THE JOINT EFFECTS OF HUMAN CAPITAL DISPERSION AND DEPLOYMENT ON TEAM PERFORMANCE

By

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ABSTRACT OF THE DISSERTATION

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Despite a rich literature on the link between the human capital possessed by individuals and their performance, scholars have placed relatively less attention on the performance implications associated with differences in the human capital possessed by individuals within a given collective. My dissertation explores how the management of individuals influences the extent to which teams are able to benefit from such differences. The management of individuals is explored in terms of how opportunities are distributed among individuals. Moreover, I explore how the contexts in which such management decisions are implemented influence the effectiveness of these management decisions. The hypotheses are tested using a sample of teams from the National Hockey League. The results indicate that the positive relationship between dispersion in human capital and team performance becomes more positive when opportunities are distributed more broadly across individuals. This positive moderating relationship is found to depend upon the broader context in which such decisions are implemented.

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INTRODUCTION

Over the last several decades, scholarship on the link between human capital—broadly defined as the knowledge, skills, and abilities possessed by individuals (Becker, 1964)—and organizational outcomes has spanned several disciplinary traditions (Ployhart, 2015; Ployhart & Moliterno, 2011). Scholarship in the strategic human capital (SHC) domain has treated human capital as a valuable resource comprised of the aggregate knowledge, skill, and abilities (KSAs) possessed by individuals and available for group, team, unit, and firm level purposes (Nyberg & Wright, 2015; Ployhart, Nyberg, Reilly, & Maltarich, 2014). This literature has largely focused on the role of strategic management decisions as a factor influencing the relationship between aggregate measures of human capital and outcomes above the individual level (Kor & Leblebici, 2005; Sirmon, Gove, & Hitt, 2008). Conversely, the team profile model proposed by teams scholars advocates a collective perspective of individuals in which the KSAs possessed by individuals can be representative of and utilized for team competencies (Harrison & Klein, 2007; Mathieu, Tannenbaum, Donsbach, & Alliger, 2014). Specifically, this perspective suggests that the composition of the team—in terms of average or dispersion in one or more human capital attributes—holds implications for overall team performance, among a variety of other outcomes (Mathieu et al., 2014). However, in contrast to the scholarship rooted in the SHC tradition, teams research embracing the team profile model has largely ignored the role of strategic management as a factor influencing the relationship between team composition and performance. Recently, there has been a call for SHC scholarship that bridges this gap between the more micro-oriented (e.g., I/O psychology, teams) literatures—focused on how

differences between individuals relate to individual, team, and unit level outcomes—and the more macro-oriented (e.g., strategic HRM, strategy) literatures—focused on how the average level of human capital relates to unit and firm level outcomes (Ployhart, 2015; Ployhart & Moliterno, 2011). My dissertation seeks to bridge this gap by integrating theoretical insights from both macro and micro perspectives to explore how differences in the human capital possessed by individuals can be managed to positively influence performance. Moreover, I integrate the literatures on SHC, teams, and resource orchestration to provide a more nuanced perspective on how differences in the human capital possessed by individuals can be best managed across varying contexts to improve overall team performance.

Focusing on the performance implications associated with differences in the human capital possessed by individuals is appropriate in light of evidence that human capital is typically distributed within organizations such that some individuals will possess more or less of a certain human capital attribute than others (Bunderson, 2003; Devine & Phillips, 2001). Moreover, research has consistently shown that such differences are increasing due to a variety of global factors (Roberson, Holmes, & Perry, 2016). The continued rise in a diversified workforce highlight the need for research on the implications such differences have for organizations. Such differences are also important due to the positive and negative effects it may have on both individual and higher level outcomes (Bunderson & Reagans, 2011; Van Knippenberg, De Dreu, & Homan, 2004). Despite a rich literature on the implications associated with differences in the human capital possessed by individuals for a given collection (i.e., team, unit, firm), the role of how such differences are managed has to date been largely overlooked. Given

the rise in the use of teams in the workplace (LePine, 2003), the role of how dispersion in human capital—defined as differences in the level of a given human capital attribute possessed by individuals within a given collective—can be managed to influence outcomes for a team merits further attention.

Much of the work on the effects such differences between individuals can have on outcomes beyond the individual level has occurred in the literature on teams (Hamilton, Nickerson, & Owan, 2003; Jackson, Joshi, & Erhardt, 2003; Mayo, Kakarika, Mainemelis, & Deuschel, 2016; Milliken & Martins, 1996; Williams & O'Reilly, 1998). Several reviews have revealed differential (that is, both positive and negative) performance implications associated with dispersion (Horwitz & Horwitz, 2007; Mayo et al., 2016). For example, scholars have suggested that differences among individuals in terms of the human capital they possess may elicit conflicting opinions, perspectives, or approaches for handling situations and completing tasks (Cronin & Weingart, 2007; Simons, Pelled, & Smith, 1999). Focusing explicitly on those studies interested in dispersion in the level of a given human capital attribute, these studies have primarily revealed many of the negative effects dispersion can have for teams. Despite these challenges, increased dispersion has also been theorized and shown to generate significant benefits—offering different, complementary points of views (Bunderson, 2003; Gibson & Vermeulen, 2003), facilitating the development of peers (Carrell, Sacerdote, & West, 2013; Lyle, 2009), and being positively associated with financial performance (Joshi, Liao, & Jackson, 2006). A review of the extant literature reveals that despite a proliferation in scholarly interest on teams, much of this research has ignored the role of dispersion in the level of human capital as well as the management of the

human capital portfolio as predictors of team performance (Humphrey & Aime, 2014; Roberson, Holmes, & Perry, 2016). As such, to date, scholars have primarily examined differences among team members in terms of team heterogeneity in demographic characteristics and largely ignored the importance of dispersion in human capital attributes among team members (Horwitz & Horwitz, 2007; Jackson et al., 1991; O'Connell et al., 2001; O'Reilly, Caldwell, & Barnett, 1989).

The SHC literature has focused on the performance implications associated with human capital at the unit and firm level (Nyberg, Moliterno, Hale, & Lepak, 2014; Ployhart & Moliterno, 2011), but has largely ignored the benefits associated with differences between individuals highlighted in much of the work on teams. Scholars in this tradition have also noted the importance of resource management as a key factor in explaining the resource-performance relationship. In fact, scholarship in the more macro-oriented tradition suggests that the management of resources is at least as important as the resources possessed (Penrose, 1959; Sirmon, Hitt, & Ireland, 2007). That is, despite similar resource endowments and environmental contexts, differential performance outcomes may occur as a result of how those resources are managed (Hitt, Bierman, Shimizu, & Kochar, 2001; Kor & Leblebici, 2005; Sirmon, Gove, & Hitt, 2008; Sirmon, Hitt, & Ireland, 2007). Therefore, whereas the SHC literature has noted the importance of aggregate human capital as well as the importance of resource management, to date, this literature has largely ignored the importance of dispersion in human capital. Conversely, recent reviews of the teams literature notes that the vast majority of research on the implications associated with differences among team members fails to answer the critical question of the factors that enable diverse teams to take advantage of such

differences to enhance overall team performance (Mayo, Kakarika, Mainemelis, & Deuschel, 2016). Bridging these two literatures, I provide a more granular analysis of how human capital dispersion within teams is related to performance. Specifically, I focus on how dispersion in the level of experience as well as skills and abilities possessed by individuals relates to overall team performance. Moreover, I argue that the potential benefits associated with dispersion in human capital are likely to be realized as a result of strategic resource management decisions made by managers. In doing so, I shift the focus from whether dispersion in the level of human capital within a team is beneficial or detrimental to team performance, and towards a more nuanced understanding of the contextual factors that allow for teams to manage these differences to improve overall team performance.

Resource management is comprised of decisions regarding how to structure, bundle, and leverage resources (Sirmon et al., 2007; Sirmon, Hitt, Ireland, & Gilbert, 2011). One way in which managers may leverage their resources is through decisions regarding the deployment of their human capital resources (Sirmon et al., 2007; 2011). Here, I focus on how managers deploy human capital through the opportunities provided to individuals within the team. Within this framework, *opportunities* refer to situations or tasks in which individuals can contribute to overall performance of their team through their actions. The extent to which these opportunities are more broadly distributed among many individuals or more skewed (or concentrated) among a select few represents the deployment of human capital. More broadly distributed opportunities provide individuals with the ability to engage in tasks, gain experience, and further develop human capital through opportunities for learning (van Dyck, Frese, Baer, & Sonnentag,

2005; Jones & O'Brien, 1991). Providing more broadly distributed opportunities among individuals becomes even more important in an interdependent team context where experience in cooperation and coordination can generally improve performance at both the individual and team level (Tjosvold, Yu, & Hui, 2004). My dissertation seeks to further examine the performance implications associated with dispersion in human capital by also focusing on how breadth in the opportunities provided among individuals moderates this relationship.

Scholarship on resource management and orchestration suggest that managers make decisions not in isolation, but in light of both the resources they have available as well as the broader context (Chatterji & Patro, 2014; Sirmon, Hitt, & Ireland, 2007; Sirmon et al., 2011). Despite a well-developed literature on resource management, scholars have yet to explicitly examine how resource management decisions influence the resource-performance relationship in contexts where these decisions matter most (Holcomb, Holmes, & Connelly, 2009). To address this, I propose that the moderating effect deployment decisions have on the relationship between dispersion in human capital and team performance depends upon the context of the task environment. I explore task environment by focusing on low and high stakes contexts. Focusing on the sustainability of team performance over the longer-term, a *low stakes context* refers to situations in which a single performance outcome for a team does not carry significant weight for the team in the short-term. Such contexts are likely to describe the general or "default" environment that teams operate in. As such, sustainability of performance and the longer-term implications associated with the routines and management of the team become tantamount to team performance in the short term. Conversely, a *high stakes*

context refers to a situation in which the importance of a single performance outcome carries significant weight for the short-term viability of the team (Eisenhardt & Bourgeois, 1988). Relative to a low stakes context, this type of task environment occurs less frequently and for a shorter duration of time. In low stakes contexts, teams can sacrifice short-term outcomes to provide relatively inexperienced, lesser skilled individuals with opportunities to gain valuable experience, learn through trial and error, and refine their ability to coordinate and collaborate with peers. However, in high stakes contexts where deployment strategies can have significant consequences for the team, supporting overall team performance becomes the main objective. As such, I develop theory to suggest that when faced with a high stakes context, teams with more dispersed human capital will outperform their peers when they embrace a concentrated deployment strategy in which opportunities are concentrated upon higher performing individuals. However, the extent to which such a deployment strategy is effective is contingent upon the deployment strategy taken in previous low stakes contexts.

