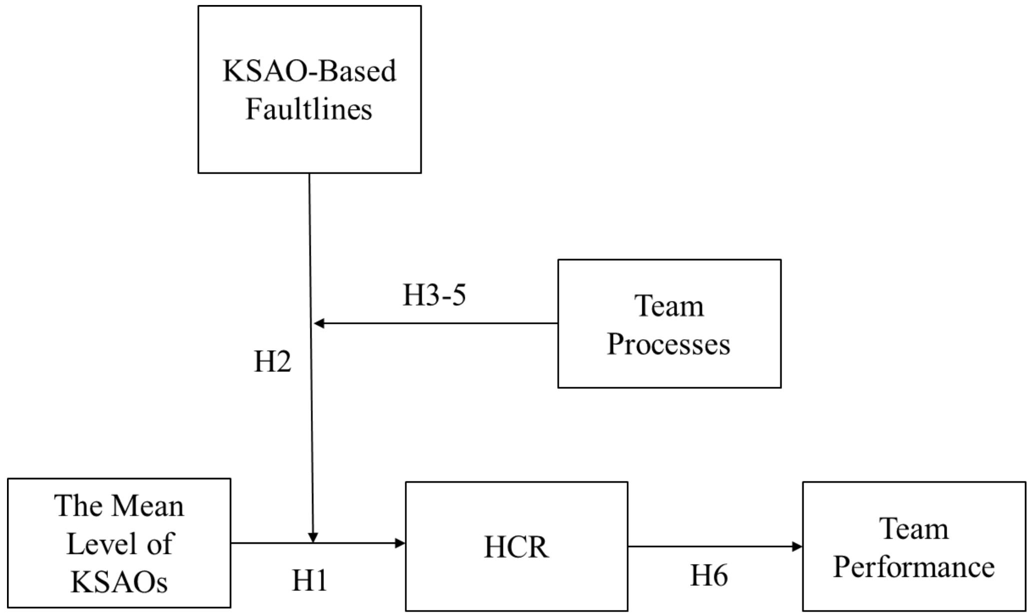

Figure 4.2 Full Model of the Mean Level of KSAOs, KSAO-Based Faultlines, HCR, Team Processes, and Team Performance

of the mean level of KSAOs and KSAO-based faultlines on HCR. I then examine how HCR ultimately influences team performance. The full model of this dissertation is depicted in Figure 4.2.

4.3.1. *Moderating Roles of Team Processes in the Relationship Between the Mean Level of KSAOs, KSAO-Based Faultlines, and HCR*

4.3.1.1. *Moderating Role of Communication*

A large body of management literature has paid attention to communication as an important factor that transmits or controls the effects of team inputs on team outcomes (e.g., Gajendran & Joshi, 2012; Ilgen, Hollenbeck, Johnson, & Jundt, 2005; Kacmar, Witt, Zivnuska, & Gully, 2003; Mathieu, Maynard, Rapp, & Gilson, 2008). Communication frequency indicates the extent to which team members interact in any form, such as in face-to-face meetings or via emails (Daft & Lengel, 1984; Katz & Kahn,

1978; Shaw, 1981), and the frequency can vary depending on the team (Ancona & Caldwell, 1992; Daft & Lengel, 1984). For example, while members in well-functioning teams communicate efficiently and frequently, members in ineffectively functioning teams have a limited amount of communication (Shaw, 1981).

As mentioned in the previous section, the opportunity for members to access, share, and combine KSAOs plays an important role in building HCR for teams. Reflecting team members' interactions, communication can facilitate or diminish this opportunity, beyond that provided by KSAO-based faultlines. Because a high level of communication develops close connections among members and enhances information flow (Gladstein, 1984; Stasser, 1992), team members have more opportunities to learn about the KSAOs of other members and, further, amplify and transform the KSAOs into HCR. In contrast, members in teams with a low level of communication are less likely to have easy and frequent communications with each other. This communication difficulty reduces chances to amplify and transform the KSAOs of other members.

When considering the opportunity to share and combine KSAOs within teams, both KSAO-based faultlines and communication may determine the degree to which team members' KSAOs can be accessed, shared, and combined in teams. KSAO-based faultlines reduce the likelihood of opportunities to share and combine KSAOs within teams. However, communication has been found to increase interactions and build close connections among team members, increasing the likelihood of such opportunities within the team. To be specific, in teams with a high level of communication, members may be better able to take advantage of the opportunity that KSAO-based faultlines provide. In teams with a low level of communication, team members may miss the opportunity that

KSAO-based faultlines provide. Thus, it is necessary to consider KSAO-based faultlines and communication together.

As reasoned earlier, in teams with weak KSAO-based faultlines, crosscutting members understand and can bridge other members' KSAOs. If these members effectively and frequently communicate with each other, the increased interaction with each other as a whole promotes the potential to develop HCR. But, if they have communication problems, crosscutting members can have difficulty bridging different subsets of KSAOs within teams. This leads members to spend extra time learning and coordinating each other's KSAOs and less likely to optimize the opportunity to make HCR than teams with a high level of communication. In contrast, in teams with strong KSAO-based faultlines, members have difficulty understanding the distinct subsets of KSAOs and thus have limited opportunity to maximize the delineated KSAOs within their teams. If these team members enjoy talking to each other, they may take moderate advantage of the limited opportunity to amplify and transform their KSAOs into HCR. If members are not comfortable talking to each other, they may fail to take any advantage of the limited opportunity to build HCR.

I therefore propose that the mitigating impact of KSAO-based faultlines on the relationship between the mean level of KSAOs and HCR is likely to be dependent on communication. I argue that with superior KSAOs, weak KSAO-based faultlines are valuable for developing HCR, especially for teams whose members frequently communicate with each other. When team members communicate with each other effectively, on average they have more opportunities to access the information and knowledge of other members as a whole (Lester, Meglino, & Korsgaard, 2002; Shaw,

1981). This effective communication may help teams capitalize on the superior, loosely aligned KSAOs as a whole, fostering HCR. Conversely, I argue that with poor KSAOs, strong KSAO-based faultlines are fruitless for building HCR, especially for teams whose members communicate with each other ineffectively. The hindrance to communication may not allow members to leverage the poor, clearly separated KSAOs as a whole to build HCR. Consequently, I expect the positive relationship between the mean level of KSAOs and HCR to be strongest when teams have both weak KSAO-based faultlines and a high level of communication, weaker when teams have either strong KSAO-based faultlines or a low level of communication, and weakest when teams have both strong KSAO-based faultlines and a low level of communication.

Consistent with this logic, communication will moderate the mitigating effect associated with the mean level of KSAOs and KSAO-based faultlines on HCR.

Hypothesis 3: There is a three-way interaction between the mean level of KSAOs, KSAO-based faultlines, and communication on HCR, such that the positive relationship between the mean level of KSAOs and HCR is (a) strongest when teams have weak KSAO-based faultlines and a high level of communication, (b) weaker when teams have either strong KSAO-based faultlines or a low level of communication, and (c) weakest when teams have strong KSAO-based faultlines and a low level of communication.

4.3.1.2. *Moderating Role of TMS*

As an emergent state of teams (Mathieu et al., 2008), TMS is defined as a cognitive system shared between individual team members and used for encoding, storing, and retrieving knowledge (Hollingshead, 2001; Lewis & Herndon, 2011). TMS

consists of two components: structural and process components (Wegner et al., 1985). While the structural component indicates how an individual's knowledge is connected with others, the process component reflects processes among members that encode, store, and retrieve knowledge. Thus, TMS can explain the development of knowledge regarding who knows what (Levitt & March, 1988; Ren & Argote, 2011) and the differentiated structure of members' expertise (Wegner, 1987). The majority of TMS research has found that TMS is positively related to various team outcomes, such as team performance, team effectiveness, member satisfaction, creativity, and group learning (e.g., Akgün, Byrne, Keskin, Lynn, & Imamoglu, 2005; Austin, 2003; Faraj, Sproull, Smith, & Stern, 2000; Lewis, 2003; Liang, Moreland, & Argote, 1995; Littlepage, Hollingshead, Drake, & Littlepage, 2008; Michinov, Olivier-Chiron, Rusch, & Chiron, 2008).

Given that TMS reflects a team's knowledge system and team members' engagement in knowledge development, TMS can increase or decrease opportunities to amplify and transform KSAOs into HCR within teams. When a team has a high level of TMS, members tend to be aware of the expertise of each member (i.e., who knows what within a team) and participate in the TMS process (Wegner, 1987). This leads to more opportunities to learn where to access KSAOs held by other members and maximize the KSAOs to develop HCR. In contrast, when a team has a low level of TMS, members are less likely to have knowledge of where specific KSAOs are located in their teams and less likely to interact with other members to coordinate their KSAOs as a whole. This leads to fewer opportunities to create synergy and leverage the KSAOs within teams.

Since KSAO-based faultlines can also provide opportunities to share and combine KSAOs within teams, as argued above, it is crucial to examine both KSAO-based faultlines and TMS simultaneously. In the presence of weak KSAO-based faultlines, team members' KSAOs are loosely aligned and more readily discerned by the other members, leading to more opportunities to share and combine KSAOs. If members know what specialized knowledge each member has and are willing to engage in the TMS process, opportunities to interact with each other as a whole increase, facilitating HCR development. However, if members have limited understanding about who knows what and lack experience in the process of encoding, storing, and retrieving information within teams, they can have difficulty in appropriately assigning tasks to members who have the requisite knowledge. This leads to the team being less likely to leverage and magnify members' KSAOs for HCR. Conversely, in the presence of strong KSAO-based faultlines, as team members' KSAOs are clearly distinct and fairly disconnected, members may not easily understand each other's KSAOs, leading to fewer opportunities to maximize their distinct subsets of KSAOs. However, if these team members have knowledge of each member's expertise and work together in a well-coordinated fashion as a whole, they may moderately utilize the limited opportunities to amplify and transform their KSAOs into HCR. However, if members do not have specialized knowledge and face challenges in coordinating a team knowledge system, they may easily fail to utilize the fewer opportunities to magnify their KSAOs to build HCR.

Taken together, I propose the attenuating effect of KSAO-based faultlines on the relationship between the mean level of KSAOs and HCR likely depends upon TMS. I argue that with superior KSAOs, weak KSAO-based faultlines are treated as helpful and

relevant to developing HCR, particularly for teams whose members have complete information about each member's KSAOs and enthusiastically participate in their knowledge system (i.e., a high level of TMS). When team members have information about who knows what, they are more likely to have chances to maximize their superior, loosely aligned KSAOs to build HCR by allocating appropriate work roles to each member. Conversely, I argue that with poor KSAOs, strong KSAO-based faultlines are disadvantageous for building HCR, particularly for teams whose members have incomplete information about who has what KSAO and whose members avoid participating in the team's knowledge system (i.e., a low level of TMS). When team members do not have information about the specialized expertise of other members, the knowledge hindrance is likely to deter them from magnifying their poor, delineated KSAOs as a whole. Accordingly, I expect the positive relationship between the mean level of KSAOs and HCR to be strongest when teams have both weak KSAO-based faultlines and a high level of TMS, weaker when teams have either strong KSAO-based faultlines or a low level of TMS, and weakest when teams have both strong KSAO-based faultlines and a low level of TMS.

On the basis of this logic, TMS will moderate the attenuating effect associated with the mean level of KSAOs and KSAO-based faultlines on HCR.

Hypothesis 4: There is a three-way interaction between the mean level of KSAOs, KSAO-based faultlines, and TMS on HCR, such that the positive relationship between the mean level of KSAOs and HCR is (a) strongest when teams have weak KSAO-based faultlines and a high level of TMS, (b) weaker when teams have either

strong KSAO-based faultlines or a low level of TMS, and (c) weakest when teams have strong KSAO-based faultlines and a low level of TMS.

4.3.1.3. *Moderating Role of Team PA*

Team affect has a critical influence on individuals as well as teams (e.g., Barsade & Gibson, 2012). Team affect refers to emotions shared among team members through affective transfer processes, such as emotional contagion (Barsade & Gibson, 1998, 2012; Sanchez-Burks & Huy, 2009). Emotional contagion is the process in which an individual affects the moods or emotions of other individuals (Schoenewolf, 1990). As team members perform tasks together, emotional contagion within a team occurs through subconscious or automatic processes. Thus, members share emotions, and the sharing occurs through a subtle but lasting transfer of emotions within a team (Barsade, 2002).

When considering team affect, there are two independent dimensions of affect: PA and negative affect (NA; Watson, Clark, & Tellegen, 1988). While PA includes enthusiasm and mental alertness (Watson & Tellegen, 1985; Watson et al., 1988), NA includes subjective distress, such as irritability, anxiety, and nervousness (Watson & Clark, 1984). Prior research has found that the two dimensions of PA and NA are generally independent, and thus associated with different antecedents, mechanisms, and consequences (Diener & Emmons, 1984; Watson & Clark, 1984; Watson et al., 1988). Further, PA and NA would asymmetrically influence the cognitive processes of an individual, and the effect of PA on perception is clearer to interpret than NA (Isen & Baron, 1991). Thus, I focus on team PA to examine the effect of an affective team process on the relationship between the mean level of KSAOs, KSAO-based faultlines, and HCR. Team PA has been shown to positively influence team processes and outcomes

(e.g., Barsade, 2002; Bramesfeld & Gasper, 2008; George, 1990; Gibson, 2003; Totterdell, 2000). For example, positive group mood is associated with decreased absenteeism (George, 1990) and greater group-level efficacy (Gibson, 2003).

As team PA can serve as a bonding function and facilitate social integration (Fischer & Manstead, 2008; Niedenthal & Brauer, 2012; Spoor & Kelly, 2004), team PA can enhance or reduce opportunities to amplify and transform a team's KSAOs into HCR. When team members experience a high level of PA, they are motivated to broaden their scope, diffuse their attention, and integrate their environments (Rhee, 2007). This gives rise to more opportunities to maximize and leverage other members' KSAOs for developing HCR. In contrast, when team members experience a low level of PA, they are less likely to seek interaction and cooperation with each other as a whole. This may inhibit the spread of KSAOs within teams, thus giving rise to fewer opportunities to utilize and magnify KSAOs to build HCR.