This research highlights important extensions of theoretical insights from the strategic human capital, resource orchestration, and teams literatures to provide a more nuanced perspective on how human capital resources can create value for teams when managed in light of contextual factors. Integrating the resource orchestration literature with that of teams and strategic human capital, I propose that the relationships tested in the resource orchestration literature—namely that between stocks of resources, the management of resources, and firm performance—also apply in the context of human capital—with new emphasis placed on the importance of dispersion in the level of human capital possessed by individuals. To this end, I begin by exploring how dispersion in the

level of human capital possessed by individuals within teams can have differential effects on overall subsequent team performance. I then integrate the resource management framework inherent in the resource orchestration literature to suggest that the relationship between human capital dispersion and performance is contingent upon strategies toward the management of the human capital portfolio. Building upon this, I develop theory to suggest that the effectiveness of such strategies depends upon the task context in which they are made. Next, I detail the methodology used to test the hypotheses proposed here. Following this is a discussion of the results and additional analyses conducted to ensure the robustness of the results. Finally, a discussion of the limitations, future directions, and the theoretical and practical implications of this research are provided.

THEORETICAL BACKGROUND AND HYPOTHESES

Prior to delving into the theoretical framework, it is important to note some of the boundary conditions that influence the generalizability of the model and theory developed here. First, I am exclusively focusing on the performance implications associated with variance in the human capital portfolio in highly interdependent task contexts. Highly interdependent tasks contexts are those in which the coordination and cooperation of individuals are required for the completion of a given task or set of tasks (Guzzo & Shea, 1992; Langfred, 2005). Task interdependence has been shown to be one of the most critical factors that influence the ability of groups, teams, and units to perform (Saavedra, Earley, & Van Dyne, 1993). The criticality of task interdependence is heightened in the context of dispersion in the human capital possessed by individuals who must cooperate and coordinate themselves successfully or at least adequately to

achieve desired outcomes (Van der Vegt & Van de Vliert, 2005). Moreover, many of the advantages and disadvantages associated with variance in the level of human capital possessed by individuals within a collective assume some level of task interdependence among members of that collective (i.e., groups, units, teams). As such, the theoretical model proposed and tested here explores how and under what conditions dispersion in the human capital possessed by individuals relates to performance in a highly interdependent task context.

Lastly, it is important to note the level of analysis. The notion of dispersion in human capital among individuals within a collective is core to the model presented here. However, the term "collective" is inherently broad and can include groups, teams, units, divisions, businesses, or entire firms. To make the model developed here significantly more generalizable, I have not limited the discussion to one type or form of collective. That is, I develop theory that suggests the performance implications associated with dispersion in the human capital possessed by individuals can be generalizable to such dispersion within groups, teams, unit, divisions or firms. To this end, I utilize the literatures on teams and strategic human capital to build theory supporting the model presented. Broadly, teams are a collective in which individuals operate in an interdependent task context where there is a shared interest in and responsibility for a given outcome or set of outcomes (Humphrey & Aime, 2014). Some teams scholars have adopted a more detailed definition in which teams are "a distinguishable set of two or more people who interact, dynamically, interdependently, and adaptively toward a common and valued goal/objective/mission, who have each been assigned specific roles or functions to perform and who have a limited life-span of membership (Salas et al.,

1992, p. 4). Despite the detailed nature of this definition, it is also consistent with much of the work conducted in the strategic human capital tradition focused on how human capital can be utilized for unit and firm level purposes (Ployhart et al., 2014; Nyberg & Ployhart, 2015). Therefore, while I largely rely upon the literature on teams and explicitly focus on the effects of dispersion at the team level, the model developed is designed to generalize beyond team level to include other collectives where individuals operate in a highly interdependent task context and there is a shared knowledge of and responsibility for a given outcome.

Human Capital Dispersion

The human capital portfolio represents an aggregate of the human capital possessed by individuals within a given collective that can be utilized for purposes beyond the individual level (Ployhart et al., 2014; Wright, Coff, & Moliterno, 2014). Scholarship on teams has proposed a *team profile model* that adopts a holistic and comparative view on the human capital possessed by team members to consider the aggregate effect human capital can have on team-level outcomes (Harrison & Klein, 2007; Mathieu et al., 2014). Much of this work has derived from social psychology and organizational behavior where the team is viewed as a whole and the focus in placed on the distributional properties (e.g., average, diversity) of team composition (Mathieu et al., 2014). This literature extends the focus beyond the human capital and performance of the individual on a team to the overall aggregate human capital possessed by the team and performance outcomes (Cannon-Bowers, Tannenbaum, Salas, & Volpe, 1995). For teams with high levels of task interdependence, differences in the human capital possessed by team members can provide teams with a pool of human capital that serves

as the basis for overall team efficacy. The underlying rationale is that differences in the human capital possessed by individuals not only has the ability to influence the competencies of other team members, but also contribute to the overall competencies of the team. Moreover, scholars have noted that such differences provide managers with the opportunity to orchestrate teamwork functions to capitalize on the benefits associated with differences in human capital possessed by team members (Mathieu et al., 2014). However, a review of the literature reveals that while the research on teams has advanced our understanding of the performance implications associated with teams, much of this literature has failed to examine the role of strategic management decisions as well as the broader task context in which the team operates.

In contrast to the literature on teams (specifically, research oriented in the teams profile model), SHC scholars have traditionally viewed the human capital portfolio in terms of the average level of human capital possessed by individuals—placing significantly less emphasis on differences among individuals (Ployhart, 2015; Ployhart & Moliterno, 2011). This is an obvious oversight in that human capital is typically heterogeneously distributed within firms, divisions, or units such that some employees will possess more or less of a certain human capital attribute (say, experience) than other employees (Bunderson, 2003; Devine & Phillips, 2001). As such, the performance implications associated with a given human capital portfolio may extend beyond the more traditional view of average level to include dispersion or variance in the level of human capital. However, unlike the more traditional research from the teams literature, SHC scholars has emphasized the role of strategic management decisions (Sirmon, Hitt, & Ireland, 2008). Here, I seek to combine the more micro-oriented literature that has

explored the performance implications associated with team composition with the more macro-oriented literature focused on the role of strategic management decisions to explore how differences in the human capital possessed by individuals within a team relates to overall team performance.

The notion that teams, units, or firms may benefit from differences among human resources is not new (Bunderson & Sutcliffe, 2002; Kearney & Gebert, 2009; Lepine, 2003; Van der Vegt & Van de Vliert, 2005). In fact, a rich literature has developed over the past few decades dedicated to uncovering the performance implications associated with differences among individuals (Bell, Villado, Lukasik, Belau, & Briggs, 2011; Horwitz & Horwitz, 2007; Joshi & Roh, 2009). However, much of the literature on the performance implications associated with differences between individuals across a variety of demographic and human capital attributes has been mixed, inconsistent, and, as a result, difficult to synthesize (Harrison & Klein, 2007). One of the biggest issues facing the literature has been the inconsistent nature of terminology used to describe differences among individuals. Specifically, scholars have frequently used the terms diversity, heterogeneity, dissimilarity, and dispersion interchangeably without regard to differential meanings (Harrison & Klein, 2007). In light of such ambiguity, I delineate a specific definition of what is meant by dispersion to distinguish between the various and often confusing terminology commonly used within the literature. Specifically, *dispersion* is used to refer to the differences observed in the level of human capital attributes possessed by individuals within a given collective (e.g., team, unit, firm) (Blau, 1977; Harrison & Klein, 2007). As opposed to other conceptualizations, this form represents key assumptions that are central to the theory and hypotheses developed here. Specifically,

the work presented here assumes that a) individuals will vary across one or more attributes within a team, b) the extent to which individuals differ across these attributes within and across teams will vary, and c) the differences between teams in terms of dispersion across the attributes will be associated with important team-level outcomes (Harrison & Klein, 2007).

The hypotheses proposed and tested here are based upon the concept of human capital dispersion. Given some of the ambiguity previously mentioned regarding the terminology used in the extant literature, a more detailed discussion of what is meant by dispersion in human capital is merited. For example, consider two teams both comprised of 5 individuals. Team A has 5 individuals with the following years of experience {3,4,5,6,7}. The individuals on Team B have the following years of experience {1,3,5,7,9}. While both Team A and Team B have an average of 5 years of experience, the dispersion in experience is much higher for Team B ($\sigma = 3.2$) than for Team A ($\sigma = 1.6$). As can be seen in this example, though both teams have the same number of individuals and the same average level of experience, the dispersion in experience with Team B is about twice that of Team A. Now, let's consider a third team. Team C, also comprised of 5 individuals, has the following distribution of experience among individuals {7,6,8,6,8}. While Team C has a higher average level of experience among its members (a mean equal to 7), the experience among members is significantly less dispersed ($\sigma = 1$) than for both Team A and B. The theory developed here and the hypotheses proposed center around dispersion in the level of human capital attributes possessed by individuals within a given team, holding constant the average level.

Human Capital Dispersion and Performance

As previously mentioned, strategic human capital scholars have highlighted the performance implications associated with aggregate measures of human capital, but have largely ignored the role of differences among those individuals in terms of the human capital they possess. Such differences in human capital possessed by individuals within a team are important in light of the differential (that is, positive and negative) effects they may have on various outcomes. While I ultimately provide a more nuanced perspective that suggests the extent to which teams can benefit from dispersion in the human capital possessed by individuals on a team depends upon how such differences are managed, a broader discussion regarding the positive and negative effects dispersion can have on team performance is merited.

Positive relationship. Dispersion in the human capital possessed by individuals within a given team can have an overall positive effect on performance (Bantel & Jackson, 1989). One perspective that suggests greater dispersion in human capital as being positively related to overall team performance is based on the information diversity and cognitive resource perspective (Cox & Blake, 1991; Williams & O'Reilly, 1998). This perspective suggests that greater distributional differences can provide teams and firms with a greater portfolio of knowledge, experience, and differing perspectives possessed by individuals (Bell et al., 2011). That is, relative to teams that are more homogenous in terms of the level of human capital possessed by individuals, such differences provide teams with access to a larger pool of human capital to draw upon. This theoretical perspective is largely based upon the assumption that such differences are observed for human capital attributes that are significantly related to the job and are

perceived as being positively related to overall team performance (Bell et al., 2011; Pelled, 1996).

Having greater dispersion in the level of human capital within a team may also provide opportunities for learning which can enhance the overall competencies of the team and, subsequently, overall performance. Such opportunities for learning are not unique to lower-ability individuals. Scholars have long recognized the performance implications and opportunities for learning when individuals are exposed to others with differing levels of expertise, knowledge, and experience (Van der Vegt & Bunderson, 2005). While it is natural to assume that learning opportunities stand to benefit those with lower levels of expertise and knowledge (Allen, Eby, Poteet, Lentz, & Lima, 2004), this may not always be the case (Liu & Batt, 2010; Ragins & Scandura, 1999). That is, having greater dispersion in human capital possessed by team members can improve overall performance of a team through *mutual* learning among all individuals. Mutual learning refers to the phenomena in which learning occurs through multiple pathways to provide learning experiences among multiple parties (Bunderson & Reagans, 2011; Van der Vegt & Bunderson, 2005). The pathways in which mutual learning may occur hold performance implications at the team level as well.

One pathway in which mutual learning has been argued to improve overall performance occurs when the less-skilled individuals are able to observe and learn how to perform tasks more efficiently and effectively from higher-ability individuals (Hamilton, Nickerson, & Owan, 2003). Lesser skilled, inexperienced individuals stand to learn through observing their higher skilled, more experienced peers as they engage in tasks and contribute to the capabilities of the team. Moreover, observing the mistakes made by

others can also provide an opportunity for learning. Research has shown that individuals can improve their own individual performance through observing the failures and mistakes made by others on their team (Gino, Argote, Miron-Spektor, & Todorova, 2010; Kc, Staats, & Gino, 2013). Together, lesser-skilled individuals can improve their own capabilities by observing not only the routines and tasks completed by their higher-skilled peers, but also through the process of learning through the mistakes made by their peers.

Alternatively, higher ability individuals stand to improve their own performance as well as that of the overall team through opportunities to gain the skills and abilities necessary to mentor and develop lower ability individuals (Franck & Nuesch, 2010; Harrison et al., 2003). This less-intuitive pathway for learning centers on the benefits mentors receive from engaging in mentoring relationships. By mentoring and developing lower ability individuals, higher ability individuals are better able to learn from their own mistakes (Tjosvold, Yu, & Hui, 2004). By learning how to mentor and instruct others on how to complete tasks, learn from mistakes, and explain what has worked in the past, higher ability individuals serving as mentors can improve their own ability to learn from mistakes and, therefore, improve their own performance (Eby, Durley, Evans, & Ragins, 2006; Ragins & Scandura, 1999). As such, greater the dispersion in human capital within a given team increases the potential for mutual learning to occur among individuals across the distribution (i.e., high and low skilled, experienced and inexperienced); whereas mutual learning is less likely to occur in more homogeneous groups (Franck & Nuesch, 2010). Taken together, greater dispersion in human capital can improve overall team performance through a more diverse pool of human capital to draw upon as well as the opportunity for mutual learning to occur among lower and higher ability individuals.

Negative relationship. Despite a rich literature that suggests a positive relationship between greater dispersion in human capital and overall performance of the group (Stewart, 2006), some scholars have noted a darker side to greater dispersion in human capital (Horwitz & Horwitz, 2007; Joshi & Roh, 2009; Stewart, 2006). Greater dispersion in human capital can have an overall negative effect on team performance for a variety of reasons. For example, more homogeneous groups (i.e., less dispersed) in which individuals share functional backgrounds, experiences, or similar levels of human capital attributes have been shown to be more effective in making decisions due to the salience of group norms shared by individuals (Stewart, 2006). Defined as "legitimate, socially shared standards against which the appropriateness of behavior can be evaluated" (Birenbaum & Sagarin, 1976; Chatman & Flynn, 2001), group norms can influence individuals' perceptions and interactions while engaged in interdependent tasks. Stronger, more salient group norms shared by individuals in less-dispersed, more homogeneous groups can also facilitate efficient decision making processes, greater coordination of tasks, and improved cooperation among members (van Knippenberg & Schippers, 2007). Such characteristics highlight one of the potential dangers associated with increased dispersion in human capital at the team level.

Scholarship rooted in the economics and social psychology literature suggest that greater dispersion in human capital within a group implies that at least some individuals can be viewed as "weak links". Even among groups whose lowest performing individual is viewed as highly capable by other teams, this mechanism suggests that such perceptions within, rather than between, teams can damage dynamics between those individuals and their more capable peers (Kremer, 1993; Prat, 2002). Such below-

threshold performance by a single individual, or even the mere perception of such individuals within a unit, can compromise the performance of the unit as a whole (Franck & Nuesch, 2010; Kremer, 1993; Prat, 2002; Steiner, 1972). Moreover, being perceived as the weakest link in a unit can impair motivation among both lower ability individuals, who perceive themselves as unable to perform at the level of their peers, and higher-ability individuals, who view such individuals as free-riders (Taggar & Neubert, 2004). Applying attribution theory to teams performing interdependent tasks, LePine and van Dyne (2001) propose that the level of human capital among low performers influence peer attributions regarding the causes, controllability, and stability of the behaviors among the low performers, which in turn influences the helping behaviors provided by their higher performing peers. Helping behaviors by the group, such as motivating, training, and mentoring provided to low ability individuals can provide a positive effect on overall group performance. However, attribution theory also proposes a negative perspective of poor performers; such perceptions may result in poor performers being ostracized (Williams, 1997) and unable to receive the help they need (Taggar & Neubert, 2004). Overall, dispersion in skill level and performance within a unit or group can produce perceptions of those at the bottom as being the "weakest link", which in turn can negatively impact overall group performance.

In addition to perceptions of being the weakest link, overall unit or firm performance may be more likely to be negatively impacted by those at the very bottom end of the distribution than positively impacted by those at the top of the distribution (Franck & Nuesch, 2010). That is, when the negative performance associated with lower ability individuals cannot be offset or "absorbed" by the positive performance among

higher-ability individuals, the net effect on overall performance due to dispersion is negative (Anderson & Sally, 2013; Krautmann, 2014). This suggests that more capable individuals may withhold effort if they perceive the performance of the overall team as being compromised by the performance of their lower performing peers. Together, these arguments suggest that greater dispersion in human capital within a unit may be negatively associated with overall unit performance when the positive contributions made by higher skilled individuals are offset by negative contributions made by lower skilled individuals.

Social psychology has also examined the ability of novices and experts to cooperate in an interdependent task environment to influence overall team level outcomes (Littlepage, Robison, & Reddington, 1997; Van der Vegt, Gerben, Bunderson, & Oosterhof, 2006). As previously noted, when a team is comprised of both low and high skilled individuals, there is potential for mutual learning and development to occur, which may ultimately improve overall team performance. However, for a variety of reasons, the potential for such gains due to highly dispersed groups may not always come to fruition. One potential factor limiting the ability of dispersed teams to positively impact performance is the frustration created by a team comprised of members with different ability levels (O'Connell, Doverspike, Cober, & Philips, 2001; Secrod & Backman, 1974). Focusing on dispersion in cognitive ability, much of this work has argued that cooperation and mutual learning between high and low ability individuals is limited due to the emergence of fault-lines in which subgroups are formed amongst the team—a finding that ultimately proves detrimental to overall team performance (Barrick et al., 1998; Tziner & Eden, 1985). In fact, empirical evidence suggests that more

dispersed groups can result in subgroups where incentives are aligned such that individuals place more attention and effort towards improving the performance of the subgroup rather than the team as a whole (Thatcher, Jehn, & Zanutto, 2003). Even in situations where subgroup formation (i.e., fault-lines) either do not or are unable to occur, higher ability individuals may withhold effort when perceiving their efforts to be offset by those of lower ability individuals, as previously mentioned (Price, Harrison, & Gavin, 2006). Overall, evidence from the social psychology literature suggests an ambiguous relationship between dispersion in human capital and team level outcomes.

Primarily focusing on the dispersion in functional background and experiences, strategy and economics scholars have examined how such dispersion in top-management-teams (TMTs) may provide inefficiencies in the decision making process (Carpenter, Geletkanycz, & Sanders, 2004). Arguing that homogeneous groups of individuals are more likely to attract those similar to the group, homogeneous groups are argued to be more productive and efficient in decision making than heterogeneous groups because of mutual attraction of similar others into the group who share similar backgrounds, experiences, and perspectives (Sollner, 2010). Greater dispersion among individuals within a group may lead to behavioral disintegration such that communication, integration, and cooperation between individuals is less likely to occur (Li & Hambrick, 2005; Ndofor, Sirmon, & He, 2015). Li and Hambrick (2005) obtained empirical evidence of large differences among TMTs as being associated with lower firm performance due to task conflict, emotional conflict, and behavioral disintegration. Taking a resource-based approach to TMT dispersion, Auh and Menguc (2006) obtained results that suggest dispersion in functional background and experience actually

increases, rather than decrease, unit performance. Such mixed findings are not surprising; nor are they limited to the research on differences among individuals in TMTs.

Aggregate Effect. While the previous section delineated the possible ways in which dispersion in human capital possessed by individuals within a given team can have beneficial or detrimental effects on team performance, the total effect may be less clear. Evidence of this can be seen in the number of review articles and meta-analyses focused on the performance implications associated with differences among individuals in work teams and groups (Bowers, Pharmer, & Salas, 2000; Horwitz & Horwitz, 2007; Joshi & Roh, 2009; van Knippenberg & Schippers, 2007; Webber & Donahue, 2001). Several reviews have noted that despite a rich literature on the implications differences between individuals have for overall team performance, the exact effects such differences have on overall team performance are not clear (Bell, Villado, Lukasik, Belau, & Briggs, 2011; Horwitz & Horwitz, 2007; Webber & Donahue, 2001). In their review of the literature, Bell and colleagues (2011) posit that such mixed findings are due to an oversimplification of the dispersion-performance relationship in teams and call for a more nuanced perspective that seeks to understand some of the contextual factors that determine the extent to which dispersion holds either positive or negative implications for performance.

In an attempt to explain factors contributing to mixed findings between individual differences (of which dispersion is just one type) and unit performance, Joshi and Roh (2009) reviewed and meta-analyzed the extant research in an attempt to identify some of the most common contextual factors likely to account for such conflicting findings.

Rather than focus on the debate regarding whether differences among group or team members as being positively or negatively associated with performance (Bowers, Pharmer, & Salas, 2000; Horwitz & Horwitz, 2007; Webber & Donahue, 2001), the authors sought to account for the contextual factors at multiple levels to examine whether such factors shaped the dispersion-performance relationship. Their results suggest that while task interdependence moderates the relationship between group and team level differences and performance, the interactive relationship may be more complex and require analyses more fine-grained than those captured in meta-analyses.