In addition to team PA, as aforementioned, KSAO-based faultlines play an essential role in offering the opportunity to share and combine KSAOs within teams, so it is critical to consider their joint effect. When teams have weak KSAO-based faultlines, a team's KSAOs are fairly relevant and connected, providing more opportunities to share and combine KSAOs. If the members are more excited and enthusiastic at that moment, they tend to cooperate with and support each other and enhance shared knowledge, information, and skills (George, 1990). The intensive interactions increase opportunities to create synergy for building HCR. However, if members are less inspired and interested at that moment, they are less likely to develop close relationships with other people and to be motivated to interact and collaborate with each other. The limited interactions

decrease opportunities to amplify and transform KSAOs into HCR. Conversely, when teams have strong KSAO-based faultlines, a team's KSAOs are quite different and highly divided, providing fewer opportunities to share and combine KSAOs. If members feel more positive at that point, they may take moderate advantage of the fewer opportunities to magnify their KSAOs. On the other hand, if they feel less positive, they may have trouble taking advantage of the limited opportunities.

Based on this reasoning, I propose that the alleviating effect of KSAO-based faultlines on the relationship between the mean level of KSAOs and HCR is likely to be contingent on team PA. I argue that with superior KSAOs, weak KSAO-based faultlines are effective at building HCR, especially for teams whose members experience a high level of PA. When members feel happier and more pleasant, they have access to a broad range of cognition and attention resources and are socially integrated (Aspinwall, 1998, 2001; Fredrickson & Joiner, 2002; Isen, 1990). This facilitates opportunities to leverage the superior, loosely aligned KSAOs as a whole to develop HCR. In contrast, I argue that with poor KSAOs, strong KSAO-based faultlines are ineffective for building HCR, especially for teams whose members experience a low level of PA. When team members feel less happy and pleasant, they have a narrow range of cognition and attention, and are hindered from developing social bonds. This may offset any opportunities to amplify poor, clearly distinct KSAOs into HCR. As a result, I predict the beneficial relationship between the mean level of KSAOs and HCR to be strongest when teams have both weak KSAO-based faultlines and a high level of team PA, weaker when teams have either strong KSAO-based faultlines or a low level of team PA, and weakest when teams have both strong KSAO-based faultlines and a low level of team PA.

Consistent with this logic, team PA will moderate the alleviating impact associated with the mean level of KSAOs and KSAO-based faultlines on HCR.

Hypothesis 5: There is a three-way interaction between the mean level of KSAOs, KSAO-based faultlines, and team PA on HCR, such that the positive relationship between the mean level of KSAOs and HCR is (a) strongest when teams have weak KSAO-based faultlines and a high level of team PA, (b) weaker when teams have either strong KSAO-based faultlines or a low level of team PA, and (c) weakest when teams have strong KSAO-based faultlines and a low level of team PA.

4.4. THE RELATIONSHIP BETWEEN HCR AND TEAM PERFORMANCE

Previous research has largely supported the notion that HCR can help teams or firms promote outcomes. Scholars have used RBV to explain this relationship in teams or firms (Barney, 1991; Gardner, Gino, & Staats, 2012; Peteraf, 1993; Wernerfelt, 1984). RBV argues that when firms have valuable, rare, inimitable, and nonsubstitutable resources, the resources can be positively related to firm performance and competitive advantages. The resources, which are hard to copy or imitate, are based on social complexity (e.g., resources based on interdependence among members), causal ambiguity (e.g., ambiguous resources formation), or path dependency (e.g., historical experiences that contribute to present situations and resources; Barney, 1991; Dierickx & Cool, 1989; Reed & DeFillippi, 1990). As the nature of HCR is embedded within the environmental context of its own emergence processes (Ployhart & Moliterno, 2011), social complexity, causal ambiguity, and path dependency can result in HCR that is team-specific and idiosyncratic in its details, making it valuable, rare, difficult to copy, and nonsubstitutable.

Because previous studies have not clearly distinguished HCR from human capital, I discuss the previous results using the phrase *human capital* rather than HCR. The bulk of the research on human capital has largely affirmed the notion that human capital is positively associated with performance (for a review of the literature, see Crook et al., 2011). Specifically, both generic and specific human capital play a crucial role in increasing performance (e.g., Hatch & Dyer, 2004; Ployhart & Moliterno, 2011; Ployhart, Van Iddekinge, & Mackenzie, 2011).

To investigate the role of human capital in any given unit, researchers have mainly followed two approaches to performance: examining the effect of investments in human capital on performance (e.g., Combs, Liu, Hall, & Ketchen, 2006; Wright & McMahan, 2011) and examining the direct impacts of human capital on performance (e.g., Crook et al., 2011). First, many studies have shown that managing human capital enhances individual and firm outcomes, such as performance and turnover (e.g., Becker & Huselid, 2006; Bowen & Ostroff, 2004; Huselid, 1995; Le, Oh, Shaffer, & Schmidt, 2007; Subramony, Krause, Norton, & Burns, 2008). Second, a recent meta-analysis found that human capital itself significantly increases the performance of firms (Crook et al., 2011). Human capital influences operational performance measures more than global performance measures, such as customer service satisfaction or innovation versus returns on assets. This line of research generally agrees on the notion that HCR is positively associated with outcomes. Therefore, I predict that HCR will increase team performance.

Hypothesis 6: HCR is positively associated with (a) objective team performance and (b) subjective team performance.

CHAPTER 5

METHOD

5.1. SAMPLE

A total of 283 undergraduate students in 70 teams were recruited from business classes at a public university in the United States. The student participants included 158 males (55.8%) and 125 females (44.2%), and the average age was 20.69 years (*SD* = 2.78). A majority of participants were Caucasian (83.4%), with the rest of the participants being Asian (9.5%), Hispanic or Latino (3.9%), and African American (2.8%). Since I required complete information from all team members to calculate a variable for faultlines, I had to drop four teams that were missing information on the number of business classes a participant had taken, work experience, and cold weather experience. The final sample size was 268 undergraduate students in 66 teams. Most participants were randomly assigned to a team and worked on a team activity about a winter survival task. They were compensated with extra credit for performing this team activity and completing a survey.

5.2. TASK DESCRIPTION

Participants conducted a team activity: a winter survival task (Johnson & Johnson, 2003). They were asked to rank, in order of importance, fifteen items based on their significance to survivors of an airplane crash. Once they completed the team activity, they were asked to complete a questionnaire measuring HCR, communication, TMS, and

team PA. They were also asked about the number of business classes they had taken, work experience, and cold weather experience for the mean level of KSAOs and KSAO-based faultlines, as well as their age, gender, and other general information for descriptive analyses.

5.3. MEASURES[2]

5.3.1. *The Mean Level of KSAOs*

To measure the mean level of KSAOs, I used three attributes: business classes taken (number), work experience (years), and cold weather experience (years). The number of business classes and work experience could have provided general knowledge, skills, and abilities for survival in a broad sense, such as signaling methods for rescue, and could reflect generic KSAOs. Additionally, cold weather experience could have offered specific knowledge, skills, and abilities for survival, such as how to preserve body heat and protect against temperature loss, and could reflect specific KSAOs from a winter survival context. I calculated the average Z-score of business classes taken, work experience, and cold weather experience. The minimum score was -.72 and the maximum score was 1.14 (M = .00, SD = .47).

5.3.2. *KSAO-Based Faultlines*

KSAO-based faultlines were operationalized as faultline strength using the asw.cluster package in the statistical analysis program R. Given several different ways to calculate faultline strength, I used the *Fau* measure developed by Thatcher and colleagues (2003). *Fau* assumes the existence of two subgroups and calculates the total

[2]A complete list of survey measures is presented in Appendix A.

variation within a team as explained by the subgroup membership based on multiple attributes using a multivariate statistical clustering approach. Since the data I use in the dissertation is from teams with fewer than ten members (i.e., three to six members), it is difficult to have more than two subgroups (Meyer, Glenz, Antino, Rico, & González-Romá, 2014). Thus, *Fau* is appropriate to measure faultline strength in this dissertation. To operationalize KSAO-based faultlines, I included the attributes of business classes taken (number), work experience (years), and cold weather experience (years).

5.5.3. *HCR*

HCR was measured with the fourteen items developed in Chapter 3. There are three dimensions that reflect three unique features of HCR: (1) *HCR level* represents collective team-level capabilities based on individual KSAOs, (2) *HCR outcome* represents relevance to team-level outcomes, and (3) *HCR emergence* represents amplification or transformation of individual KSAOs through emergence processes. The subscale of HCR level was measured with five items adapted from Subramaniam and Youndt (2005). Sample items are "We are highly skilled" and "We are creative and bright." The six-item subscale for HCR outcome, for example, contained items such as "We possess the knowledge, skills, and abilities to complete our task" and "We have valuable resources that contribute to our task." The four-item subscale for HCR emergence, for example, contained items such as "We leverage members' knowledge, skills, and abilities" and "We are able to magnify team members' information and expertise." All items were measured using a 7-point Likert-type scale (1 = "strongly disagree"; 7 = "strongly agree"). The Cronbach's alpha for HCR was .95. The HCR of teams was calculated as the average of all team members' scores of HCR level, HCR

outcome, and HCR emergence. The ICC(1) and ICC(2) for HCR were .23 and .55, respectively.

5.3.4. *Team Performance*

For team performance, I used both objective and subjective team performance scores. Objective scores were based on the quality of team decisions made during the winter survival task and were determined by comparing the teams' lists to a list compiled by winter survival experts (Johnson & Johnson, 2003). As in previous studies that used the winter survival task (Rico, Sánchez-Manzanares, Antino, & Lau, 2012), I calculated the absolute values of the differences between each team's list and the expert's list to calculate a total difference score for each survival item. I then reversed the total score to more easily interpret Hypothesis 6.

Subjective team performance was measured with four items adapted from Jehn and Bezrukova (2010), such as "My team, as a whole, performs well on this task" and "We are a high-performing team." All items were measured using a 7-point Likert-type scale (1 = "strongly disagree"; 7 = "strongly agree"). The Cronbach's alpha for subjective team performance was .96. Subjective team performance scores were calculated as the average of each team member's subjective team performance score. The ICC(1) and ICC(2) for subjective team performance were .15 and .42, respectively.

5.3.5. *Communication*

Communication was measured with four items adapted from Lester et al. (2002). Sample items are "We are very willing to share information with other passengers about our work" and "We enjoy talking to each other." All items were measured using a 7-point Likert-type scale (1 = "strongly disagree"; 7 = "strongly agree"). The Cronbach's alpha

for communication was .89. The communication of teams was calculated as the average of all team members' communication scores. The ICC(1) and ICC(2) for communication were .23 and .54, respectively.

5.3.6. *TMS*

To measure TMS, I used a fifteen-item measure adapted from Lewis (2003). Sample items are "I have knowledge about an aspect of performing tasks that no other passengers have," "I trust that other passengers' knowledge about the tasks is credible," and "We have very few misunderstandings about what to do." All items were measured using a 7-point Likert-type scale (1 = "strongly disagree"; 7 = "strongly agree"). The Cronbach's alpha for TMS was .79. The TMS of teams was calculated as the average of all team members' TMS scores. The ICC(1) and ICC(2) for TMS were .23 and .54, respectively.

5.3.7. *Team PA*

Team PA was measured with ten items adapted from the reliable and valid Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). PANAS includes ten items that are pure markers of PA (e.g., "excited," "enthusiastic," and "proud"). Because I focus on state affect (i.e., relatively short-term changes in mood) rather than trait affect (i.e., long-term individual differences in affect), participants were asked to indicate the extent to which they felt an emotion in the present moment on a 7-point Likert-type scale (1 = "very slightly or not at all"; 7 = "extremely"). The Cronbach's alpha for PA was .94. Team PA was calculated as the average of all team members' PA scores. The ICC(1) and ICC(2) for team PA were .18 and .47, respectively.

5.3.8. *Control Variables*

Team size in the data ranged from three to six team members. As team size has been found to play a significant role in team outcomes (Hare, 1981), I included team size as a control variable. In addition, following the recommendations of Bezrukova et al. (2007) and Lau and Murnighan (2005), I controlled for diversity effects to include the distinct effect of faultlines. Since I used the number of business classes, work experience, and cold weather experience for KSAO-based faultlines, I used the coefficient of variation for the same attributes (Allison, 1978) to calculate the diversity score. After calculating the coefficients of variation for each variable, I calculated the average value of the three diversity scores to create a composite diversity score.

5.4. ANALYSES

I first conducted a CFA using Mplus 7.4 (Muthén & Muthén, 2010) to confirm whether the new HCR scale developed in Chapter 3 showed a good fit to the data using a different sample. Following the same procedure in Chapter 3, I conducted a series of CFAs by identifying five different models (i.e., a three-factor model, three two-factor models, and a one-factor model). I used fit indices (i.e., CFI, RMSEA, and SRMR) and the χ^2 test scores (Browne & Cudeck, 1993; Hu & Bentler, 1999) to determine the most appropriate model. I followed the guidelines of Browne and Cudeck (1993) and Hu and Bentler (1999), using cutoff values of .90 for CFI and .08 for both RMSEA and SRMR for acceptable model fit.

As shown in Table 5.1, given the sample size and degrees of freedom, the three-factor model showed a reasonable fit to the data (χ^2 = 152.59, *df* = 74, CFI = .93, RMSEA = .13, SRMR = .04). Further, this three-factor model showed a better fit than the other

Table 5.1 Fit Indices of Confirmatory Factor Analysis for HCR

Model	χ^2	*df*	CFI	RMSEA	SRMR	$\Delta\chi^2$	Δdf
Three-factor Model	152.59	74	.93	.13	.04		
One-factor Model	286.59	77	.81	.18	.06	134	3
Two-factor Model (level + outcome)	Not Estimable (No Convergence)						
Two-factor Model (level + emergence)	Not Estimable (No Convergence)						
Two-factor Model (Outcome + emergence)	Not Estimable (No Convergence)						

Note: N = 66.

four models. For instance, the three two-factor models did not converge and the one-factor model showed a bad fit (χ^2 = 286.59, *df* = 77, CFI = .81, RMSEA = .18, SRMR = .06). These results suggest the HCR scale with three dimensions is reasonable, similar to the findings in Chapter 3.

I then performed another CFA using Mplus 7.4 (Muthén & Muthén, 2010) to test the discriminant validity of measures used in Chapter 4. I compared three models: the seven-factor model (the mean level of KSAOs, KSAO-based faultlines, HCR, communication, TMS, team PA, and team performance), the three-factor model (a team's KSAOs, team processes, and team performance), and the one-factor model (team variables). As shown in Table 5.2, although CFI indicated a good fit, the seven-factor model (χ^2 = 169.18, *df* = 86, CFI = .90, RMSEA = .12, SRMR = .12) did not have a good fit to the data. However, considering the small sample size and the number of parameters, this seven-factor model was not expected to show a good fit (Cheung & Rensvold 2002; Sharma et al., 2005). Furthermore, the seven-factor model yielded a better factor structure than the three-factor model (χ^2 = 379.32, *df* = 102, CFI = .66, RMSEA = .20, SRMR = .13; $\triangle\chi^2$ = 210.14, $\triangle df$ = 16) and the one-factor model (χ^2 = 410.08, *df* = 104, CFI = .62, RMSEA = .21, SRMR = .12; $\triangle\chi^2$ = 240.90, $\triangle df$ = 18). This suggests the seven

variables were different and should be investigated separately (Browne & Cudeck, 1993; Hu & Bentler, 1999).

Finally, I conducted hierarchical regression analyses at the team level using SPSS 25 to test the hypothesized model. The analyses were conducted using two sets of models. The first set of models tested the relationship between the mean level of KSAOs, KSAO-based faultlines, HCR, and team processes (Hypotheses 1–5). Specifically, this set included the main effect of the mean level of KSAOs on HCR, the joint effect of the mean level of KSAOs and KSAO-based faultlines on HCR, and the three-way interactive effect of the mean level of KSAOs, KSAO-based faultlines, and team processes on HCR. To test these hypothesized relationships, the control variables (team size and team diversity) were entered in Step 1, the independent variable (the mean level of KSAOs) was entered in Step 2, the moderating variable (KSAO-based faultlines) was entered in Step 3, and the moderating variables for three-way interactions (communication, TMS, and team PA, respectively) were entered in Step 4 (Cohen, Cohen, West, & Aiken, 2003).

The second model predicted the main impact of HCR on team performance (Hypothesis 6). To run this model, the control variables (team size and team diversity) were entered in Step 1, the focal variables that can influence HCR (the mean level of KSAOs and KSAO-based faultlines) were entered in Step 2, and the independent variable

Table 5.2 Fit Indices of Confirmatory Factor Analysis for Study Variables

Model	χ^2	*df*	CFI	RMSEA	SRMR	$\Delta\chi^2$	Δdf
Seven-factor Model	169.18	86	.90	.12	.12		
Three-factor Model	379.32	102	.66	.20	.13	210.14	16
One-factor Model	410.08	104	.62	.21	.12	240.90	18

Note: N = 66.

(HCR) was entered in Step 3 (Cohen et al., 2003). Before I conducted the interaction analyses, I centered the variables at their grand mean to rule out nonessential multicollinearity and to help the interpretation of results (Cohen et al., 2003). Due to the small sample size (N = 66), judgements on hypothesis significance are based on the threshold value of $p < .10$.

CHAPTER 6

RESULTS

Table 6.1 presents the descriptive statistics of the study variables such as means, standard deviations, and correlations. Unexpectedly, the mean level of KSAOs and KSAO-based faultlines were not statistically significantly correlated with HCR (r = .11, p > .10; r = -.05, p > .10, respectively). However, communication, TMS, and team PA were significantly and positively correlated with HCR (r = .71, p < .01; r = .75, p < .01; r = .56, p < .01, respectively), suggesting that communication, TMS, and team PA have some relationship with HCR. In addition, HCR was not correlated with objective team performance (r = .03, p > .10), whereas it was significantly correlated with subjective team performance (r = .80, p < .01).

6.1. HYPOTHESIS TESTS

Hypothesis 1 proposed that the mean level of KSAOs positively influences HCR. As shown in Table 6.2, the mean level of KSAOs was not significantly associated with HCR (b = .20, SE = .20, p > .10). Thus, Hypothesis 1 was not supported. Hypothesis 2 predicted the moderating role of KSAO-based faultlines in the relationship between the mean level of KSAOs and HCR. Table 6.2 reveals that KSAO-based faultlines significantly moderated the effect of the mean level of KSAOs on HCR (b = 2.81, SE = 1.27, p < .05), but this moderating effect was in the opposite direction of the hypothesized relationship. As shown in Figure 6.1, weak KSAO-based faultlines

Table 6.1 Descriptive Statistics

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. Team Size	4.06	.43										
2. Diversity	.71	.26	.07									
3. The Mean Level of KSAOs	.00	.47	-.08	-.45**								
4. KSAO-based Faultlines	.00	.13	-.46**	-.06	.13							
5. HCR	5.46	.67	.20	-.03	.11	-.05	(.95)					
6. Communication	.00	.67	.21	-.28*	.32**	-.05	.71**	(.89)				
7. TMS	.00	.48	.15	-.16	.31*	.07	.75**	.73**	(.79)			
8. Team PA	.00	.82	.27*	.16	-.06	-.22	.56**	.46**	.50**	(.94)		
9. Objective Team Performance	89.94	18.90	-.11	-.17	-.06	.07	.03	.11	-.05	-.07		
10. Subjective Team Performance	5.67	.68	.16	-.11	.14	-.12	.80**	.76**	.76**	.59**	.03	(.96)

Note: N = 66. HCR = human capital resource; TMS = transactive memory system; Team PA = team positive affect. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$. Cronbach's alphas are reported across the diagonal where appropriate.

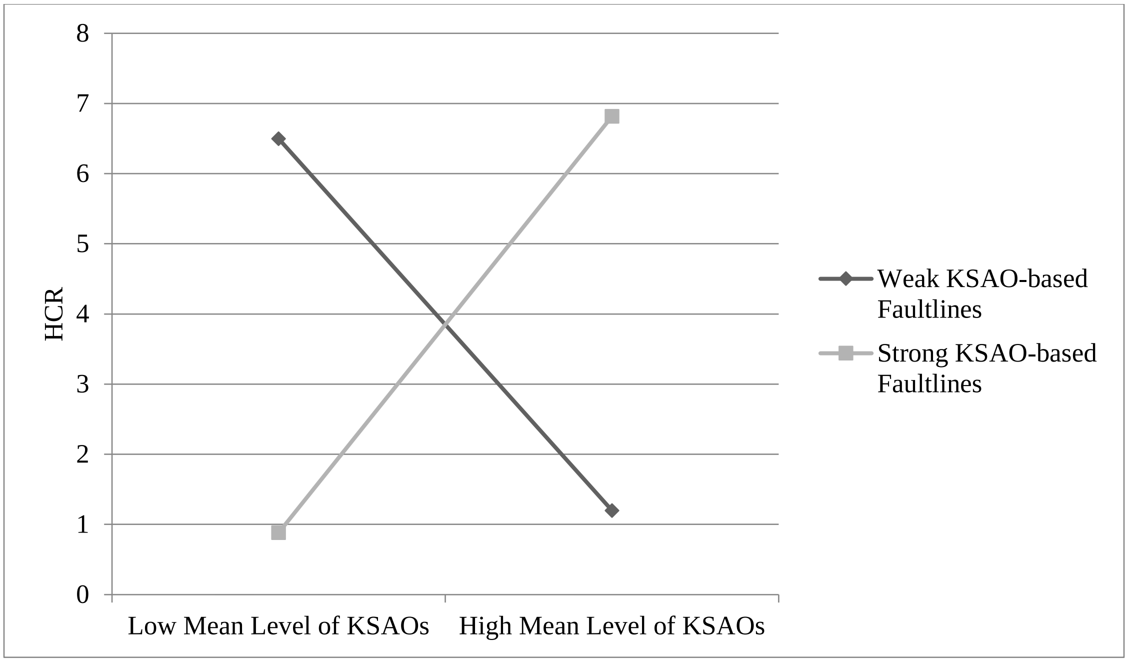

Figure 6.1 Moderating Effects of KSAO-Based Faultlines on the Relationship Between the Mean Level of KSAOs and HCR

negatively influenced the relationship between the mean level of KSAOs and HCR, while strong KSAO-based faultlines positively influenced the relationship between the mean level of KSAOs and HCR.

Hypothesis 3 suggested a three-way interaction between the mean level of KSAOs, KSAO-based faultlines, and communication. In the presence of a high level of communication, teams with superior KSAOs and weak KSAO-based faultlines are likely to have a higher level of HCR compared to teams with a low level of communication. As indicated in Table 6.2, the three-way interaction between the mean level of KSAOs, KSAO-based faultlines, and communication was not significant ($b = 2.45$, $SE = 1.58$, $p > .10$). Therefore, Hypothesis 3 was not supported. Hypothesis 4 predicted another three-way interaction between the mean level of KSAOs, KSAO-based faultlines, and TMS. In the presence of a high level of TMS, teams with superior KSAOs and weak KSAO-based

faultlines are likely to have a higher level of HCR compared to teams with a low level of TMS. As shown in Table 6.3, Hypothesis 4 was not supported (b = -.16, SE = 1.88, p > .10). In addition, Hypothesis 5 proposed a three-way interaction between the mean level of KSAOs, KSAO-based faultlines, and team PA. In the presence of a high level of team PA, teams with superior KSAOs and weak KSAO-based faultlines are likely to have a higher level of HCR compared to teams with a low level of team PA. As represented in Table 6.4, Hypothesis 5 was not supported (b = -2.22, SE = 1.51, p > .10).

Finally, Hypothesis 6 predicted that HCR is positively associated with team performance. As reflected in Table 6.5, while HCR did not significantly influence objective team performance (b = 1.81, SE = 3.64, p > .10), HCR significantly influenced subjective team performance (b = .82, SE = .08, p < .01). Therefore, Hypothesis 6a was not supported, but Hypothesis 6b was supported.

6.2. SUPPLEMENTAL ANALYSES

6.2.1. Alternative Measure of Faultlines

There are several different ways to calculate a variable for faultlines, such as *Fau* (Thatcher et al., 2003) and ASW (average silhouette width) faultline clustering (Meyer & Glenz, 2013). I conducted a supplemental analysis to test whether a different measure of faultlines generates results similar to what I found in the hypothesis testing.

ASW uses cluster analysis to detect maximum within-subgroup similarity, allows both numeric and dichotomous attributes, and considers the existence of two or more subgroups (Meyer et al., 2014). Since the data in this dissertation contains six-member teams, which have the potential for more than two subgroups, ASW is also appropriate for this dissertation. To operationalize KSAO-based faultlines, I included the attributes of

Table 6.2 Regression Results for the Mean Level of KSAOs, KSAO-based Faultlines, Communication, and HCR

Variable	Model 1	Model 2	Model 3	Model 4
Intercept	4.22^{**} (.81)	4.06^{**} (.82)	3.85^{**} (.90)	4.79^{**} (.67)
Team Size	.32 (.19)	$.34^{\dagger}$ (.19)	$.40^{\dagger}$ (.21)	.09 (.16)
Diversity	-.10 (.32)	.05 (.35)	-.07 (.35)	.38 (.27)
Mean Level of KSAOs		.20 (.20)	.16 (.19)	-.22 (.15)
KSAO-based Faultlines			.00 (.73)	-.01 (.56)
Communication				$-.75^{**}$ (.10)
Mean Level of KSAOs X KSAO-based Faultlines			2.81^{*}(1.27)	-.72 (1.06)
Mean Level of KSAOs X Communication				.19 (.22)
KSAO-based Faultlines X Communication				1.62^{*} (.76)
Mean Level of KSAOs X KSAO-based Faultlines X Communication				2.45 (1.58)
R^2	.04	.06	.13	.60
F	1.41	1.28	1.79	9.47^{**}
ΔR^2		.02	.07	.47
F change		1.00	$2.48^{\dagger}$	16.72^{**}

Note: N = 66. Standard errors in parentheses. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$.

Table 6.3 Regression Results for the Mean Level of KSAOs, KSAO-based Faultlines, TMS, and HCR

Variable	Model 1	Model 2	Model 3	Model 4
Intercept	4.22** (.81)	4.06** (.82)	3.85** (.90)	5.06** (.69)
Team Size	.32 (.19)	.34† (.19)	.40† (.21)	.10 (.16)
Diversity	-.10 (.32)	.05 (.35)	-.07 (.35)	-.05 (.27)
Mean Level of KSAOs		.20 (.20)	.16 (.19)	-.28† (.16)
KSAO-based Faultlines			.00 (.73)	-.49 (.55)
TMS				1.07** (.14)
Mean Level of KSAOs X KSAO-based Faultlines			2.81*(1.27)	-.08 (.98)
Mean Level of KSAOs X TMS				.50† (.28)
KSAO-based Faultlines X TMS				.75 (1.12)
Mean Level of KSAOs X KSAO-based Faultlines X TMS				-.16 (1.88)
R^2	.04	.06	.13	.62
F	1.41	1.28	1.79	10.07**
ΔR^2		.02	.07	.49
F change		1.00	2.48†	17.88**

Note: N = 66. TMS = transactive memory system. Standard errors in parentheses. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$.

Table 6.4 Regression Results for the Mean Level of KSAOs, KSAO-based Faultlines, Team PA, and HCR

Variable	Model 1	Model 2	Model 3	Model 4
Intercept	4.22** (.81)	4.06** (.82)	3.85** (.90)	5.32** (.83)
Team Size	.32 (.19)	.34† (.19)	.40† (.21)	.13 (.19)
Diversity	-.10 (.32)	.05 (.35)	-.07 (.35)	-.52 (.33)
Mean Level of KSAOs		.20 (.20)	.16 (.19)	-.04 (.19)
KSAO-based Faultlines			.00 (.73)	.15 (.63)
Team PA				.48** (.09)
Mean Level of KSAOs X KSAO-based Faultlines			2.81*(1.27)	2.97* (1.14)
Mean Level of KSAOs X Team PA				.40† (.22)
KSAO-based Faultlines X Team PA				-.13 (.76)
Mean Level of KSAOs X KSAO-based Faultlines X Team PA				-2.22 (1.51)
R^2	.04	.06	.13	.43
F	1.41	1.28	1.79	4.77**
ΔR^2		.02	.07	.30
F change		1.00	2.48†	7.51**

Note: N = 66. Team PA = team positive affect. †p < .10; *p < .05; **p < .01.