One of the common conclusions noted in their meta-analysis and noted in other reviews (Bell et al., 2011; Bowers, Pharmer, & Salas, 2000; Horwitz & Horwitz, 2007; Webber & Donahue, 2001) is the importance of the contingencies on these relationships, rather than the direct effects themselves. That is, differences among individuals in the workplace are inevitable and the individual positive and negative effects such differences may have on team performance become less informative for scholarship (Joshi & Roh, 2009; Kearney & Gebert, 2009; Stewart, 2006; Van Knippenberg & Schippers, 2007); instead, how and why such differences lead to differential outcomes are more informative and important endeavors for scholars to examine. As such, rather than explicate the positive and negative effects dispersion may have on performance by proposing competing hypotheses, I focus on the contingencies that moderate whether, and the degree to which, dispersion in the human capital possessed by individuals within a team leads to optimal performance outcomes. By shifting the focus away from whether differences are beneficial or detrimental for overall team performance, I provide a more nuanced perspective and suggest that it depends upon contingencies both endogenous as

well as exogenous to the dispersion-performance relationship. Specifically, I explore such contingencies in terms of how strategies for managing human capital (human capital deployment strategy) as well as the broader task context in which such strategies are implemented influence the extent to which teams benefit from greater dispersion.

Human Capital Deployment, Human Capital Dispersion, and Performance

Human capital deployment. Strategy scholars have extended the RBV—the main perspective that suggests resource endowments as a key factors explaining why firms outperform others—to include the management of those resources as critical for obtaining a competitive advantage and explaining differential outcomes for firms holding similar resources (Penrose, 1959; Sirmon, Hitt, & Ireland, 2007; Zott, 2003). Largely referred to as *resource orchestration*, this perspective combined the theoretical insights gained from the literatures on resource management and asset orchestration to explain how firms are able to achieve differential performance outcomes, despite having similar resource endowments and facing similar environmental contexts (Hitt, Bierman, & Shimizu, 2001; Kor & Leblebici, 2005; Sirmon, Gove, & Hitt, 2008; Sirmon et al., 2007). Resource orchestration posits that it is through the combination of resources, capabilities and managerial acumen that firms are able to achieve superior performances (Chadwick, Super, & Kwon, 2015; Sirmon et al., 2007; 2011). While much of the early work on the RBV placed the emphasis on the resources possessed by the firm, this perspective shifts the focus towards how those resources are managed and the contingencies under which resources are able to lead to more optimal outcomes. In short, the resource orchestration framework extends and broadens the RBV by considering how firms are able to achieve optimal outcomes through the management of their resource stocks.

Resource management is comprised of the decisions regarding the implications associated with the management of resources through the structuring, bundling, and leveraging of resources (Sirmon et al., 2007; 2011). The leveraging of resources involves the set of processes used to configure as well as deploy capabilities (Sirmon et al., 2007; 2011). One way in which managers can deploy their resources is through decisions regarding the opportunities provided to human capital resources to contribute to team, unit, or firm capabilities (Kor & Leblebici, 2005; Sirmon et al., 2007; 2011). *Human capital deployment* refers to the strategic choices related to the deployment of firms' strategic human resources (Kor & Leblici, 2005). Put differently, managers are able to utilize a resource advantage or exploit an opportunity by deploying individuals who possess certain human capital attributes. Here, I focus on how managers deploy human capital through the opportunities provided to individuals within a team. Within this framework, *opportunities* refer to situations in which individuals can contribute to overall performance of their team through their actions. In the next section, I argue that the extent to which these opportunities are more broadly distributed among many individuals or more skewed (or concentrated) among a select few represents a specific form of leveraging human capital capabilities—human capital deployment.

It is important to note how the model and theory developed here differ from other studies focused on the leveraging of human capital (Kor & Leblici, 2005). Such departures also reflect two important boundary conditions. First, the SHC literature has provided a variety of conceptualizations of how human capital aggregates to influence a variety outcomes beyond the individual level (Ployhart & Moliterno, 2011). Human capital has a long tradition of being a source of value and competitive advantage among

micro (i.e., I/O psychology), meso (i.e., SHC, teams), and macro-oriented (i.e., strategy) scholarship (Crook, Todd, Combs, Weber, & Ketchen, 2011). A review of the extant literature reveals a variety of ways in which these scholars have treated human capital both conceptually (e.g., tacit, general, firm specific, and industry specific knowledge) and operationally (e.g., years of education, educational degree, age, functional background, tenure, labor market experience, training). In their review of the diversity-performance relationship among teams, Bell and colleagues (2011) note that for the differences in a given attribute to have implications for a team, such attributes must be highly task- and job-relevant and be positively related to overall team performance. The significant and positive relationship between task- and job-specific skills and abilities possessed by team members and overall competencies of the team has been consistently supported by research spanning multiple scholarly domains (Crook et al., 2011;Neuman & Wright, 1999). In addition to skills and abilities, experience has been theorized as an attribute of human capital that provides individuals with both a pool of knowledge regarding what has and has not contributed to task success but also a tacit understanding of team dynamics over time (Marks, Mathieu, & Zaccaro, 2001). In an interdependent team context, experience may serve as an attribute that facilitates the transfer of knowledge from more experienced individuals to their lesser-experienced peers (Porac, Wade, Fischer, Brown, Kanfer, & Bowker, 2004). Such knowledge sharing can provide lesser-skilled individuals with increased knowledge regarding individual-level task proficiency as well as team-level processes—both of which may further develop the skills and abilities of the lesser-experienced individuals. As such, I focus on the two human capital attributes scholars have identified as being generally related to jobs across organizational

contexts as well as being related to performance at both the individual and team level: skillfulness and experience (Bell, Villado, Lukasik, Belau, & Briggs, 2011; Crook et al., 2011; Mathieu et al., 2014). I address the potential limitations of this decision in the section on limitations.

A second boundary condition relates to the role of individuals who influence the resource management decisions. Much of the work applying resource orchestration in the context of human capital has relied upon the role of the manager in making allocation decisions regarding when and how to allocate human resources. Largely referred to as *dynamic managerial capabilities*, this literature has focused on how managers' change and reallocate their firm resources in response to changing or competitive environmental conditions (Chatterji & Patro, 2014; Helfat, Finkelstein, Mitchell, & Peteraf, 2007). While this places emphasis on how the social and human capital possessed by managers influence their decisions and how these decisions ultimately influence firm performance (Helfat & Martin, 2015), here, I focus exclusively on the implications a given decision has on performance. That is, rather than focus on how the human capital possessed by managers relates to their decisions regarding the management of resources, I focus on how those decisions influence the effect human capital dispersion has on team performance. Combining the RBV and resource orchestration literatures, I argue that the relationship between dispersion in the stock of human capital and overall team performance is a function of how human capital is deployed by managers. That is, I propose a more nuanced view of resource orchestration and human capital through a focus on the role of dispersion in human capital, the different decisions regarding how to deploy human capital, and the performance implications associated with such decisions.

Deployment as a moderator of human capital dispersion and performance.

Managers are able to utilize a resource advantage or exploit an opportunity though strategic decisions regarding the deployment of individuals possessing certain human capital attributes (Helfat & Martin, 2014). Here, I focus on how managers deploy human capital through the opportunities provided to individuals within a team. Below, I argue that the extent to which opportunities are provided more broadly among many individuals or more skewed (concentrated) among relatively fewer individuals represents a key strategic decision regarding the deployment of human capital. These decisions can be made in light of the benefits associated with the breadth in which opportunities are provided to individuals. The theoretical framework developed here explores how the deployment of human capital moderates the relationship between human capital dispersion and team performance. Specifically, I posit that many of the benefits associated with dispersion in human capital within a team are amplified when combined with a broader allocation of opportunities among individuals across the human capital distribution. To explicate how such decisions moderate this relationship, it is important to make note of the costs and benefits associated with different human capital deployment strategies. To this end, I simplify the discussion by categorizing deployment strategies as being oriented towards a broader or more concentrated distribution of opportunities.

Deployment strategies oriented towards providing a more concentrated distribution of opportunities limit the availability of opportunities to a specific subgroup of individuals. Such strategies are beneficial for group or team performance for two main reasons. First, and most obvious, is the team performance implications associated with

providing relatively more opportunities among more skilled, experienced individuals. As previously mentioned, there is a generally positive relationship between the aggregate level of human capital possessed by individuals on a team and overall team performance (LePine, Hollenbeck, Ilgen, &Medlund, 1997; Stewart, 2006; Tziner & Eden, 1985). However, teams are not just interested in improving their level of performance—they are also likely seeking to perform consistently. For teams to perform at both a high level and on a consistent basis, teams require members to perform on a consistently high basis as well. Individuals performing at a high level are more likely to be seeking to maintain their current level of performance, whereas those performing at a lower level are more likely to be seeking to improve their performance (Murphy, 1989). Individuals seeking to maintain their already high level of performance have been shown to perform more reliably than those seeking to improve their performance (Murphy, 1989; Thoresen, Bradely, Bliese, & Thoresen, 2004). For teams with greater dispersion in the level of human capital possessed by individuals, a concentrated strategy can capitalize on both the higher level and more reliable performance among the more capable individuals. Together, these benefits reveal how adopting a strategy in which opportunities are more concentrated among high skilled, experienced individuals can improve team performance.

Although team performance can be heightened through leveraging strategies oriented towards a more concentrated distribution of opportunities, such strategies are not without their costs. While it may seem logical to skew the allocation of opportunities among high skilled, high performing individuals, such deployment decisions may not be either feasible or in the best interest of the team. Teams' continued reliance on high

performers increases their vulnerability of not succeeding in the future due to increased risks that an individual or set of individuals become burnt-out or turnover (Groysberg & Lee, 2009; Groysberg, Lee, & Nanda, 2008; Kehoe & Tzabbar, 2015). Continued reliance upon such individuals can result in mental and physical exhaustion and fatigue, which has been linked to increased likelihood of burnout and decreased future performance (Bakker, Demerouti, & Verbeke, 2004; Maslach, Schaufeli, & Leiter, 2001). However, the likelihood of burnout and fatigue leading to decreased performance can be mitigated by reducing the reliance on high-ability individuals through increased opportunities among lower-skilled individuals. Faced with the potential drawbacks associated with a continued focus on providing opportunities among only higher-ability individuals, firms with human capital deployment strategies that seek to achieve a balance between utilization of individuals of both low and high ability are likely to outperform those that only leverage one group of individuals (Kor & Leblebici, 2005). As such, providing more broadly distributed opportunities for individuals reduces the overreliance on high performers and, as a result, decreases the likelihood of mental and physical fatigue among those individuals. Such deployment strategies may sacrifice short-term performance of the team by providing opportunities to less capable individuals, but benefit the long-term reliability of team performance by limiting the reliance on more capable individuals.