Table 6.5 Regression Results for HCR and Team Performance

Variable	Objective Team Performance			Subjective Team Performance		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Intercept	116.51** (22.93)	119.48** (26.08)	112.35** (29.89)	4.81** (.83)	4.91** (.95)	1.70* (.66)
Team Size	-4.41 (5.50)	-4.15 (6.21)	-4.81 (6.39)	.26 (.20)	.21 (.23)	-.09 (.14)
Diversity	-12.10 (8.99)	-17.73† (10.05)	-17.82† (10.11)	-.30 (.33)	-.15 (.37)	-.19 (.22)
Mean Level of KSAOs		-7.20 (5.64)	-7.54 (5.72)		.21 (.21)	.05 (.13)
KSAO-based Faultlines		4.92 (21.07)	4.50 (21.22)		-.46 (.77)	-.64 (.47)
HCR			1.81 (3.64)			.82** (.08)
R^2	.04	.07	.07	.04	.06	.66
F	1.31	1.06	.89	1.24	.93	22.75**
ΔR^2		.03	.00		.02	.60
F change		.82	.25		.63	103.79**

Note: N = 66. HCR = human capital resource. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$.

business classes taken (number), work experience (years), and cold weather experience (years).

I used this alternative measure of faultlines and checked the correlation between the two different measures of faultlines. The results showed that ASW was significantly correlated with *Fau* ($r = .83$, $p < .01$), which was substantially high. I then tested a two-way interaction between the mean level of KSAOs and KSAO-based faultlines (Hypothesis 2) and three-way interactions between the mean level of KSAOs, KSAO-based faultlines, and team processes (Hypotheses 3–5). As shown in Table 6.6, different from the previous finding, KSAO-based faultlines did not significantly moderate the relationship between the mean level of KSAOs and HCR ($b = 1.09$, $SE = 1.30$, $p > .10$). However, like the previous findings, the results as shown in Tables 6.6, 6.7, and 6.8 indicated that communication, TMS, and team PA did not significantly moderate the relationship between the mean level of KSAOs, KSAO-based faultlines, and HCR (communication: $b = 1.65$, $SE = 1.47$, $p > .10$; TMS: $b = .73$, $SE = 1.88$, $p > .10$; team PA: $b = .83$, $SE = 1.62$, $p > .10$). Overall, these results suggested that both measures of faultlines give rise to similar results.

6.2.2. Alternative Measure of HCR

Although I developed a new scale of HCR, I consider the current scale of human capital (Subramaniam & Youndt, 2005)—what I call HCR level—as an alternative measure of HCR. This scale of HCR level, which reflects the degree to which team members have intellectual capital, has been generally used in existing human capital research. Thus, I used an aggregation of this scale, instead of the new HCR scale

developed in Chapter 3, to test whether the results of Subramaniam and Youndt's scale and the new HCR scale are similar.

To compare these two measures, I first checked the correlation between HCR level and HCR. The results indicated the two variables are significantly correlated ($r = .93$, $p < .01$), which was considerably high. Next, I tested a main effect of the mean level of KSAOs on HCR level (Hypothesis 1) and tested a moderating role of KSAO-based faultlines in the relationship between the mean level of KSAOs and HCR level (Hypothesis 2). In addition, I tested three-way interactions between the mean level of KSAOs, KSAO-based faultlines, and team processes on HCR level (Hypotheses 3–5).

As shown in Table 6.9, like the previous finding using the new HCR scale, the mean level of KSAOs was not significantly associated with HCR level ($b = .12$, $SE = .20$, $p > .10$). KSAO-based faultlines did not significantly moderate the relationship between the mean level of KSAOs and HCR level ($b = 2.04$, $SE = 1.30$, $p > .10$), which was different from the previous finding. Moreover, consistent with the prior findings, the three-way interactions were not significant. As indicated in Tables 6.9, 6.10, and 6.11, the moderating roles of communication, TMS, and team PA in the relationship between the mean level of KSAOs, KSAO-based faultlines, and HCR level were not significant (communication: $b = 2.38$, $SE = 1.78$, $p > .10$; TMS: $b = .98$, $SE = 2.19$, $p > .10$; team PA: $b = -.70$, $SE = 1.65$, $p > .10$). In sum, these results reflect that HCR level and HCR generate similar results.

Table 6.6 Regression Results for the Mean Level of KSAOs, KSAO-based Faultlines, Communication, and HCR Using ASW Measure

Variable	Model 1	Model 2	Model 3	Model 4
Intercept	4.22^{**} (.81)	4.06^{**} (.82)	4.08^{**} (.84)	4.84^{**} (.58)
Team Size	.32 (.19)	$.34^{\dagger}$ (.19)	$.34^{\dagger}$ (.20)	.08 (.14)
Diversity	-.10 (.32)	.05 (.35)	.02 (.36)	.38 (.26)
Mean Level of KSAOs		.20 (.20)	.21 (.20)	-.14 (.15)
KSAO-based Faultlines (ASW)			-.01 (.63)	-.04 (.43)
Communication				$.73^{**}$ (.09)
Mean Level of KSAOs X KSAO-based Faultlines			1.09 (1.30)	-.33 (.89)
Mean Level of KSAOs X Communication				.19 (.21)
KSAO-based Faultlines X Communication				1.75^{*} (.67)
Mean Level of KSAOs X KSAO-based Faultlines X Communication				1.65 (1.47)
R^2	.04	.06	.07	.62
F	1.41	1.28	.89	9.94^{**}
ΔR^2		.02	.01	.55
F change		1.00	.36	19.84^{**}

Note: N = 66. Standard errors in parentheses. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$.

Table 6.7 Regression Results for the Mean Level of KSAOs, KSAO-based Faultlines, TMS, and HCR Using ASW Measure

Variable	Model 1	Model 2	Model 3	Model 4
Intercept	4.22^{**} (.81)	4.06^{**} (.82)	4.08^{**} (.84)	4.90^{**} (.56)
Team Size	.32 (.19)	$.34^{\dagger}$ (.19)	$.34^{\dagger}$ (.20)	.14 (.13)
Diversity	-.10 (.32)	.05 (.35)	.02 (.36)	-.04 (.26)
Mean Level of KSAOs		.20 (.20)	.21 (.20)	$-.31^{*}$ (.16)
KSAO-based Faultlines (ASW)			-.01 (.63)	-.52 (.42)
TMS				1.10^{**} (.13)
Mean Level of KSAOs X KSAO-based Faultlines			1.09 (1.30)	-.68 (.89)
Mean Level of KSAOs X TMS				$.52^{*}$ (.26)
KSAO-based Faultlines X TMS				.61 (.97)
Mean Level of KSAOs X KSAO-based Faultlines X TMS				.73 (1.88)
R^2	.04	.06	.07	.63
F	1.41	1.28	.89	10.43^{**}
ΔR^2		.02	.01	.56
F change		1.00	.36	20.88^{**}

Note: N = 66. TMS = transactive memory system. Standard errors in parentheses. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$.

Table 6.8 Regression Results for the Mean Level of KSAOs, KSAO-based Faultlines, Team PA, and HCR Using ASW Measure

Variable	Model 1	Model 2	Model 3	Model 4
Intercept	4.22** (.81)	4.06** (.82)	4.08** (.84)	5.24** (.79)
Team Size	.32 (.19)	.34† (.19)	.34† (.20)	.10 (.18)
Diversity	-.10 (.32)	.05 (.35)	.02 (.36)	-.25 (.34)
Mean Level of KSAOs		.20 (.20)	.21 (.20)	.13 (.19)
KSAO-based Faultlines (ASW)			-.01 (.63)	.28 (.56)
Team PA				.45** (.09)
Mean Level of KSAOs X KSAO-based Faultlines			1.09 (1.30)	.85 (1.14)
Mean Level of KSAOs X Team PA				.20 (.21)
KSAO-based Faultlines X Team PA				.43 (.69)
Mean Level of KSAOs X KSAO-based Faultlines X Team PA				.83 (1.62)
R^2	.04	.06	.07	.37
F	1.41	1.28	.89	3.58**
ΔR^2		.02	.01	.30
F change		1.00	.36	6.52**

Note: N = 66. Team PA = team positive affect. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$.

Table 6.9 Regression Results for the Mean Level of KSAOs, KSAO-based Faultlines, Communication, and HCR Level

Variable	Model 1	Model 2	Model 3	Model 4
Intercept	4.05^{**} (.81)	3.95^{**} (.82)	3.73^{**} (.91)	4.64^{**} (.75)
Team Size	$.38^{*}$ (.19)	$.39^{*}$ (.19)	$.46^{*}$ (.22)	.17 (.18)
Diversity	-.23 (.32)	-.14 (.35)	-.23 (.36)	.13 (.30)
Mean Level of KSAOs		.12 (.20)	.90 (.20)	-.28 (.17)
KSAO-based Faultlines			.12 (.75)	.02 (.63)
Communication				$.69^{**}$ (.11)
Mean Level of KSAOs X KSAO-based Faultlines			2.04 (1.30)	-1.12 (1.20)
Mean Level of KSAOs X Communication				.27 (.25)
KSAO-based Faultlines X Communication				1.23 (.86)
Mean Level of KSAOs X KSAO-based Faultlines X Communication				2.38 (1.78)
R^2	.06	.07	.11	.50
F	2.14	1.53	1.46	6.27^{**}
ΔR^2		.01	.04	.39
F change		.37	1.31	11.07^{**}

Note: N = 66. Standard errors in parentheses. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$.

Table 6.10 Regression Results for the Mean Level of KSAOs, KSAO-based Faultlines, TMS, and HCR Level

Variable	Model 1	Model 2	Model 3	Model 4
Intercept	4.05^{**} (.81)	3.95^{**} (.82)	3.73^{**} (.91)	4.65^{**} (.80)
Team Size	.38 (.19)	$.39^{*}$ (.19)	$.46^{*}$ (.22)	.21 (.19)
Diversity	-.23 (.32)	-.14 (.35)	-.23 (.36)	-.17 (.31)
Mean Level of KSAOs		.12 (.20)	.90 (.20)	$-.33^{\dagger}$ (.18)
KSAO-based Faultlines			.12 (.75)	-.26 (.63)
TMS				$.93^{**}$ (.16)
Mean Level of KSAOs X KSAO-based Faultlines			2.04 (1.30)	-.72 (1.14)
Mean Level of KSAOs X TMS				.41 (.33)
KSAO-based Faultlines X TMS				1.11 (1.30)
Mean Level of KSAOs X KSAO-based Faultlines X TMS				.98 (2.19)
R^2	.06	.07	.11	.49
F	2.14	1.53	1.46	5.98^{**}
ΔR^2		.01	.04	.38
F change		.37	1.31	10.49^{**}

Note: N = 66. TMS = transactive memory system. Standard errors in parentheses. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$.

Table 6.11 Regression Results for the Mean Level of KSAOs, KSAO-based Faultlines, Team PA, and HCR Level

Variable	Model 1	Model 2	Model 3	Model 4
Intercept	4.05^{**} (.81)	3.95^{**} (.82)	3.73^{**} (.91)	4.90^{**} (.91)
Team Size	.38 (.19)	$.39^{*}$ (.19)	$.46^{*}$ (.22)	.23 (.21)
Diversity	-.23 (.32)	-.14 (.35)	-.23 (.36)	-.57 (.36)
Mean Level of KSAOs		.12 (.20)	.90 (.20)	-.04 (.20)
KSAO-based Faultlines			.12 (.75)	.33 (.69)
Team PA				$.42^{**}$ (.10)
Mean Level of KSAOs X KSAO-based Faultlines			2.04 (1.30)	1.90 (1.24)
Mean Level of KSAOs X Team PA				.27 (.24)
KSAO-based Faultlines X Team PA				-.10 (.83)
Mean Level of KSAOs X KSAO-based Faultlines X Team PA				-.70 (1.65)
R^2	.06	.07	.11	.33
F	2.14	1.53	1.46	3.12^{**}
ΔR^2		.01	.04	.22
F change		.37	1.31	4.75^{**}

Note: N = 66. Team PA = team positive affect. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$.

6.2.3. Conditional Indirect Effect

Since the aim of this dissertation is to explore a direct effect of the mean level of KSAOs on HCR, a two-way interactive effect of the mean level of KSAOs and KSAO-based faultlines on HCR, three-way interactive effects of the mean level of KSAOs, KSAO-based faultlines, and team processes on HCR, and a direct effect of HCR on team performance, I did not conduct a test of the conditional indirect effect. However, the full model of this dissertation assumes the conditional indirect effect; therefore, I further tested whether the effect of the mean level of KSAOs on team performance in teams with strong (weak) KSAO-based faultlines and a high (low) level of team processes (i.e., communication, TMS, and team PA) is mediated by HCR. To test the conditional indirect effect, I used Hayes' (2013) PROCESS macro (Model 11; 5,000 bootstrap samples). As shown in Tables 6.12, 6.13, and 6.14, the conditional indirect effect was significant in one combination of KSAO-based faultlines and team processes. When teams have loosely aligned KSAOs and a low level of PA, the effect of the mean level of KSAOs on team performance was significantly mediated by HCR (bootstrapped indirect effect = -.79, 95% CI = [-2.15, -.15]). Excluding this combination, the conditional indirect effects were not significant in any combinations of KSAO-based faultlines and team processes.

Table 6.12 Conditional Indirect Effects Between the Mean Level of KSAOs and Team Performance via HCR: Communication

DV = Objective Team Performance				
Moderator 1	Moderator 2	Indirect Effect	95% CI Lower Bound	95% CI Upper Bound
Weak KSAO-based Faultlines	Low Communication (-1SD)	-.10	-3.48	2.70
(-1SD)	High Communication (+1SD)	-.38	-3.43	1.82
Strong KSAO-based Faultlines	Low Communication (-1SD)	-1.20	-5.94	4.85
(+1SD)	High Communication (+1SD)	.04	-1.61	1.84

Note: CI = confidence interval. Bootstrapping repetition n = 5,000. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$.

DV = Subjective Team Performance				
Moderator 1	Moderator 2	Indirect Effect	95% CI Lower Bound	95% CI Upper Bound
Weak KSAO-based Faultlines	Low Communication (-1SD)	-.04	-.78	.49
(-1SD)	High Communication (+1SD)	-.17	-.64	.31
Strong KSAO-based Faultlines	Low Communication (-1SD)	-.53	-1.10	.30
(+1SD)	High Communication (+1SD)	.02	-.38	.33

Note: CI = confidence interval. Bootstrapping repetition n = 5,000. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$.

Table 6.13 Conditional Indirect Effects Between the Mean Level of KSAOs and Team Performance via HCR: TMS

DV = Objective Team Performance				
Moderator 1	Moderator 2	Indirect Effect	95% CI Lower Bound	95% CI Upper Bound
Weak KSAO-based Faultlines	Low TMS (-1SD)	-.96	-5.82	2.39
(-1SD)	High TMS (+1SD)	-.04	-1.52	2.14
Strong KSAO-based Faultlines	Low TMS (-1SD)	-.96	-7.65	2.68
(+1SD)	High TMS (+1SD)	-.11	-2.34	1.05

Note: CI = confidence interval; TMS = transactive memory system. Bootstrapping repetition *n* = 5,000. †p < .10; *p < .05; **p < .01.

DV = Subjective Team Performance				
Moderator 1	Moderator 2	Indirect Effect	95% CI Lower Bound	95% CI Upper Bound
Weak KSAO-based Faultlines	Low TMS (-1SD)	-.42	-.97	.17
(-1SD)	High TMS (+1SD)	-.02	-.36	.40
Strong KSAO-based Faultlines	Low TMS (-1SD)	-.42	-1.14	.17
(+1SD)	High TMS (+1SD)	-.05	-.39	.21

Note: CI = confidence interval; TMS = transactive memory system. Bootstrapping repetition *n* = 5,000. †p < .10; *p < .05; **p < .01.

Table 6.14 Conditional Indirect Effects Between the Mean Level of KSAOs and Team Performance via HCR: Team PA

DV = Objective Team Performance				
Moderator 1	Moderator 2	Indirect Effect	95% CI Lower Bound	95% CI Upper Bound
Weak KSAO-based Faultlines	Low Team PA (-1SD)	-1.79	-11.04	5.81
(-1SD)	High Team PA (+1SD)	.25	-1.04	2.58
Strong KSAO-based Faultlines	Low Team PA (-1SD)	.44	-4.21	4.64
(+1SD)	High Team PA (+1SD)	.79	-2.29	4.99

Note: CI = confidence interval; Team PA = team positive affect. Bootstrapping repetition n = 5,000. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$.

DV = Subjective Team Performance				
Moderator 1	Moderator 2	Indirect Effect	95% CI Lower Bound	95% CI Upper Bound
Weak KSAO-based Faultlines	Low Team PA (-1SD)	-.79*	-2.15	-.15
(-1SD)	High Team PA (+1SD)	.11	-.11	.48
Strong KSAO-based Faultlines	Low Team PA (-1SD)	.19	-.64	1.00
(+1SD)	High Team PA (+1SD)	.35	-.20	.73

Note: CI = confidence interval; Team PA = team positive affect. Bootstrapping repetition n = 5,000. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$.

CHAPTER 7

DISCUSSION

This dissertation extends the human capital literature by building our knowledge about a team's KSAOs, HCR, team processes, and team performance. Drawing on human capital, faultlines, and multilevel theories, I explored how two forms of a team's KSAOs (i.e., the mean level of KSAOs and KSAO-based faultlines) influence HCR, which in turn affects team performance. To be specific, given the importance and necessity of a new HCR scale that reflects the unique features of HCR (i.e., collective team-level capabilities, relevance to team outcomes, and amplification or transformation of individual KSAOs through emergence processes), I developed and validated a new comprehensive HCR scale. This new comprehensive HCR scale includes the three subscales of HCR level, outcome, and emergence that reflect all three unique features of HCR.

Using this HCR scale, I investigated the main effect of the mean level of KSAOs on HCR, as well as the interactive effect of the mean level of KSAOs and KSAO-based faultlines on HCR. I found the mean level of KSAOs was not significantly associated with HCR. In addition, regarding the moderating role of KSAO-based faultlines, I expected the positive relationship between the mean level of KSAOs and HCR would be weaker in teams with strong KSAO-based faultlines, while the positive relationship would be stronger in teams with weak KSAO-based faultlines. Consistent with my prediction, I found that strong KSAO-based faultlines positively influence the

relationship between the mean level of KSAOs and HCR. However, contrary to my prediction, I found that weak KSAO-based faultlines negatively influence the relationship between the mean level of KSAOs and HCR. Surprisingly, this finding suggests that poor, loosely aligned KSAOs as a whole are better for building HCR within teams than superior, loosely aligned KSAOs. This may be because team members understand the KSAOs of other members when KSAOs are loosely aligned. When members have superior KSAOs, they may be confident about completing their tasks and may not need to consider the KSAOs of other members. This offers fewer opportunities to leverage KSAOs into HCR. In contrast, members who have poor KSAOs may not rely on their own KSAOs to complete tasks and may pay more attention to the knowledge and understanding of other members. This can provide more opportunities to maximize KSAOs to develop HCR.

Building on this interactive impact of the mean level of KSAOs and KSAO-based faultlines on HCR, I considered the key role of team processes in developing HCR. I tested how team processes (i.e., communication, TMS, and team PA) influence the relationship between the mean level of KSAOs, KSAO-based faultlines, and HCR. Unexpectedly, I found that communication, TMS, and team PA do not have statistically significant effects on the relationship between the mean level of KSAOs, KSAO-based faultlines, and HCR. Finally, I examined how HCR impacts team performance. I found that HCR does not significantly influence objective team performance, but does significantly influence subjective team performance.

7.1. THEORETICAL AND PRACTICAL IMPLICATIONS

7.1.1. *Theoretical Implications*

This dissertation offers theoretical contributions to the human capital literature in three ways. First, this dissertation reinforces the extant understanding of human capital by considering the configuration of KSAOs within teams along with the level of KSAOs. Previous studies have often used the mean level of KSAOs to reflect human capital at any given level (e.g., unit or firm), yet they have largely ignored how individuals' KSAOs work together in any given unit. However, some recent human capital researchers have acknowledged the importance of the interdependence of KSAOs across members within units (Ployhart et al., 2014). Teams may have the same level of KSAOs, but each team can have a different configuration of KSAOs depending on team composition. With this in mind, I drew upon multilevel theories and faultlines research to introduce KSAO-based faultlines that reflect how an individual's KSAOs are aligned with the KSAOs of other members within a context. This dissertation extends understanding of the interdependent nature of individuals' KSAOs within a context.

Second, this dissertation advances our understanding of where HCR comes from. This dissertation shows how the mean level of KSAOs and KSAO-based faultlines are associated with HCR, clarifying important factors that influence HCR. Most previous human capital research has long been interested in the impact of HCR on outcomes, such as performance, for any given unit. A few studies have theorized the development process of HCR (Ployhart & Moliterno, 2011) and focused on what antecedents determine HCR (e.g., Wright et al., 1999). In this regard, I showed that the mean level of KSAOs and KSAO-based faultlines jointly influence HCR by capturing different

components of a team's KSAOs (i.e., level and configuration). That is, although previous research has supported that the mean level of KSAOs increases HCR, I found this relationship hinges on KSAO-based faultlines. For example, a low mean level of KSAOs is generally expected to be less associated with HCR than a high mean level of KSAOs. However, I found that, even with a low mean level of KSAOs, teams with weak KSAO-based faultlines are more likely to have HCR because the loose alignment of KSAOs allows synergy and leveraging of KSAOs for HCR. By demonstrating the mean level of KSAOs and KSAO-based faultlines as essential factors that affect HCR, this dissertation sheds light on the development of HCR.

Third, this dissertation contributes to human capital research by suggesting a new scale of HCR based on recent works on the theoretical development of HCR, which is conceptually different from human capital (Ployhart & Moliterno, 2011; Ployhart et al., 2014). Based on recent studies, HCR may consist of three unique features: collective-level capabilities derived from individual KSAOs, relevance to collective-level outcomes, and amplification or transformation of individual KSAOs through emergence processes. However, the existing measures of human capital use aggregate scores of KSAO proxies (e.g., education and tenure) or aggregate scores of individual human capital from survey items; thus, these measures do not completely reflect the three distinct features of HCR together. Therefore, this dissertation contributes to the literature by developing and validating a new comprehensive scale of HCR that goes beyond the existing measures of human capital to include the three unique features of HCR.

7.1.2. *Practical Implications*

This dissertation offers practical implications for researchers and practitioners. First, the findings enable practitioners to understand how HCR forms within a context, with particular attention to both the level and configuration of KSAOs as essential factors for HCR. In general, human capital research argues that teams whose members have high quality KSAOs are more likely to develop HCR than teams whose members have low quality KSAOs. However, I found the relationship between KSAO quality and HCR depends on the configuration of KSAOs. In the case of teams with loosely aligned KSAOs, teams with low quality KSAOs more effectively combine and maximize them for HCR than do teams with high quality KSAOs. In the case of teams with clearly distinct KSAOs, teams with high quality KSAOs are better at building HCR. Thus, this provides practitioners a valuable guideline for organizing teams. For example, when a team has low quality, clearly distinct sets of KSAOs, practitioners should consider hiring a member who has KSAOs bridging the original subsets of KSAOs. Consequently, practitioners can coordinate their team's composition by adding new members and retaining or moving existing members to increase HCR.

Second, this dissertation offers practitioners valuable insight into what happens to HCR within a context. This dissertation successfully develops a new scale of HCR that represents team members' subjective perceptions of the extent to which they possess KSAOs, the extent to which they transform KSAOs into HCR, and the extent to which HCR is related to team outcomes. Practitioners can use this scale as a tool to evaluate whether HCR actually exists within their team and further encourage team members to maximize their KSAOs. For example, for teams in which HCR does not yet exist,

practitioners can establish appropriate plans for rewards, benefits, and compensation to lead members to leverage their KSAOs to build HCR.

7.2. LIMITATIONS AND FUTURE DIRECTIONS

There are some limitations to this dissertation that should be addressed in future research. First, although a series of tests for scale development and validation offered strong support for the new HCR scale, I used only a laboratory sample. Scholars have often used both laboratory and field samples to develop and validate new scales to ensure application in all other settings (e.g., Lewis, 2003). Therefore, future research should use a field sample to test this scale. Additionally, I used two sets of data including individual-level and team-level data to validate the HCR scale. The sample size of the individual-level data was appropriate, but the sample size of the team-level data was relatively small. Although scale development and validation with individual-level data is common (Bliese, Maltarich, Hendricks, Hofmann, & Adler, 2019), a more comprehensive validation will require more tests with a larger sample of team-level data.

Second, related to the first limitation, this dissertation shows the new scale of HCR is different from the scales of TMS and team learning behavior, supported by the discriminant validity analysis in Chapter 3. Other collective constructs may describe aspects similar to those of HCR, but these constructs are conceptually different. For example, group potency refers to “the collective belief in a group that it can be effective” (Guzzo, Yost, Campbell, & Shea, 1993, p. 87) and may describe an aspect of HCR outcome. However, because the construct of HCR developed in Chapter 3 includes three unique features together (i.e., HCR level, outcome, and emergence), I expect group

potency is distinct from HCR. Tests comparing HCR with other collective constructs will provide more concrete evidence that HCR is distinct.

Third, this dissertation tested the hypothesized model with undergraduate students who had not worked together in the past. Students performing team decisions in a business class was appropriate for testing the hypothesized model because students had the opportunity to use not only their own KSAOs but also those of other students on their team, allowing them to focus on their decision-making tasks. However, tests in different social contexts are needed because the winter survival exercise might not reflect real business situations. For instance, compared to our sample of undergraduate students, some actual business contexts may have a high level of uncertainty and complexity. Therefore, it is necessary to replicate this study in the field with diverse samples. Future research could explore the hypothesized model in diverse social contexts to improve generalizability.

Fourth, this dissertation focused on communication, TMS, and team PA as behavioral, cognitive, and affective emergent enabling states, and explored the interactive impact of each of emergent enabling states on the relationship between the mean level of KSAOs, KSAO-based faultlines, and HCR. However, Ployhart and Moliterno (2011) pointed out that emergence enabling states can be interdependent. In particular, behavioral states are central to the existence of cognitive and affective states. In this regard, future studies should investigate the relationships between behavioral, cognitive, and affective states and the impact of emergence enabling states on the development of HCR.

Fifth, human capital researchers have suggested task environment plays an essential role in the emergence processes of individual KSAOs (Ployhart & Moliterno, 2011). This dissertation used a winter survival task that was not highly interdependent because participation by all team members was not necessary. However, task interdependence influences how individual KSAOs emerge as HCR (Ployhart & Moliterno, 2011; Wright & McMahan, 2011). A high level of task interdependence represents considerable need for interaction and coordination for performing tasks (e.g., Bachrach, Powell, Bendoly, & Richey, 2006; Katz-Navon & Erez, 2005). In contrast, a low level of task interdependence requires little or no cooperative effort from team members and has limited need for collective resources for task completion. Therefore, task interdependence may provide opportunity to share and combine individual KSAOs. Future research could explore how different levels of task interdependence influence HCR formation.

Sixth, this dissertation used the three attributes of business classes taken, work experience, and cold weather experience as proxies for the mean level of KSAOs and KSAO-based faultlines. However, there are many different proxies for KSAOs. For example, previous studies have used education, experience, and tenure (e.g., Berman et al., 2002; Carpenter et al., 2001; Hitt et al., 2006; Pennings et al., 1998). Apart from the three objective proxies for KSAOs, I did not ask participants about what KSAOs were valuable, important, and helpful for their tasks. There could have been other KSAOs that were more impactful and appropriate for participants in the performance of their task. Other proxies may explain the nonsignificant effect of the mean level of KSAOs on HCR. Therefore, future research should identify important KSAOs for a particular task

and use more diverse proxies to reflect those KSAOs to explore how the mean level of KSAOs and KSAO-based faultlines influence HCR.

Finally, this dissertation used a cross-sectional perspective to explore the impacts of the mean level of KSAOs and KSAO-based faultlines on HCR, which in turn influences team performance. Recent works on HCR development have suggested that social environment, which takes into account interaction patterns among team members, can highly influence HCR. These interaction patterns may depend on a team's history or membership changes over time. For example, when newcomers join a team, its combination of KSAOs can be different from that of the original team. These two distinct combinations of KSAOs can differently influence HCR. As a result, future studies could examine the dynamic nature of HCR from a longitudinal perspective.

7.3. CONCLUSION

Recent conceptual advancements in HCR (Nyberg et al., 2014; Ployhart & Moliterno, 2011; Ployhart et al., 2014) call for research on the construct validation, antecedents, and outcomes of HCR. To unpack these three issues, I develop and validate a new comprehensive scale of HCR to capture its unique aspects. In addition, considering jointly the level and configural nature of a team's KSAOs, I investigate an interactive causal effect of the mean level of KSAOs and KSAO-based faultlines on HCR. Furthermore, I examine the moderating role of team processes in the relationship between the mean level of KSAOs, KSAO-based faultlines, and HCR. Finally, I explore the effect of HCR on team performance. Therefore, this dissertation improves overall understanding of what HCR is, where HCR comes from, and how HCR influences outcomes within a context.