The broader literature on team dynamics suggests that teams develop over time and can improve their collective performance through the opportunities provided to members (Harrison et al., 2003; Humphrey & Aime, 2014). Human capital deployment strategies oriented towards providing opportunities more broadly among team members

allow for individuals to work towards and contribute to the achievement of team goals and objectives. Such strategies also provide individuals with the opportunity to gain experience alongside other team members and become more familiar with their teammates (Harrison et al., 2003). McGrath's Time, Interaction, and Performance (TIP) theory (1991) suggests that to the extent that teams operating in an interdependent work context can provide members with such opportunities, individuals can achieve a shared mindset regarding the goals, coordination, and norms governing the team (Harrison et al., 2003; Hirschfeld & Bernerth, 2008; Matheiu, Heffner, Goodwin, & Cannon-Bowers, 2000). Experiences that enable individuals to develop a shared mindset and achieve greater familiarity with other team members have been found to be associated with improved performance of both individual members as well as for the overall team (Gersick, 1988; Harrison et al., 2003).

Relatedly, providing more broadly distributed opportunities to more individuals also allows for learning and development among less-skilled, inexperienced individuals. Scholars largely agree that individuals can improve their short-term as well as long-term abilities when provided with the opportunities to make and learn from their own errors (van Dyck et al., 2005; Jones & O'Brien, 1991; McCune, 1997). Providing individuals with the ability to engage in learning-by-doing can facilitate improved perceptions of psychological safety, which, as a result, can increase the ability of individuals to learn from these experiences (Edmondson, 1996). Perceptions of psychological safety can be fostered when greater opportunities for learning from mistakes are provided to lower-ability individuals in the presence of higher-ability individuals (Bunderson & Reagans, 2010). Edmondson (1996) found that healthcare groups in which individuals perceived a

high level of psychological safety to discuss errors made on the job were also more likely to be able to both better identify the factors that contributed to their errors as well as developing methods to reduce the occurrence of such errors in the future. Such effects were linked to improved future performance of the unit. Similarly, Cannon and Edmondson (2001) found that performance at the group level increases when individuals are in agreement that hands-on learning through trial and error provides an opportunity for learning among members. The ability to improve future performance of the group through learning and development of lesser-skilled individuals is particularly important in interdependent work contexts where the overall performance of the group depends upon the performance of the collective, rather than a single individual. Together, this research suggests that providing opportunities for individuals to experience hands-on learning through trial-and-error experiences can improve an individual's performance as well as their ability to contribute to performance of the team.

Greater opportunities for learning and development among individuals can become even more beneficial when such opportunities are provided in the presence of higher-skilled individuals. As previously mentioned, higher-skilled individuals can provide feedback and support to further facilitate the learning among their lesser-skilled peers as they obtain greater hands-on experience. Empirical research supports the positive impact working alongside higher skilled, more experienced individuals can have on lesser skilled, inexperienced individuals. For example, Kor and Leblebici (2005) obtained results that reveal law firms are able to achieve superior performance through strategies focused on utilizing high ability individuals for both direct task performance as well as for the development of lower-ability firm-specific human capital. Specifically,

their results suggest that extreme levels of utilization among higher-skilled individuals is likely to have negative performance implications as it sacrifices opportunities to develop lower-ability individuals in exchange for direct task performance among high performing individuals. Tjosvold, Yu and Hui (2004) examined some of the contextual factors likely to influence the ability of team members to positively influence team performance through the development of their peers. Specifically, their study examined the interaction between task interdependence, committing errors, and cooperation among individuals as it pertained to overall group performance among a sample of teams within Chinese organizations. Their results suggest that members on teams characterized as being interdependent and supportive are more likely to learn from their mistakes, whereas those on teams in which task interdependence is low and learning from mistakes is not emphasized are significantly less likely to learn from their mistakes. These findings are supported by additional research that found individuals are better able to learn from their mistakes and improve their ability to perform in the future when provided with the opportunity gain experience and commit errors (Rybowiak et al., 1998; Van Dyck et al., 1998; Tjosvold, Yu, & Hui, 2004). Overall, these findings suggest that future team performance can be improved when individuals are provided with opportunities for learning and development—especially when such opportunities are experienced in the presence of higher-skilled individuals.

As previously mentioned, human capital leveraging strategies embracing a more balanced deployment of human capital represent a broader delegation of opportunities to both high and low skilled individuals; whereas a less balanced strategy reflects the concentration of opportunities among a select few individuals. Together, the arguments

thus far suggest that for teams with greater dispersion in the level of human capital possessed by individuals will benefit from human capital deployment strategies oriented towards providing greater opportunities among individuals across the human capital distribution. That is, teams featuring greater dispersion in the skill level and experience possessed by individuals are more likely to benefit from deployment strategies that focus on providing opportunities to both experience and inexperienced individuals as a means of fostering growth, development, coordination, and a collective mindset among all team members. Moreover, this strategy also reduces a team's reliance upon their more experienced, higher skilled individuals. Conversely, teams with less-dispersion in their human capital are less likely to benefit from increased dispersion in the allocation of opportunities. Relative to less-dispersed teams, teams with greater dispersion in the human capital possessed by individuals have greater potential to improve performance through a broader distribution of opportunities. Therefore, as shown in Figure 1, I posit that for teams in which human capital is highly dispersed, the positive effects of such dispersion on performance are likely to be more positive when greater opportunities are provided across more individuals.

Hypothesis 1a: Controlling for the average level of experience, the relationship between the dispersion in experience and team performance will be moderated by the human capital deployment strategy. That is, the relationship between dispersion in experience and performance will be more positive when the distribution of opportunities for individuals is more broadly distributed across individuals within the team.

Hypothesis 1b: Controlling for the average level of skills and abilities, the relationship between the dispersion in skills and abilities and team performance will be moderated by human capital deployment strategy. That is, the relationship between dispersion in skills and abilities and performance will be more positive when the distribution of opportunities for individuals is more broadly distributed across individuals within the team.

Context, Human Capital Dispersion, and Performance

In the previous section, I develop theory to suggest that the dispersion-performance relationship is moderated by the human capital deployment strategy taken by managers. To this end, I detailed many of the advantages as well as disadvantages associated with human capital deployment strategies in which opportunities are more or less broadly distributed among individuals. In the discussion that follows, I consider the role of a team's task context in determining the effectiveness of different deployment strategies. Specifically, I focus on the distinction between high stakes and low stakes task contexts. Both contexts (i.e., high and low) are comprised of multiple instances in which a team can engage in routines and perform. We can think of the stakes associated with a task context as the relative importance associated with each specific performance outcome for the team. At one extreme, a *low stakes context* describes situations in which a single performance outcome does not carry significant weight for the team. Such contexts are likely to describe the environment in which teams primarily operate and, as such, sustainability of longer-term performance is emphasized. Conversely, a *high stakes context* describes a situation in which the importance of an individual performance outcome is heightened. These differences in the context hold implications for the hypotheses proposed earlier.

As an example, consider a law office that accepts a variety of cases. These cases can range from simple civil cases (for minor legal infractions) that receive relatively little public attention to more serious cases that attract significant attention from the public and media. Simple civil cases tend to occur more frequently and the individual outcomes of these cases tend to entail little significance for the long-term performance of the law firm.

However, the firm may occasionally encounter a more serious case (say, one that involves a well known individual) that receives heightened publicity and, as a result, the outcome of the case entails significant importance for the firm. Relative to the majority of civil cases taken by the firm, these types of cases occur less frequently and account for less of the total time spent on cases by the firm. As such, the default situation the law firm primarily operates in reflects a low stakes context where the outcomes of one single case does not entail significant implications for the firm, whereas the higher stake cases can carry significantly more weight.

Prior to theorizing the role task context plays in the management of the dispersion-performance relationship, it is important to note two aspects of task context. First, relative to when the stakes are low, this context tends to occur less frequently and for a shorter duration of time. Using the law example above, it the firm primarily receives cases where the outcome of that individual case does not hold significant implications for the firm. As the majority of their cases fall within this category, the firm primarily operates in a low stakes context. However, when a high profile case is taken where the outcome can have significant implications (both good or bad) for the firm, such situations are reflective of a high stakes context. Relative to all of the cases received by the firm, such high stakes contexts occur less frequently and over a shorter duration of time. Second, the definition and conceptualization of low and high stakes context does not assume a difference in the level of difficulty for tasks in either context. That is, tasks in a low stakes context are not inherently less difficult than those in a high stakes context. Rather, it is the implications of the outcomes that vary. A more

substantial discussion of these assumptions and the potential limitations associated with them is provided in a later section on limitations and future directions.

Resource Management in High Stakes Contexts.

The two key distinctions in low versus high stakes contexts—namely, the relative importance of single performance outcomes and the difference in duration (compressed versus extended)—point to the relevance of different considerations a firm is likely to make when selecting human capital deployment strategies in these two contexts. In particular, in a default, low stakes context, teams likely consider the sustainability of their deployment strategies (given the extended time period) and, as a result, may choose to prioritize the team's longer-term viability and success. As such, the opportunities for development and learning provided by a balanced deployment strategy may be especially valuable. On the other hand, in a high stakes environment where each single performance outcome carries significant weight and the risks of overuse and burnout are reduced given the relatively compressed timeframe, the reliability and exceptional performance of a team's top human capital enabled by a concentrated deployment strategy may be optimal.