REFERENCES

Ackerman, P. L. 1996. A theory of adult intellectual development: Personality, interest, and knowledge. *Intelligence*, 22: 227–257.

Ackerman, P. L., & Heggestad, E. D. 1997. Intelligence, personality, and interests: Evidence for overlapping traits. *Psychological Bulletin*, 121: 219–245.

Akgün, A. E., Byrne, J., Keskin, H., Lynn, G. S., & Imamoglu, S. Z. 2005. Knowledge networks in new product development projects: A transactive memory perspective. *Information and Management*, 42: 1105–1120.

Alchian, A. A., & Demsetz, H. 1972. Production, information costs, and economic organization. *American Economic Review*, 62: 777–795.

Allison, P. D. 1978. Measures of Inequality. *American Sociological Review*, 43: 865–880.

Ancona, D. G., & Caldwell, D. F. 1992. Demography and design: Predictors of new product team performance. *Organization Science*, 3: 321–341.

Antino, M., Rico, R., & Thatcher, S. M. B. (in press). Structuring reality through the faultlines lens: The effects of structure, fairness, and status conflict on the activated faultlines-performance relationship. *Academy of Management Journal*. doi.org/10.5465/amj.2017.0054.

Aspinwall, L. G. 1998. Rethinking the role of positive affect in self-regulation. *Motivation and Emotion*, 22: 1–32.

Aspinwall, L. G. 2001. Dealing with adversity: Self-regulation, coping, adaptation, and health. In A. Tesser, & N. Schwarz (Eds.), *Blackwell handbook of social psychology: Vol 1. lntrapersonal processes*: 159–614. Maiden, MA: Blackwell.

Austin, J. R. 2003. Transactive memory in organizational groups: The effects of content, consensus, specialization, and accuracy on group performance. *Journal of Applied Psychology*, 88: 866–878.

Bachrach, D. G., Powell, B. C., Bendoy, E., & Richey, R. G. 2006. Organizational citizenship behavior and performance evaluations: Exploring the impact of task interdependence. *Journal of Applied Psychology*, 19: 193–201.

Bae, J., & Lawler, J. J. 2000. Organizational performance and HRM strategies in Korea: Impact on firm performance in an emerging economy. *Academy of Management Journal*, 43: 502–517.

Barney, J. B. 1986. Strategic factor markets: Expectations, luck, and business strategy. *Management Science*, 32: 1231–1241.

Barney, J. B. 1991. Firm resources and sustained competitive advantage. *Journal of Management*, 17: 99–120.

Barney, J. B., & Wright, P. M. 1998. On becoming a strategic partner: The role of human resources in gaining competitive advantage. *Human Resource Management*, 37: 31–46.

Barsade, S. G. 2002. The ripple effect: Emotional contagion and its influence on group behavior. *Administrative Science Quarterly*, 47: 644–675.

Barsade, S. G., & Gibson, D. E. 1998. Group emotion: A view from top and bottom. In M. A. Neale, & E. A. Mannix (Eds.), *Research on managing groups and teams*: 81–102. Greenwich, CT: JAI Press.

Barsade, S. G., & Gibson, D. E. 2012. Group affect: Its influence on individual and group outcomes. *Current Directions in Psychological Science*, 21: 119–123.

Bartel, C. A. 2001. Social comparisons in boundary-spanning work: Effects of community outreach on members' organizational identity and identification. *Administrative Science Quarterly*, 46: 379–413.

Becker, G. S. 1964. *Human capital*. New York: Columbia University Press.

Becker, G. S. 2002. *The age of human capital: Education in the twenty-first century*. Palo Alto, CA: Hoover Institution Press.

Becker, B. E., & Huselid, M. A. 2006. Strategic human resource management: Where do we go from here? *Journal of Management*, 32: 898–925.

Bell, B. S., & Kozlowski, S. W. J. 2002. A typology of virtual teams: Implications for effective leadership. *Group and Organization Management*, 27: 14–49.

Bell, S. T., Villado, A. J., Lukasik, M. A., Belau, L., & Briggs, A. L. 2011. Getting specific about demographic diversity variable and team performance relationships: A meta-analysis. *Journal of Management*, 37: 709–743.

Berman, S. L., Down, J., & Hill, C. W. L. 2002. Tacit knowledge as a source of competitive advantage in the national basketball. *Academy of Management Journal*, 45: 13–31.

Beus, J. M., Jarrett, S. M., Bergman, M. E., & Payne, S. C. 2012. Perceptual equivalence of psychological climates within groups: When agreement indices do not agree. *Journal of Occupational and Organizational Psychology*, 85: 454–471.

Bezrukova, K., Jehn, K., Zanutto, E. L., & Thatcher, S. M. B. 2009. Do workgroup faultlines help or hurt? A moderated model of faultlines, team identification, and group performance. *Organization Science,* 20: 35–50.

Bezrukova, K., Spell, C. S., Caldwell, D., & Burger, J. M. 2016. A multilevel perspective on faultlines: Differentiating the effects between group- and organizational-level faultlines. *Journal of Applied Psychology*, 101: 86–107.

Bezrukova, K., Spell, C., & Perry, J. 2010. Violent splits or healthy divides? Coping with injustice through faultlines. *Personnel Psychology,* 63: 719–751.

Bezrukova, K., Thatcher, S. M. B., & Jehn, K. 2007. Group heterogeneity and faultlines: Comparing alignment and dispersion theories of group composition. In K. J. Behfar, & L. L. Thompson (Eds.), *Conflict in organizational groups: New directions in theory and practice*: 57–92. Evanston, IL: Northwestern University Press.

Bezrukova, K., Thatcher, S. M. B., Jehn, K. A., & Spell, C. S. 2012. The effects of alignments: Examining group faultlines, organizational cultures, and performance. *Journal of Applied Psychology*, 97: 77–92.

Bliese, P. D., Maltarich, M. A., Hendricks, J. L., Hofmann, D. A., & Adler, A. B. 2019. Improving the measurement of group-level constructs by optimizing between-group differentiation. *Journal of Applied Psychology*, 104: 293–302.

Boies, K., & Howell, J. M. 2006. Leader-member exchange in teams: An examination of the interaction between relationship differentiation and mean LMX in explaining team-level outcomes. *Leadership Quarterly*, 17: 246–257.

Bowen, D. E., & Ostroff, C. 2004. Understanding HRM–firm performance linkages: The role of the “strength” of the HRM system. *Academy of Management Review*, 29: 203–221.

Bramesfeld, K. D., & Gasper, K. 2008. Happily putting the pieces together: A test of two explanations for the effects of mood on group-level information processing. *British Journal of Social Psychology*, 47: 285–309.

Brewer, M. B. 1991. The social self: On being the same and different at the same time. *Personality and Social Psychology Bulletin*, 17: 475–482.

Brewer, M. B. 2001. Ingroup identification and intergroup conflict. In R. D. Ashmore, L. Jussim, & D. Wilder (Eds.), *Social identity, intergroup conflict, and conflict reduction*: 17–41. Oxford, UK: Oxford University Press.

Brewer, M. B., Manzi, J. M., & Shaw, J. S. 1993. In-group identification as a function of depersonalization, distinctiveness, and status. *Psychological Science*, 4: 88–92.

Browne, M. W., & Cudeck, R. 1993. Alternative ways of assessing model fit. In K. A. Bollen, & J. S. Long (Eds.), *Testing structural equation models*: 136–162. Newbury Park, CA: Sage.

Burton-Jones, A., & Spender, J. C. 2011. *Oxford handbook of human capital*. Oxford, UK: Oxford University Press.

Byrne, D. E. 1971. *The attraction paradigm*. New York: Academic Press.

Campbell, B. A., Coff, R., & Kryscynski, D. 2012. Rethinking sustained competitive advantage from human capital. *Academy of Management Review*, 37: 376–395.

Campbell, D. T., & Fiske, D. W. 1959. Convergent and discriminant validation by the multitrait–multimethod matrix. *Psychological Bulletin*, 56: 85–105.

Carpenter, M. A., Sanders, G., & Gregersen, H. B. 2001. Bundling human capital with organizational context: The impact of international assignment experience on multinational firm performance and CEO pay. *Academy of Management Journal*, 44: 493–511.

Carton, A. M., & Cummings, J. N. 2012. A theory of subgroups in work teams. *Academy of Management Review*, 37: 441–470.

Carton, A. M., & Cummings, J. N. 2013. The impact of subgroup type and subgroup configurational properties on work team performance. *Journal of Applied Psychology*, 98: 732–758.

Chan, D. 1998. Functional relations among constructs in the same content domain at different levels of analysis: A typology of composition models. *Journal of Applied Psychology*, 83: 234–246.

Chan, D. 2019. Team-level constructs. *Annual Review of Oragnizational Psychology and Organizational Behavior*, 6: 325–348.

Chen, S., Wang, D., Zhou, Y., Chen, Z., & Wu, D. 2017. When too little or too much hurts: Evidence for a curvilinear relationship between team faultlines and performance. *Asia Pacific Journal of Management*, 1–20.

Cheung, G. W., & Rensvold, R. B. 2002. Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9: 233–255.

Chiu, Y.-T., & Staples, D. S. 2013. Reducing faultlines in geographically dispersed teams: Self-disclosure and task elaboration. *Small Group Research*, 44: 498–531.

Choi, J. N., & Sy, T. 2010. Group-level organizational citizenship behavior: Effects of demographic faultlines and conflict in small work groups. *Journal of Organizational Behavior*, 31: 1032–1054.

Chrobot-Mason, D., Ruderman, M. N., Weber, T. J., & Ernst, C. 2009. The challenge of leading on unstable ground: Triggers that activate social identity faultlines. *Human Relations*, 62: 1763–1794.

Chung, Y., Liao, H., Jackson, S. E., Subramony, M., Colakoglu, S., & Jiang, Y. 2015. Cracking but not breaking: Joint effects of faultline strength and diversity climate on loyal behavior. *Academy of Management Journal*, 58: 1495–1515.

Coff, R., & Kryscynski, D. 2011. Drilling for micro-foundations of human capital-based competitive advantages. *Journal of Management*, 37: 1429–1443.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. 2003. *Applied multiple regression/correlation analysis for the behavioral sciences*. Mahwah, NJ: Lawrence Erlbaum Associates.

Coleman, J. S. 1988. Social capital in the creation of human capital. *American Journal of Sociology*, 94: S95–S120.

Colquitt, J. A., Noe, R. A., & Jackson, C. L. 2002. Justice in teams: Antecedents and consequences of procedural justice climate. *Personnel Psychology*, 55: 83–109.

Combs, J., Liu, Y., Hall, A., & Ketchen, D. 2006. How much do high-performance work practices matter? A meta-analysis of their effects on organizational performance. *Personnel Psychology*, 59: 501–528.

Cook, K., Kallen, M., & Amtmann, D. 2009. Having a fit: Impact of number of items and non-normality on tests of IRT's unidimensionality assumption. *Quality of Life Research*, 18: 447–460.

Cooper, D., Patel, P., & Thatcher, S. M. B. 2014. It depends: Environmental context and the effects of faultlines on top management team performance. *Organization Science*, 25: 633–652.

Cronbach, L. J. 1951. Coefficient alpha and the internal structure of tests. *Psychometrika*, 16: 297–334.

Cronin, M. A., Bezrukova, K., Weingart, L. R., & Tinsley, C. H. 2011. Subgroups within a team: The role of cognitive and affective integration. *Journal of Organizational Behavior*, 32: 831–849.

Crook, T. R., Todd, S. Y., Combs, J. G., & Woehr, D. J. 2011. Does human capital matter? A meta-analysis of the relationship between human capital and firm performance. *Journal of Applied Psychology*, 96: 443–456.

Crucke, S., & Knockaert, M. 2016. When stakeholder representation leads to faultlines. A study of board service performance in social enterprises. *Journal of Management Studies*, 53: 768–793.

Daft, R. L., & Lengel, R. H. 1984. Information richness. A new approach to managerial behavior and organization design. *Research in Organizational Behavior*, 6: 191–233.

Dau, L. A. 2016. Biculturalism, team performance, and cultural-faultline bridges. *Journal of International Management*, 22: 48–62.

DeVellis, R. F. 1991. *Scale development: Theory and applications*. Newbury Park, CA: Sage.

Diener, E., & Emmons, R. A. 1984. The independence of positive and negative affect. *Journal of Personality and Social Psychology*, 47: 1105–1117.

Dierickx, I., & Cool, K. 1989. Asset stock accumulation and sustainability of competitive advantage. *Management Science*, 35: 1504–1511.

Dineen, B. R., Noe, R. A., Shaw, J. D., Duffy, M. K., & Wiethoff, C. 2007. Level and dispersion of satisfaction in teams: Using foci and social context to explain the satisfaction-absenteeism relationship. *Academy of Management Journal*, 50: 623–643.

Dwertmann, D. J. G., Nishii, L. H., & van Knippenberg, D. 2016. Disentagling the fairness & discrimination and synergy perspectives on diversity climate: Moving the field forward. *Journal of Management*, 42: 1136–1168.

Edmondson, A. 1999. Psychological safety and learning behavior in work teams. *Administrative Science Quarterly*, 44: 350–383.

Ellis, A. P. J., Mai, K. M., & Christian, J. S. 2013. Examining the asymmetrical effects of goal faultlines in groups: A categorization-elaboration approach. *Journal of Applied Psychology*, 98: 948–961.

Faraj, S., Sproull, L., Smith, R. H., & Stern, L. N. 2000. Coordinating expertise in software development teams. *Management Science*, 46: 1554–1568.

Fischer, A. H., & Manstead, A. S. R. 2008. Social functions of emotion. In M. Lewis, J. Haviland-Jones, & L. F. Barrett (Eds.), *Handbook of emotions*: 456–468. New York, NY: Guilford Press.

Fredrickson, B. L., & Joiner, T. 2002. Positive emotions trigger upward spirals toward emotional well-being. *Psychological Science*, 13: 172–175.

Fulmer, I. S., & Ployhart, R. E. 2014. Our most important asset: A multidisciplinary/multilevel review of human capital valuation for research and practice. *Journal of Management*, 40: 161–192.

Gajendran, R. S., & Joshi, A. 2012. Innovation in globally distributed teams: The role of LMX, communication frequency, and member influence on team decisions. *Journal of Applied Psychology*, 97: 1252–1261.

Galunic, D. C., & Anderson, E. 2000. From security to mobility: Generalized investments in human capital and agent commitment. *Organization Science*, 11: 1–20.

Gardner, H., Gino, F., & Staats, B. 2012. Dynamically integrating knowledge in teams: A resource-based view of team performance. *Academy of Management Journal*, 55: 998–1022.

George, J. M. 1990. Personality, affect, and behavior in groups. *Journal of Applied Psychology*, 75: 107–116.

Gibson, C. B. 2003. The efficacy advantage: Factors related to the formation of group efficacy. *Journal of Applied Social Psychology*, 33: 2153–2186.

Gibson, C., & Vermeulen, F. 2003. A healthy divide: Subgroups as a stimulus for team learning behavior. *Administrative Science Quarterly*, 48: 202–239.

Gladstein, D. 1984. A model of task group effectiveness. *Administrative Science Quarterly*, 29: 499–517.

Glebbeek, A. C., & Bax, E. H. 2004. Is high employee turnover really harmful? An empirical test using company records. *Academy of Management Journal*, 47: 277–286.

Guzzo, R. A., Yost, P. R., Campbell, R. J., & Shea, G. P. 1993. Potency in groups: Articulating a construct. *British Journal of Social Psychology*, 3: 87–106.

Hare, A. P. 1981. Group size. *American Behavioral Scientist*, 24: 695–708.

Hatch, N. W., & Dyer, J. H. 2004. Human capital and learning as a source of sustainable competitive advantage. *Strategic Management Journal*, 25: 1155–1178.

Hayes, A. F. 2013. *Introduction to mediation, moderation and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press.

Hess, A. M., & Rothaermel, F. T. 2011. When are assets complementary? Star scientists, strategic alliances, and innovation in the pharmaceutical industry. *Strategic Management Journal*, 32: 895–909.

Hinds, P. J., Neeley, T. B., & Cramton, C. D. 2014. Language as a lightning rod: Power contests, emotion regulation, and subgroup dynamics in global teams. *Journal of International Business Studies*, 45: 536–561.

Hitt, M. A., Bierman, L., Uhlenbruck, K., & Shimizu, K. 2006. The importance of resources in the internationalization of professional service firms: The good, the bad, and the ugly. *Academy of Management Journal*, 49: 1137–1157.

Hollingshead, A. B. 2001. Cognitive interdependence and convergent expectations in transactive memory. *Journal of Personality and Social Psychology*, 81: 1080–1089.

Homan, A. C., Hollenbeck, J. R., Humphrey, S. E., Van Knippenberg, D., Ilgen, D. R., & Van Kleef, G. A. 2008. Facing differences with an open mind: Openness to

experience, salience of intragroup differences, and performance of diverse work groups. *Academy of Management Journal*, 51: 1204–1222.

Hornsey, M. J., & Hogg, M. A. 1999. Subgroup differentiation as a response to an overly-inclusive group: A test of optimal distinctiveness theory. *European Journal of Social Psychology*, 29: 543–550.

Horwitz, S. K., & Horwitz, I. B. 2007. The effects of team diversity on team outcomes: A meta-analytic review of team demography. *Journal of Management*, 33: 987–1015.

Hraba, J., Hagendoorn, L., & Hagendoorn, R. 1989. The ethnic hierarchy in the Netherlands: Social distance and social representation. *British Journal of Social Psychology*, 28: 57–69.

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

Huselid, M. A. 1995. The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of Management Journal*, 38: 635–672.

Ilgen, D. R., Hollenbeck, J. R., Johnson, M., & Jundt, D. 2005. Teams in organizations: From input-process-output models to IMOI models. *Annual Review of Psychology*, 56: 517–543.

Isen, A. M. 1990. The influence of positive and negative affect on cognitive organization: Some implications for development. In N. Stein, B. Leventhal, & T. Trabasso (Eds.), *Psychological and biological approaches to emotion*: 75–94. Hillsdale, NJ: Erlbaum.

Isen, A. M., & Baron, R. A. 1991. Positive affect as a factor in organizational-behavior. *Research in Organizational Behavior*, 13: 1–53.

Jehn, K. A. 1995. A multimethod examination of the benefits and detriments of intragroup conflict. *Administrative Science Quarterly*, 40: 256–282.

Jehn, K. A. 1997. A qualitative analysis of conflict types and dimensions in organizational groups. *Administrative Science Quarterly*, 42: 530–557.

Jehn, K. A., & Bezrukova, K. 2010. The faultline activation process and the effects of activated faultlines on coalition formation, conflict, and group outcomes. *Organizational Behavior and Human Decision Processes*, 112: 24–42.

Jehn, K. A., & Rupert, J. 2008. Group faultlines and team learning: How to benefit from different perspectives. In V. I. Sessa, & M. London (Eds.), *Work group learning: Understanding, improving and assessing how groups learn in organizations*: 119–147. New York: Taylor & Francis.

Jensen, A. R. 1998. *The g factor*. Westport, CT: Praeger.

Jetten, J., Spears, R., & Postmes, T. 2004. Intergroup distinctiveness and differentiation: A meta-analytic integration. *Journal of Personality and Social Psychology*, 86: 862–879.

Jiang, Y., Jackson, S. E., Shaw, J. B., & Chung, Y. 2012. The consequences of educational specialty and nationality faultlines for project teams. *Small Group Research*, 43: 613–644.

Johnson, D. W., & Johnson, P. J. 2003. *Joining together: Group theory and group skills*. Boston, MA: Allyn & Bacon.

Joshi, A., & Roh, H. 2009. The role of context in work team diversity research: A meta-analytic review. *Academy of Management Journal*, 52: 599–627.

Kacmar, K. M., Witt, L. A., Zivnuska, S., & Gully, S. M. 2003. The interactive effect of leader–member exchange and communication frequency on performance ratings. *Journal of Applied Psychology*, 88: 764–772.

Katz, D., & Kahn, R. L. 1978. *The social psychology of organizations*. New York: Wiley.

Katz-Navon, T. Y., & Erez, M. 2005. When collective- and self-efficacy affect team performance: The role of task interdependence. *Small Group Research*, 36: 437–465.

Kozlowski, S. W. J., & Ilgen, D. R. 2006. Enhancing the effectiveness of work groups and teams. *Psychological Science in the Public Interest*, 7: 77–124.

Kozlowski, S. W. J., & Klein, K. J. 2000. A multi-level approach to theory and research in organizations: Contextual, temporal, and emergent processes. In K. J. Klein, & S. W. J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations*. San Francisco: Jossey-Bass.

Kulkarni, M. 2015. Language-based diversity and faultlines in organizations. *Journal of Organizational Behavior*, 36: 128–146.

Lau, D. C., & Murnighan, J. K. 1998. Demographic diversity and faultlines: The compositional dynamics of organizational groups. *Academy of Management Review*, 23: 325–340.

Lau, D. C., & Murnighan, J. K. 2005. Interactions within groups and subgroups: The effects of demographic faultlines. *Academy of Management Journal*, 48: 645–659.

Le, H., Oh, I. S., Shaffer, J., & Schmidt, F. 2007. Implications of methodological advances for the practice of personnel selection: How practitioners benefit from meta-analysis. *Academy of Management Perspectives*, 21: 6–15.

Lester, S. W., Meglino, B. M., & Korsgaard, A. M. 2002. The antecedents and consequences of group potency: A longitudinal investigation of newly formed work groups. *Academy of Management Journal*, 45: 352–368.

Leonard, J. S., Levine, D. I., & Joshi, A. 2004. Do birds of a feather shop together? The effects on performance of employees' similarity with one another and with customers. *Journal of Organizational Behavior*, 25: 731–754.

Leong, C. H., & Ward, C. 2000. Identity conflict in sojourners. *International Journal of Intercultural Relations*, 24: 763–776.

Levitt, B., & March, J. G. 1988. Organizational learning. *Annual Review of Sociology*, 14: 319–340.

Lewis, K. 2003. Measuring transactive memory systems in the field: Scale development and validation. *Journal of Applied Psychology*, 88: 587–604.

Lewis, K., & Herndon, B. 2011. Transactive memory systems: Current issues and future research directions. *Organization Science*, 22: 1254–1265.

Li, J., & Hambrick, D. C. 2005. Factional groups: A new vantage on demographic faultlines, conflict, and disintegration in work teams. *Academy of Management Journal*, 48: 794–813.

Liang, D. W., Moreland, R., & Argote, L. 1995. Group versus individual training and group performance: The mediating role of transactive memory. *Personality and Social Psychology Bulletin*, 21: 384–393.

Lim, J. Y., Busentiz, L. W., & Chidambaram, L. 2013. New venture teams and the quality of business opportunities identified: Faultlines between subgroups of founders and investors. *Entrepreneurship and Theory and Practice*, 37: 47–67.

Lindell, M., & Brandt, C. 2000. Climate quality and climate consensus as mediators of the relationship between organizational antecedents and outcomes. *Journal of Applied Psychology*, 85: 331–348.

Linnehan, F., & De Carolis, D. 2005. Strategic frameworks for understanding employer participation in school-to-work programs. *Strategic Management Journal*, 26: 523–539.

Littlepage, G. E., Hollingshead, A. B., Drake, L. R., & Littlepage, A. M. 2008. Transactive memory and performance in work groups: Specificity, communication, ability differences, and work allocation. *Group Dynamics: Theory Research and Practice*, 12: 223–241.

Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. 2001. A temporally based framework and taxonomy of team processes. *Academy of Management Review*, 26: 356–376.

Mathieu, J., Maynard, M. T., Rapp, T., & Gilson, L. 2008. Team effectiveness 1997-2007: A review of recent advancements and a glimpse into the future. *Journal of Management*, 34: 410–476.

McGrath, J. E. 1984. *Groups: Interaction and performance*. Englewood Cliffs, NJ: Pretice-Hall.

Messersmith, J. G., & Guthrie, J. P. 2010. High performance work systems in emergent organizations: Implications for firm performance. *Human Resource Management*, 49: 241–264.

Meyer, B., & Glenz, A. 2013. Team faultline measures: A computational comparison and a new approach to multiple subgroups. *Organizational Research Methods*, 16: 393-424.

Meyer, B., Glenz, A., Antino, M., Rico, R., & González-Romá, V. 2014. Faultlines and subgroups: A meta-review and measurement guide. *Small Group Research*, 45: 633–670.

Meyer, B., & Schermuly, C. C. 2012. When beliefs are not enough: Examining the interaction of diversity faultlines, task motivation, and diversity beliefs on team performance. *European Journal of Work and Organizational Psychology,* 21: 456–487.

Meyer, B., Shemla, M., & Schermuly, C. C. 2011. Social category salience moderates the effect of diversity faultlines on information elaboration. *Small Group Research*, 42: 257–282.

Meyer, B., Shemla, M., Li, J., & Wegge, J. 2015. On the same side of the faultline: Inclusion in the leader's subgroup and employee performance. *Journal of Management Studies*, 52: 354–380.

Michinov, E., Olivier-Chiron, E., Rusch, E., & Chiron, B. 2008. Influence of transactive memory on perceived performance, job satisfaction and identification in anaesthesia teams. *British Journal of Anaesthesia*, 100: 327–332.

Molleman, E. 2005. Diversity in demographic characteristics, abilities and personality traits: Do faultlines affect team functioning? *Group Decision and Negotiation*, 14: 173–193.

Molloy, J. C., & Ployhart, R. E. 2012. Construct clarity: Multidisciplinary considerations and an illustration using human capital. *Human Resource Management Review*, 22: 152–156.

Murphy, K. R. 2012. Individual differences. In N. Schmitt (Ed.), *Oxford handbook of personnel assessment and selection*: 31–47. Oxford, UK: Oxford University Press.

Muthén, L. K., & Muthén, B. 2010. *USER's guide*. Los Angeles, CA: Muthén and Muthén.

Nahapiet, J., & Ghoshal, S. 1998. Social capital, intellectual capital, the organizational advantage. *Academic Management Review*, 23: 242–266.

Niedenthal, P. M., & Brauer, M. 2012. Social functionality of human emotion. *Annual Review of Psychology*, 63: 259–285.

Noe, R. A., Hollenbeck, J. R., Gerhart, B., & Wright, P. M. 2006. *Human resource management: Gaining a competitive advantage*. New York, NY: McGraw-Hill/Irwin.

Nunnally, J. C., & Bernstein, I. H. 1994. *Psychometric theory*. New York: McGraw-Hill.

Nurosis, M. 1994. *Statistical Data Analysis*. Chicago, IL: SPSS Inc.

Nyberg, A. J., Moliterno, T. P., Hale, D., & Lepak, D. P. 2014. Resource-based perspectives on unit-level human capital: A review and integration. *Journal of Management*, 40: 316–346.

Nyberg, A. J., & Wright, P. M. 2015. 50 years of human capital research: Assessing what we know, exploring where we go. *Academy of Management Perspectives*, 29: 287–295.

Oakes, P. J., Haslam, S. A., & Turner, J. C. 1994. *Stereotyping and social reality*. Oxford, UK: Blackwell.

Oliveira, J. M., & Scherbaum, C. 2015. Effects of activating team diversity dimensions on member perceptions of conflict, trust, and respect. *The New School Psychology Bulletin*, 13: 21–37.

Pearsall, M. J., Ellis, A. P. J., & Evans, J. M. 2008. Unlocking the effects of gender faultlines on team creativity: Is activation the key? *Journal of Applied Psychology*, 93: 225–234.

Pennings, J. M., Lee, K., & Van Witteloostuijn, A. 1998. Human capital, social capital, and firm dissolution. *Academy of Management Journal*, 41: 425–440.

Penrose, E. T. 1959. *The theory of the growth of the firm*. New York: John Wiley.

Peteraf, M. 1993. The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal,* 14: 179–191.

Peteraf, M. A., & Barney, J. 2003. Unraveling the resource-based tangle. *Managerial and Decision Economics*, 24: 309–323.

Phillips, K. W., Mannix, E. A., & Neale, M. A. 2004. Diverse groups and information sharing: The effects of congruent ties. *Journal of Experimental Social Psychology*, 40: 497–510.

Pickett, C. L., & Brewer, M. B. 2001. Assimilation and differentiation needs as motivational determinants of perceived in-group and out-group homogeneity. *Journal of Experimental Social Psychology*, 37: 341–348.

Pil, F. K., & Leana, C. 2009. Applying organizational research to public school reform: The effects of teacher human and social capital on student performance. *Academy of Management Journal*, 52: 1101–1124.