Action teams are teams designed to have team member interdependence across a variety of tasks and operate in a variety of task contexts (Hirschfeld & Bernerth, 2008). Examples of action teams include sports teams, military combat teams, search and rescue teams, flight crews, and surgery teams (Chen, Thomas, & Wallace, 2005; Hirschfeld & Bernerth, 2008; Sundstrom, De Meuse, & Futrell, 1990). Such teams perform a variety of tasks in contexts where the implications associated with success and failure varies

from minimal to significantly large—synonymous to the low and high stakes contexts explored here. For example, while a surgical team may perform the same procedure (e.g., minimally invasive cardiovascular surgery) the majority of the time (representative of a low stakes context), they may encounter the situation in which they must perform the procedure on a high-risk patient—placing the surgeons in a high stakes context where the implications with mistakes and errors can be large (i.e., life or death of the patient). The literature on action teams has embraced the *team profile approach* to examine how the composition of a given team relates to a variety of outcomes (Jackson, Joshi, & Erhardt, 2003; Mathieu et al., 2013). Specifically, such research has examined how the human capital possessed by an individual contributes to the aggregate pool of human capital at the team level. The level of human capital possessed by team members represents the aggregate knowledge that can serve as the basis for building team-level capabilities (Hirschfeld & Bernerth, 2008; Mathieu & Schultz, 2006). The profile of the team, in terms of the average level of or differences in one or more attributes, has been hypothesized as being important for team level outcomes when orchestrated effectively through management decisions (Mathieu et al., 2013). To date, however, the literature on action teams has ignored the role of management decisions and placed greater focus on the role of team collaboration, perceptions of psychological safety, psychical efficacy, and perceptions of team efficacy (Gully, Incalcaterra, Joshi, & Beaubien, 2002; Hirschfeld & Bernerth, 2008)

Whereas the literature on action teams has largely ignored the role of strategic management, the role of strategic resource management as a factor influencing the relationship between teams and a variety of outcomes has been explored in the literature

on high-reliability organizations (HROs). HROs provide an example of organizations in which the reliability of outcomes for a given task or set of tasks is prioritized in an attempt to achieve a virtually problem-free performance across risky, high-stakes situations (Bigley & Roberts, 2001; Ericksen & Dyers, 2004; Roberts, 1989). To this end, HROs seek to identify and develop people and organizational management structures flexible enough to not only routinely handle a wide-range of probable situations, but also to manage potential environmental contingencies to reliably sustain a high-level of performance in the occurrence of a high stakes context (Weick, Sutcliffe, & Obstfeld, 2008; Ericksen & Dyer, 2004). Reliability of their performance become critical when high-risk contexts pose significant negative implications associated with failing to perform at a given level. Examples of HROs include nuclear power plants, naval aircraft carriers, air traffic control systems, hospital emergency centers, and military and police task forces. HROs manage resources such that in high stakes contexts, individuals who can perform both at a high level and reliably can be utilized for those shorter periods of time in which the performance of the collective is paramount; but also utilized less in other contexts where their higher level, more reliable performance is less necessary for the team (Weick, Sutcliffe, & Obstfeld, 2008; Ericksen & Dyer, 2004). While HROs do not perpetually operate in high stakes contexts, they do, however, provide a relevant case for understanding how the broader task context can be examined in terms of the stakes involved with outcomes for a team. Specifically, this literature explores the role of management and team competencies when the outcomes associated with a single or set of tasks hold significant implications for the team or firm.

The role of performance in high stakes contexts has also been explored in the literature on "choking"—defined as performing below expectations, given one's skill level, in situations where performance pressure is at a maximum (Beilock & Gray, 2007; Beilock & Carr, 2001; DeCaro, Thomas, Albert, & Beilock, 2011). While individuals are likely to find themselves in high stakes situations, scholars have found that more skilled individuals who perform at a high level are less likely to perform below expectation ("choke") and make a higher level of contribution to their team when the stakes are high (Baumeister, 1984; Baumeister & Showers, 1986; DeCaro, Thomas, Albert, & Beilock, 2011). As a result, concentrating opportunities among more experienced, skilled individuals in high stakes contexts can provide a team with a more reliable, higher level of performance. Concentrating opportunities among higher performing individuals becomes even more crucial in high stakes context where a single team performance outcome carries more weight, relative to a low stakes context. While I do not hypothesize, nor do I test, which individuals receive opportunities; it is assumed that a concentrated deployment strategy reflects a deliberate and conscious effort to provide opportunities to those individuals who perform at a high level and reliably. A more detailed discussion of this assumption is provided in a later section.

While the literatures on HROs and choking suggest that relying upon more experienced, higher skilled individuals in high stakes can yield a better, more reliable outcome, it does not take into account how resources are managed across contexts. That is, while each single performance outcome in a high stakes context carries greater weight for a team in the short-term, the aggregate pattern of human capital utilization (through deployment strategies) has lasting, long-term implications for a team's human capital.

Specifically, relying upon top human capital through a concentrated deployment strategy may provide higher, more reliable performance for the collective, but may risk mental and physical fatigue or, at worst, burnout among those individuals (Bakker, Demerouti, & Verbeke, 2004; Maslach, Schaufeli, & Leiter, 2001). Therefore, a deployment strategy that consistently relies upon these individuals risks the long-term performance and viability of the team as a whole. This suggests that concentrating opportunities among more experienced, higher-skilled individuals in a high stakes context assumes teams to have also implemented a balanced deployment strategy in low stakes contexts. A balanced deployment strategy in low stakes contexts allows for teams to reserve the concentrated utilization of top human capital for high stakes contexts. As such, I hypothesize that the effectiveness of a concentrated deployment strategy for high dispersion teams in a high stakes context depends on such teams' utilization of a balanced deployment strategy in low stakes contexts.

Hypothesis 2a: Among teams facing a high stakes context, the moderating effect human capital deployment has on the relationship between dispersion in experience and performance is contingent upon human capital deployment strategies in low stakes contexts. Specifically, the positive moderating effect a concentrated deployment strategy has on the dispersion-performance relationship is contingent upon teams' utilization of a balanced deployment strategy in low stakes contexts.

Hypothesis 2b: Among teams facing a high stakes context, the moderating effect human capital deployment has on the relationship between dispersion in skills and abilities and performance is contingent upon how opportunities were distributed in low stakes contexts. Specifically, the positive moderating effect a concentrated deployment strategy has on the dispersion-performance relationship is contingent upon teams' utilization of a balanced deployment strategy in low stakes contexts.

METHODS

Sample

The hypotheses proposed here are tested using a sample of National Hockey League (NHL) teams. The NHL is comprised of thirty teams divided into divisions. The number of teams has increased from twenty-one in 1979 to thirty in 2000, and has remained unchanged since. The NHL guidelines stipulate that each team be comprised of no more than 23 players and have a roster of players finalized and submitted to the league on the opening day of the season (NHL Hockey Operations Guidelines). Since teams are limited in the number of players they are able to place on their roster, hockey provides a context in which teams, similar to some firms, are bound by the number of employees they can staff and payroll expenses. Data on individual players and teams were obtained from official NHL records accessed from NHL.com, hockeyzoneplus.com, and hockey-reference.com. These data sources have been utilized in a variety of other studies testing theoretical relationships in the context of hockey teams (Grohsjean, Kober, & Zucchini, *in press*; Jones, Nadeau, & Walsh, 1999; Lambrinos & Ashman, 2007; Trevor, Reilly, & Gerhart, 2012). Subsequent data that is not publicly available was collected from hockeydb.com. Access to the data and permission for its use, was granted by the owners on the condition that that their website be mentioned and that the results of the study be shared with them.

Hockey serves as an appropriate context in which to test the relationships proposed here for several reasons. First, the hypotheses proposed here posit that the performance implications of team level dispersion in the distribution of human capital are largely based upon an interdependent task context in which successfully completing tasks

requires high levels of coordination and cooperation among individuals. This is consistent with the context of hockey teams in which team performance depends on the strong work interdependence between individuals on the team (Beauchamp & Bray, 2001; Foster & Washington, 2009; Gerhart & Rynes, 2003; Trevor, Reilly, & Gerhart, 2012). Moreover, much of the theory supporting a positive relationship between dispersion in teams and performance implicitly and explicitly assumes broad non-task-related interactions and/or task interdependence between similar and dissimilar individuals (Devine & Phillips, 2001; van Knippenberg, De Dreu, & Homan, 2004; Webber & Donahue, 2001). Sports teams, and hockey specifically, provide ample opportunities for individuals to interact both within their given in-game tasks as well as outside of the game during practice and team activities (Day, Gordon, & Fink, 2012).

Second, this sample provides objective measures of the key variables central to the hypotheses proposed here. Hockey provides objective measures of individual and team characteristics and performance. These objective measures are collected and organized across all teams to establish official league, team, and player statistics. Such statistics are acknowledged as being meaningful for understanding individual player and team aspects. Relatedly, since dispersion in human capital is central to the hypotheses developed here, it is important to test these hypotheses in a context in which such dispersion is likely to be observed within as well as between teams. Controlling for the average level of human capital—both in terms of skill set level and experience—hockey teams are comprised of individuals with varying skill sets and experience. The levels of dispersion among individuals within a team will also vary between teams. Such dispersion exists throughout teams in the NHL since players simultaneously play two

different aspects of the game: offense and defense. Such differences present coaches and managers with decisions regarding the deployment in terms of different human capital attributes (i.e., offensive and defensive skills) simulataneously. As such, the decision regarding how to leverage and utilize players has been shown to vary both within and between hockey teams (Edwards & Washington, 2013), based upon the offensive and defensive skills possessed by players.

Another strength of the sample and approach taken here is in the lack of variance in team size. Given that all hockey teams are bound by having a twenty-three player roster, the objective statistics collected allow for equal sample sizes across teams. Testing the hypotheses proposed here in a context of teams of equal size is incredibly important. In their review of the appropriateness of empirical studies on the relationship between team diversity measures and various outcomes, Biermann and Kearney (2010) found that many of the popular measures of dispersion (e.g., Blau index, gini coefficient, standard deviation, coefficient of variation) are systematically biased when samples contain groups or teams of varying size. By utilizing a sample in which team size remains constant across all teams throughout time, I am able to mitigate systemic bias associated with unequal team size. Together, these characteristics support the use of hockey as a context in which to test the hypotheses proposed here.

Dispersion Measure

Prior to discussing the operationalization of key variables, the measure of dispersion used throughout the analyses merits discussion. Organizational research has utilized a variety of measures to capture the differences among individuals in work groups, teams, and units (Bierman & Kearney, 2010; Lawrence, 1997; Tsui & Gutek,

1999). Here, determining which measure of dispersion to use is based upon a careful analysis of several theoretical and empirical issues. In theory, the variables and measures being used in the analyses should influence the measure of dispersion used (Harrison & Klein, 2007). However, several scholars have noted that the selection of which measure to use has been based more on common practice rather than through sound theoretical and methodological considerations (Bedeian & Mossholder, 2000; Riordan & Wayne, 2008). Here, the variables used to capture human capital are measured using an interval scale. Bedeian and Mossholder (2000) among others (Harrison & Klein, 2007) propose the coefficient of variation (CV) and the standard deviation (SD) as appropriate measures of dispersion for studies using measures on an interval scale. Below, I discuss the merit of these recommendations in light of the potential advantages and drawbacks associated with both measures.