Ployhart, R. E., & Moliterno, T. P. 2011. Emergence of the human capital resource: A multilevel model. *Academy of Management Review*, 36: 127–150.

Ployhart, R. E., Nyberg, A. J., Reilly, G., & Maltarich, M. A. 2014. Human capital is dead; Long live human capital resources! *Journal of Management*, 40: 371–398.

Ployhart, R. E., van Iddekinge, C. H., & Mackenzie, W. I. 2011. Acquiring and developing human capital in service contexts: The interconnectedness of human capital resources. *Academy of Management Journal*, 54: 353–368.

Polzer, J. T., Crisp, C. B., Jarvenpaa, S. L., & Kim, J. W. 2006. Extending the faultline model to geographically dispersed teams: How colocated subgroups can impair group functioning. *Academy of Management Journal*, 49: 679–692.

Powell, T. C. 2003. Varieties of competitive parity. *Strategic Management Journal*, 24: 61–86.

Reed, R., & DeFillippi, R. J. 1990. Causal ambiguity, barriers to imitation, and sustainable competitive advantage. *Academy of Management Review*, 15: 88–102.

Ren, H., Gray, B., & Harrison, D. A. 2015. Triggering faultline effects in teams: The importance of bridging friendship ties and breaching animosity ties. *Organization Science*, 26: 390–404.

Ren, Y., & Argote, L. 2011. Transactive memory systems 1985–2010: An integrative framework of key dimensions, antecedents, and consequences. *Academy of Management Annals*, 5: 189–229.

Rhee, S. Y. 2007. Group emotions and group outcomes: The role of group-member interactions. In E. A. Mannix, M. A. Neale, & C. P. Anderson (Eds.), *Research on managing groups and teams*: 65–95. San Francisco, CA: JAI Press.

Rico, R., Molleman, E., Sánchez-Manzanares, M., & Van der Vegt, G. S. 2007. The effects of diversity faultlines and team task autonomy on decision quality and social integration. *Journal of Management*, 33: 111–132.

Rico, R., Sánchez-Manzanares, M., Antino, M., & Lau, D. 2012. Bridging team faultlines by combining task role assignment and goal structure strategies. *Journal of Applied Psychology*, 97: 407–420.

Rosen, S. 1981. The economics of superstars. *American Economic Review*, 71: 845–858.

Rupert, J., Blomme, R. J., Dragt, M. J., & Jehn, K. 2016. Being different, but close: How and when faultlines enhance team learning. *European Management Review*, 13: 275–290.

Sanchez-Burks, J., & Huy, Q. N. 2009. Emotional aperture and strategic change: The accurate recognition of collective emotions. *Organization Science*, 20: 22–34.

Sanders, W. G., & Hambrick, D. C. 2007. Swinging for the fences: The effects of CEO stock options on company risk taking and performance. *Academy of Management Journal*, 50: 1055–1078.

Sawyer, J. E., Houlette, M. A., & Yeagley, E. L. 2006. Decision performance and diversity structure: Comparing faultlines in convergent, crosscut, and racially homogeneous groups. *Organizational Behavior and Human Decision Processes*, 99: 1–15.

Schmitt, N. 2014. Personality and cognitive ability as predictors of effective performance at work. *Annual Review of Organizational Psychology and Organizational Behavior*, 1: 45–65.

Schmitt, N., & Chan, D. 1998. *Personnel selection: A theoretical approach*. Thousand Oaks, CA: Sage.

Schölmerich, F., Schermuly, C. C., & Deller, J. 2016. How leaders' diversity beliefs alter the impact of faultlines on team functioning. *Small Group Research*, 47: 1–30.

Schölmerich, F., Schermuly, C. C., & Deller, J. 2017. To believe or not to believe? The joint impact of faultlines and pro-diversity beliefs on diplomats' performance. *Human Performance*, 30: 99–115.

Schoenewolf, G. 1990. Emotional contagion: Behavioral induction in individuals and groups. *Modern Psychoanalysis*, 15: 49–61.

Schultz, T. W. 1961. Investment in human capital. *The American Economic Review*, 51: 1–17.

Schwab, D. P. 1980. Construct validity in organizational behavior. *Research in Organizational Behavior*, 2: 3–43.

Sharma, S., Mukherjee, S., Kumar, A., & Dillon, W. R. 2005. A simulation study to investigate the use of cutoff values for assessing model fit in covariance structure models. *Journal of Business Research*, 58: 935–943.

Shaw, M. E. 1981. *Group dynamics: The psychology of small group behavior*. New York: McGraw-Hill.

Shaw, J. B. 2004. The development and analysis of a measure of group faultlines. *Organizational Research Methods*, 7: 66–100.

Shemla, M., Meyer, B., Greer, L., & Jehn, K. A. 2014. A review of perceived diversity in teams: Does how members perceive their team's composition affect team processes and outcomes? *Journal of Organizational Behavior*, 37: S89–S106.

Spector, P. E. 1992. *Summated rating scale construction: An introduction*. Newbury Park, CA: Sage.

Spoelma, T. M., & Ellis, A. P. J. 2017. Fuse or fracture? Threat as a moderator of the effects of diversity faultlines in teams. *Journal of Applied Psychology,* 102: 1344–1359.

Spoor, J. R., & Kelly, J. R. 2004. The evolutionary significance of affect in groups: Communication and group bonding. *Group Processes and Intergroup Relations*, 7: 398–412.

Stasser, G. 1992. Pooling of unshared information during group discussions. In S. Worchel, W. Wood, & J. A. Simpson (Eds.), *Group process and productivity*: 48–67. Newbury Park, CA: Sage.

Steiner, I. D. 1972. *Group process and productivity*. New York: Academic Press.

Subramaniam, M., & Youndt, M. A. 2005. The influence of intellectual capital on the types of innovative capabilities. *Academy of Management Journal*, 48: 450–463.

Subramony, M., Krause, N., Norton, J., & Burns, G. N. 2008. The relationship between human resource investments and organizational performance: A firm-level examination of equilibrium theory. *Journal of Applied Psychology*, 93: 778–788.

Tekleab, A. G., & Quigley, N. R. 2014. Team deep-level diversity, relationship conflict, and team members' affective reactions: A cross-level investigation. *Journal of Business Research*, 67: 394–402.

Thatcher, S. M. B., Jehn, K. A., & Zanutto, E. 2003. Cracks in diversity research: The effects of diversity faultlines on conflict and performance. *Group Decision and Negotiation*, 12: 217–241.

Thatcher, S. M. B., & Patel, P. C. 2012. Group faultlines: A review, integration, and guide to future research. *Journal of Management*, 38: 969–1009.

Thompson, J. D. 1967. *Organizations in action*. New York: McGraw-Hill.

Totterdell, P. 2000. Catching moods and hitting runs: Mood linkage and subjective performance in professional sport teams. *Journal of Applied Psychology*, 85: 848–859.

Tsui, A. S., Egan, T. D., & O'Reilly III, C. A. 1992. Being different: Relational demography and organizational attachment. *Administrative Science Quarterly*, 37: 549–579.

Tsui, A. S., & O'Reilly III, C. A. 1989. Beyond simple demographic effects: The importance of relational demography in superior-subordinate dyads. *Academy of Management Journal*, 32: 402–423.

Turner, J. C. 1985. Social categorization and the self-concept: A social cognitive theory of group. *Advances in Group Processes*, 2: 77–121.

Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. 1987. *Rediscovering the social group: A self-categorization theory*. Oxford, UK: Blackwell.

Van der Vegt, G. S., Van de Vliert, E., & Huang, X. 2005. Location-level links between diversity and innovative climate depend on national power distance. *Academy of Management Journal*, 48: 1171–1182.

Van de Ven, A. H., Delbecq, A. L., & Koenig, R. 1976. Determinants of coordination modes within organizations. *American Sociological Review*, 41: 322–338.

van Knippenberg, D., De Dreu, C. K. W., & Homan, A. C. 2004. Work group diversity and group performance: An integrative model and research agenda. *Journal of Applied Psychology*, 89: 1008–1022.

Veltrop, D. B., Hermes, N., Postma, T. J. B. M., & de Haan, J. 2015. A Tale of two factions: Why and when factional demographic faultlines hurt board performance. *Corporate Governance: An International Review*, 23: 145–160.

Watson, D., & Clark, L. A. 1984. Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin*, 96: 465–490.

Watson, D., Clark, L. A., & Tellegen, A. 1988. Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54: 1063–1070.

Watson, D., & Tellegen, A. 1985. Toward a consensual structure of mood. *Psychological Bulletin*, 98: 219–235.

Wegner, D. M. 1987. Transactive memory: A contemporary analysis of the group mind. In B. Mullen, & G. R. Goethals (Eds.), *Theories of group behavior*: 185–208. New York: Springer.

Wegner, D. M., Giuliano, T., & Hertel, P. T. 1985. Cognitive interdependence in close relationships. In W. J. Ickes (Ed.), *Compatible and incompatible relationships*: 253–276. New York: Springer.

Wernerfelt, B. 1984. A Resource-based view of the firm. *Strategic Management Journal*, 5: 171–180.

Williams, K. Y., & O'Reilly, C. A. 1998. Demography and diversity in organizations: A review of 40 years of research. *Research in Organizational Behavior*, 20: 77–140.

Wright, P. M., & Boswell, W. R. 2002. Desegregating HRM: A review and synthesis of micro and macro human resource management research. *Journal of Management*, 28: 247–276.

Wright, P. M., Coff, R. W., & Moliterno, T. P. 2014. Strategic human capital: Crossing the great divide. *Journal of Management*, 40: 353–370.

Wright, P. M., McCormick, B., Sherman, W. S., & McMahan, G. C. 1999. The role of human resource practices in petro-chemical refinery performance. *International Journal of Human Resource Management*, 10: 551–571.

Wright, P. M., & McMahan, G. C. 2011. Exploring human capital: Putting human back into strategic human resource management. *Human Resource Management Journal*, 21: 93–104.

Wright, P. M., McMahan, G. C., & McWilliams, A. 1994. Human resources and sustained competitive advantage: A resource-based perspective. *International Journal of Human Resource Management*, 5: 301–326.

Yanadori, Y., & Kato, T. 2007. Average employee tenure, voluntary turnover ratio, and labour productivity: Evidence from Japanese firms. *International Journal of Human Resource Management*, 18: 1841–1857.

Zanutto, E. L., Bezrukova, K., & Jehn, K. A. 2011. Revisiting faultline conceptualization: Measuring faultline strength and distance. *Quality and Quantity*, 45: 701–714.

APPENDIX A

SURVEY ITEMS

KSAOs
Please check or fill in the appropriate information:

How many business classes have you taken?: ______________________
Cold weather experience: ___ years, ____ months
Full-time work experience: ___ years, ____ months
Part-time work experience: ___ years, ____ months

HCR
Below are phrases describing your team. Please indicate the extent to which you disagree or agree with the following statements:

HCR: Level
1. We are highly skilled.
2. We have a lot of talent.
3. We are creative and bright.
4. We are experts in our particular areas.
5. We develop new ideas and knowledge.

HCR: Outcome
1. We possess the knowledge, skills, and abilities to complete our task.
2. The resources that we have are valuable to help us accomplish our task.
3. We are well-suited to succeed in our task.
4. We often waste time by using knowledge, skills, and abilities that are unrelated to our task.
5. We have valuable resources that contribute to our task.
6. Our knowledge, skills, and abilities are helpful for completing our task.

HCR: Emergence
1. Our members' knowledge and skills create synergy.
2. We make excellent use of members' expertise in our particular areas.
3. Our members' skills are complementary.
4. We amplify team members' abilities.
5. We maximize team members' knowledge.
6. We leverage members' knowledge, skills, and abilities.
7. We are able to magnify team members' information and expertise.
8. We maximize team members' available resources.

9. We are able to accomplish tasks that we would not be able to accomplish as individuals.

Communication
Below are phrases describing your team. Please indicate the extent to which you disagree or agree with the following statements:

1. We are very willing to share information with other team members about our task.
2. We enjoy talking to each other.
3. When we talk to each other, there is a great deal of understanding.
4. We are comfortable talking to each other about what needs to be done.

TMS
Below are phrases describing your team. Please indicate the extent to which you disagree or agree with the following statements:

1. Each team member has specialized knowledge of some aspect of our task.
2. I have knowledge about an aspect of our task that no other member has.
3. Different team members are responsible for expertise in different areas.
4. The specialized knowledge of several different team members is needed to complete the task deliverables.
5. I know which team members have expertise in specific areas.
6. I am comfortable accepting procedural suggestions from other team members.
7. I trust that other members' knowledge about the task is credible.
8. I am confident relying on the information that other team members bring to the discussion.
9. When other members gave information, I want to double-check it for myself.
10. I do not have much faith in other members' "expertise".
11. Our team works together in a well-coordinated fashion.
12. Our team has very few misunderstandings about what to do.
13. Our team needs to backtrack and start over a lot.
14. We accomplish the task smoothly and efficiently.
15. There is much confusion about how we would accomplish the task.

Team PA
Below are words that describe different feelings and emotions. Please indicate to what extent you feel this way right now, that is, at the present moment on this scale:

1. Interested
2. Excited
3. Strong
4. Enthusiastic
5. Proud
6. Alert
7. Inspired
8. Determined

9. Attentive
10. Active

Subjective Team Performance
Below are phrases describing your team. Please indicate the extent to which you disagree or agree with the following statements:

1. My team, as a whole, performs well on this task.
2. We are a high-performing team.
3. My team performs very effectively.
4. This is an effective team.

Team Learning Behavior
Below are phrases describing your team. Please indicate the extent to which you disagree or agree with the following statements:

1. We regularly take time to figure out ways to improve our team's work processes.
2. Our team tends to handle differences of opinion privately or off-line, rather than addressing them directly as a team.
3. Team members go out and get all the information they possibly can from others.
4. Our team frequently seeks new information that leads us to make important changes.
5. In this team, someone always makes sure that we stop to reflect on the team's work process.
6. People in this team often speak up to test assumptions about issues under discussion.
7. We invite people from outside the team to present information or have discussions with us.

General Information
Please check or fill in the appropriate information:

Date of Birth (month/day/year): ______________________
What is your major (intended)?: ______________________
What is your gender?
a) Male ____
b) Female ____
c) Other ______________________
Please describe your race/ethnicity:
a) Africa-American or Black____
b) Asian____
c) Hispanic or Latino____
d) Native American, American Indian, or Alaska Native____
e) Native Hawaiian or Pacific Islander____
f) Caucasian or White____
g) Other ___________