Also referred to as the relative standard deviation, the CV is a measure of dispersion and heterogeneity that has been widely used throughout management, HR, and strategy research as an index of observed differences in TMTs, task groups, board of directors, departments, and teams along a variety of constructs (Bedein & Mossholder, 2000; Williams & O'Reilly, 1998). Theoretically, the CV represents a measure of dispersion that is appropriate in light of the hypotheses developed here. Since the hypotheses control for the average level of human capital, it is appropriate that the measure of dispersion also control for the average level. Computed as a ratio of a sample standard deviation to the mean, the CV represents a measure of dispersion that takes into account the mean value of a given sample. By indexing the measure of a sample's

dispersion to its own mean, the CV provides a scale-invariant, relative measure of dispersion.

An alternative approach for capturing dispersion would be to utilize the standard deviation (SD) of a given attribute. The standard deviation provides an overall measure of the average squared differences between individuals within a given grouping. One of the benefits associated with the SD as a measure of dispersion is its invariance to sample size. That is, the SD for a group does not change as a function of the size of the group. As such, a larger group with the difference between individuals does not exhibit a larger SD than a smaller group with the same level of difference, as a function of the larger group size. However, this attribute may also serve as a limitation. For instance, being invariant to sample size inherently renders this measure incomparable across different variables and groups (Harrison & Klein, 2007). Another advantage to the SD as a measure of dispersion is its simplicity in composition. That is, the standard deviation provides an overall assessment of how far the average individual varies from others. However, this benefit can become a limitation if the average level for the attribute of which individuals vary is of importance. Since the hypotheses proposed here explicitly control for the average level of for a given attribute, and the traditional measure of standard deviation does not factor the mean level of a variable into the measure of dispersion, one would have to include a control for the mean level in the analysis to parse out variance it may account for.

Given that the theory developed here is explicitly focused on the role of dispersion, the standard deviation of a given attribute provides a more pure and easily interpretable gauge of dispersion, whereas the CV provides a measure containing another

statistic (the mean). However, despite being a more pure measure of dispersion, utilizing the SD as a measure of dispersion is not without some concerns. Primary among these is a concern of multicollinearity. If the mean and standard deviation are correlated, allowing both terms to enter a regression model is likely to increase the potential for multicollinearity. Inferences based on least square estimation techniques are severely limited in the presence of multicollinearity (Greene, 2008). However, if the mean and measure of dispersion were transformed into a single measure, least square estimates become more reliable and consistent, holding all else equal. Together, these theoretical and empirical considerations support the use of the CV as an appropriate measure of dispersion.

The appropriateness of which measure to use comes down to examining the relationship between the mean and standard deviation for each of the factors in which the dispersion is of interest. If the mean and standard deviation are not significantly and statistically related, reliable and efficient least square estimates can be obtained. As such, the standard deviation would be a more "pure" measure of the dispersion for a given human capital attribute. To capture the effect such dispersion has on team performance, I would first control for the average level of a given human capital attribute and then enter the standard deviation into the regression equation. Since the study presented here utilizes two different attributes of human capital (experience and skills and abilities), different ways of operationalizing dispersion may be used in the analyses.

Dependent Variable

The hypotheses proposed here focus on the performance implications associated with dispersion in human capital and strategies for managing such dispersion. Team

performance is measured somewhat differently in low and high stakes contexts. Since low stakes contexts refer to the general or "default" context in which the team operates, team performance will be assessed here at the season level. Consistent with prior literature, team performance is measured at the season-level using two alternative operationalizations (Berman, Down, & Hill, 2002; Landis, 2001; Pfeffer & Davis-Blake, 1986; Trevor, Reilly, & Gerhart, 2012). The first measure, *Team League Points*, refers to the points a team earns for their win-loss record during the regular season. It is important to note that this statistic is based on the outcome of each game and differs from the number of goals a team scored in the game. The NHL awards two points for each win recorded by a team, one point for a tie, one point for an overtime loss, and zero points for a loss. These points are used to determine league rankings during the regular season as well as how teams are seeded in the playoffs. For example, a team with 40 wins, 20 losses, and 5 overtime losses would have a received 85 team league points for purposes of ranking ((40 * 2) + (5 * 1)). Beyond determining who makes it into the post-season playoffs, league points have implications for post-season decisions in terms of playing more games at home and who they will be set to play against in the first round of the playoffs. As such, teams are not only incentivized to earn the most points in their division, but also among all teams.

An alternative measure of team performance, *Winning Percentage*, is used to test the robustness of the results against other measures of team performance. A team's winning percentage reflects the percentage of total games a team has won in a given regular season. Though easily interpretable, this measure of team performance categorizes game outcomes as either a win or loss. However, a team can lose a game to

varying degrees. When a team is outscored by the end of regulation time in a game, the game is over. However, if the two teams are tied at the end of regulation time, an extra period is played—commonly known as "overtime". A team losing in overtime was much closer to winning and more competitive than a team who loses in regulation time. Therefore, whereas team league points differentiate between regular losses and overtime losses, in which the game was much closer, winning percentages treat all losses the same. Though somewhat different, subsequent analyses reveal these two measures of team performance as highly correlated ($r = 0.53$). Both measures of team performance will be utilized in the analyses in an effort to ensure the reliability of the results.

The ultimate goal for hockey teams is to advance to and win the Stanley Cup Championship. Each year, sixteen teams are selected for the playoffs based upon team league points—four teams each from the four different divisions. The Stanley Cup Championship is comprised of five rounds in which teams advance through a best-of-seven games series. The variable *playoff round* is used to capture if and how far a team made it into the post-season. Consistent with prior studies (Trevor, Reilly, & Gerhart, 2012), the variable will take the following coding scheme: 0 for teams that did not make it into the playoffs; 1 for teams that made it to the first round of the playoffs but lost (8 teams); 2 for teams that made it to the second round of the playoffs but lost (4 teams); 3 for teams that made it to third round of the playoffs but lost (2 teams); 4 for the team that made it to the Stanley Cup Championship but lost (1 team); and 5 for the team winning the Stanley Cup Championship (1 team). This variable represents the ability of teams to reach and progress through the playoffs.

Independent Variables

Dispersion in Experience. A player's experience is measured using two different metrics. First, *league experience* captures the number of years in which a player has been actively playing in the NHL. This measure is synonymous with measures of industry experience commonly used in management studies. Second, *game experience* is measured as the number of games a given player has played over their career. Though similar, these two measures of experience may differ in relation to individual performance for a variety of reasons. First, injuries that occur after the start of a season can limit the number of games an individual is able to play. Since they started the season without injury, the data reflects an additional year of experience despite the player missing portions of the season. As a result, a player can technically gain an additional year of experience while missing the vast majority of games for the team. To account for differences in the number of years in the league and number of games played, I consider both measures of dispersion in experience for the analyses. Given the high correlation between these two variables, only one should be entered into the regression equation. Since there is no theoretical justification to prefer one operationalization to the other, I rely upon the statistical relationship each measure has with team performance to determine which should enter the model.

The performance implications associated with dispersion in experience is not limited to differences in the number of years in which individuals have experience. It may also be the case that dispersion in the *quality*, rather than just the *quantity*, of experience plays a role. I measure the quality of experience with a dummy variable to indicate whether an individual has experienced playing on a team who has advanced into

the Stanley Cup Playoffs. The dummy variable is then aggregated to the team level to reflect the proportion of the team that has playoff experience.

Dispersion in Skillfulness. Similar to the nature of play in the National Basketball Association, hockey players are expected to possess both offensive and defensive skills. Offensive skills and abilities reflect the ability of a player to contribute to the scoring of goals by their team either directly through their play or indirectly through their coordination with and support of their teammates. Defensive skills and abilities, on the other hand, reflect the overall ability of an individual to restrict or impede the offensive play of the opposing team. Therefore, the skill and abilities possessed by a given player are decomposed into two broad categories consisting of offensive and defensive skills.

An individual's skills and abilities are measured using a measure developed by hockey analysts and statisticians called goals-versus-threshold. Simply put, goals-versus-threshold (GVT) is a statistic that represents the value of players' skills and abilities, measured in goals, above what the average replacement player would have contributed. While it may seem logical and intuitive to just examine the offensive and defensive production of individual players, such measures are less likely to influence key team-level outcomes. For example, a team could be comprised of some of the more offensively talented players. However, just scoring goals does not ensure the success of the team as a whole. In fact, such teams may also be some of the least talented in terms of defense. As a result, it is important to focus on the skills and abilities that contribute to the goal differential (that is, the difference between the goals scored and those given up by the team). GVT provides a standardized metric by which we can assess how much an

individual player helped or, in some cases harmed, their team in outscoring their opponents, and, as a result, ultimately winning games.

There are several fundamental characteristics of the GVT that support its use as a standardized gauge of the skills and abilities possessed by all players on a team (Awad, 2009). First, GVT is measured in goals. By measuring the statistic in goals, GVT provides concrete value that is interpretable and generalizable across teams and over time. Moreover, goals can be used to assess the economic significance of GVT for teams. Second, GVT takes into account the position an individual plays for a given team. By adjusting for the position played by the individual, GVT controls for the probability that an individual is likely to posses the skills and abilities consistent with that position. Put differently, we would expect a player in an offensive oriented position to possess a higher level of offensive skills and abilities relative to an individual in a defensive oriented position. GVT takes such differences into account. Lastly, since this measure became available only recently, past values are generated based on the formula. However, the value a player adds to a team through their skills and abilities has changed over the years and across leagues. For example, it is often difficult to tell if certain statistics for players are "good" or "bad" given the status of the league decades ago. As such, GVT normalizes and accounts for changes in leagues over time. This allows for a more comparable measure over time.

GVT has also been an established measure of skills and abilities possessed by players for purposes of recruiting and scouting by teams. In an attempt to qualitatively confirm the appropriateness of this measure, I spoke with one of the recruiting and scouting consultants for a major NHL hockey team. The consultant confirmed that

measures of GVT were applied to potential college players who were entering the draft. These measures were then used to assess both the offensive and defensive skills and abilities possessed by the potential draft picks. Together, this suggests GVT as an appropriate measure of the skills and abilities possessed by a hockey player.

Human Capital Deployment. Human capital can be deployed across opportunities and over time. One of the ways in which we can examine the deployment of human capital is through the management of opportunities provided to individuals. Here, strategies for the deployment of human capital are explored in terms of the breadth or dispersion in the opportunities provided within a given team. The distribution of opportunities will be measured by the dispersion in time (measured in minutes) each player receives to play during each game. That is, the opportunities received by each player will be computed as a cumulative average in which the total number of minutes of playing time received is adjusted by the number of games played,

$$Opportunities_{i,t} = \frac{Minutes\ played_{t-1,t-2,\ldots,t-T}}{Games\ played_{t-1,t-2,\ldots,t-T}}$$

For each team, the adjusted number of minutes received by each player on the team is computed and then the standard deviation is used to capture the dispersion in minutes received by players:

$$Distribution\ of\ Opportunities_{i,t} = \sqrt{\frac{\sum_t^i (x - \bar{x})^2}{n - 1}}$$

where x is equal to the weighted opportunities received by each player and *n* is equal to the number of players on the team. A higher value indicates greater breadth in the deployment of opportunities received across players on a team. Conversely, a lower value indicates a less-broad, more concentrated distribution of playing time

(opportunities) received by players. The distribution of opportunities is calculated separately for both the low and high stakes contexts. For each context, if the mean level of opportunities is significantly correlated with the standard deviation, then the CV will be used as the primary measure of dispersion.

Task Context. The hockey season is broadly comprised of two portions: the regular season and the playoffs. In the regular season, teams play a total of 82 games. The sixteen hockey teams with the best performance (as determined by team league points) in the regular season are allowed to enter the playoffs. As previously mentioned, the playoffs are structured as an elimination style, winner-take-all tournament consisting of four rounds with each round featuring a best-of-seven series to determine which team advances to the next round. Whereas losing a game in the regular season does not eliminate a team from competition, losses in the playoffs may result in elimination. More than three losses in a given playoff round results in elimination. As such, the post-season represents a high-stakes context in which a team's single game performance outcome carries significant weight. To examine the performance of teams in high stakes contexts, the dependent variable reflects how far teams advanced in the playoffs. As such, whereas the moderating effect the distribution of opportunities has on the relationship between dispersion in human capital and team performance in low stakes contexts is explored for all teams during the regular season, the relationship among teams in a high stakes context is conducted on a subsample, limited to those who qualified to advance into the playoffs.

Control Variables

Consistent with prior literature, a variety of control variables are included to minimize alternative explanations beyond those attributed to the main independent variables theorized.

Coach Experience. In a sports context, coaches play a significant, but varied, role in the management of the team (Ertug & Castelluci, 2013; Pfeffer & Davis-Blake, 1986). Here, I focus on the impact coaching experience has on the overall performance of the team. Specifically, I control for the number of games a coach has coached in the NHL. While this is likely to reflect the experience each coach has in the league, I also use league tenure, measured as the number of years coached in the league, as an alternative control. Given the high correlation between these two measures, only one is allowed to enter the model as a control. To determine which represents a more appropriate control, I examine the correlation between these two alternative controls with team performance. The results indicate that games coached by a manager as being more correlated with their team's winning percentage ($r = 0.22$) than the number of years spent as a coach in the league ($r = 0.08$). As such, the number of games coached is used in the model to control for coach experience.

Past Team Performance. Past performance has been argued to influence future performance in sports contexts (Ertug & Castelluci, 2013; Pfeffer & Davis-Blake, 1986; Landis, 2001; Trevor, Reilly, & Gerhart, 2012). To control for the influence past performance may have on future performance, scholars have typically included performance lagged by one period as a predictor (Kilduff, Crossland, Tsai, & Bowers, 2016; Pfeffer & Davis-Blake, 1996). However, it is possible for a more dynamic lag

structure to exist in which current performance is affected by performance beyond one lagged period. To determine the appropriate lag structure, I conduct a Durbin-Watson (DW) test. The Durbin-Watson test regresses current performance in time *t* on several lagged values of past performance to provide the Durbin-Watson statistic (*d*),

$$d = \frac{\sum_{t=2}^{T}(e_t - e_{t-1})^2}{\sum_{t=2}^{T} e_t^2} = 2(1 - r) - \frac{e_1^2 + e_T^2}{\sum_{t=1}^{T} e_t^2}$$

where *r* represents the first-order autocorrelation coefficient (Greene, 2008). A test statistic greater than two indicate the presence of first-order autocorrelation. However, since the DW test is most appropriate for determining a lag structure not beyond the first-order condition, a DW statistic that rejects the null hypothesis of no first-order autocorrelation necessitates further testing to confirm autocorrelation beyond the first order. The Breusch-Godfrey test represents a form of the Lagrange multiplier (BGLM) in which OLS residuals (e_t) are regressed upon $\mathbf{x_{t,0}}$, where $\mathbf{x_{t,0}}$ represents the original **X** matrix of regressors with additional columns, **P**, containing the lagged residuals ($e_{t-1}, \dots, e_{t-P}$) (Greene, 2008; Hayashi, 2007). In contrast to the DW test, the BGLM provides a joint test for the first-order autocorrelation (P_1) as well as additional orders. Therefore, the appropriate lag structure for past values of team performance is determined through a joint-test of both the DW and BGLM tests for autocorrelation. The results of the DW test indicate the presence of first-order autocorrelation. These results were confirmed through the BGLM technique. Together, the results of both tests confirm the use of a one-period lag in performance as a control for past team performance.

Team Participatory Environment. Teams are likely to differ in the extent to which individuals provide support for one another and contribute to the shared goals of the team (Kirkman & Rosen, 1999). Such efforts extend beyond the opportunities

provided to individuals. To capture the extent to which teams embrace greater participation by members to support team objectives, *distribution of shots* represents the CV for shots taken by players on a team. Put differently, this represents the proportion of the team that was able to take shots for each game and then averaged over the course of the season. Larger values indicate teams with a greater proportion of members participating in taking shots and supporting team tasks, whereas lower number indicate less members participating in taking shots.

Penalties. Each time a player on a team commits a penalty, that player is removed from the game for a period of time pre-determined by the league according to the infraction. The team is then left to play without that player until their penalty time is served or the opposing team scores a goal. Teams who have a higher propensity to be assessed penalties are thus significantly more likely to be scored on and lose games. As such, I control for this by including the penalties against a team in terms of the penalty minutes assessed.

Awards. There are a variety of awards a player can earn in the NHL. Individuals can receive awards based on not only their performance in the sport (e.g., Hart Memorial Trophy, Calder Memorial trophy), but also for those who exhibit outstanding sportsmanship (Lady Byng Memorial Trophy), for those who best exemplify the qualities of perseverance, sportsmanship, and dedication (Bill Masterdon Memorial Trophy), as well as for the individual who represents an outstanding player and overall individual as voted by the players themselves (Ted Lindsay Award). These awards represent the abilities of players to not only perform at an exceptional level in the sport, but also possess abilities to serve as leaders, examples, and mentors to others players. There are a

total of 20 such awards that are provided to players each year. Teams comprised of players who receive these awards are likely to benefit from the additional contributions such individuals are likely to make to the team. To control for this, I control for the total number of awards received by individuals on a given team.

Team Competitive Environment. Lastly, I control for the primary environment in which a team competes. The division in which a given team is placed establishes who they directly compete against for a position in the playoffs. Since teams must place in the top of their division, in terms of league points, to advance to the playoffs, the competitive level may be increased when competing against teams in the same division (Grohsjean, Kober, & Zucchini, *in Press*) who have outstanding performance. To account for such differences, three dummy variables were created to control for the unique effects attribute to the division in which the team plays: *Western, Eastern*, and *Campbell*.

Econometric Methodology

Addressing Causality and Endogeneity. The relationships between skill sets, experience, and performance at the individual and team level are likely to be dynamic and non-recursive. That is, while the model proposed here posits a directional relationship between human capital and performance, it is impossible to eliminate the possibility of team performance influencing dispersion in human capital. Such reverse causality can create methodological difficulties in isolating the directional effects of dispersion in human capital on performance. As such, efforts were taken to better establish the causality between these measures.

One way to better establish causal relationships is through a concept referred to as Granger causality. Granger causality refers to statistical technique in which the statistical

feedback between a predictor and outcome is absent when $f(x_t|x_{t-1}, y_{t-1}) = f(x_t|x_{t-1})$. By definition, if lagged values of the dependent variable yield no explanatory power beyond those provided by lagged values of the independent variable itself, then the independent variable is deemed exogeneous as it can be shown that the dependent variable does not "Granger cause" the independent variable (Greene, 2008). The results indicate that past levels of team performance do not Granger cause future levels of dispersion in human capital; though it is important to note that there does exist a weak correlation between the two (r = 0.09). Conversely, the results indicate that past levels of dispersion in human capital do Granger cause future values of team performance. Put differently, the results indicate that while there is a relationship between past performance and future levels of dispersion in human capital, the relationship is significantly weaker than that between past values of dispersion in human capital and future team performance. Therefore, I can conclude that changes in levels of dispersion in human capital are causally related to future changes in team performance.

Pre-Regression Diagnostics. Broadly speaking, there are two main types of regression models that can be used to test the hypotheses presented here—random- or fixed-effects. Whereas a *random effects model* allows for the unobserved individual effects observed in a dataset to be correlated with the included variables, a *fixed-effects model* assumes that the constant term is "fixed" for each group (Greene, 2008). A Hausman test for orthogonality is used to determine whether there exists significant correlation between the individual effects and the other regressors. If such correlation is significant, then a fixed-effects model is to be estimated. Fixed-effects models are also beneficial in helping minimize the problems of heteroskedasticity and autocorrelation

(Finkel, 1995; Greene, 2008). The estimation of a fixed-effects model using panel data has commonly been referred to as the least squares dummy variable (LSDV) model. If, however, the Hausman test yields a statistically nonsignficant result, a random effects model will be used. Random-effects models are commonly used when utilizing panel datasets due to the inherent longitudinal nature (Bergh, 1993; Greene, 2008). The results of the Hausman test for orthogonality suggest that the individual effects are significantly correlated with other regressors. As such, a fixed-effects estimation technique will be specified to produce unbiased, efficient regression coefficients (Greene, 2008). Fixed-effects estimation techniques are common in studies utilizing sports data to test team-level outcomes (Ertug & Castellucci, 2013; Trevor, Reilly, & Gerhart, 2012). Fixed-effects regression techniques were used to test the interactive effect human capital dispersion and the distribution of opportunities have on team performance. These results were generated in STATA using the *xtreg* command.

Following the Hausman test, post-regression analyses were conducted to determine whether robust standard errors were necessary to correct for heteroskedasticity of the residuals. After estimating the control models, the residuals were plotted to determine whether subsequent regression models would employ robust standard errors to control for non-normality of the residuals. As a result, robust standard errors were utilized using the *vce(robust)* command in STATA. As a result, all models were estimated using fixed effects and robust standard errors.

While fixed-effects regression estimates are appropriate for estimating the effects of human capital dispersion and deployment strategies on winning percentages or team points, such estimation techniques are not appropriate for models examining these effects

in high-stakes contexts where outcomes are observed in winner-take-all playoff tournaments. As discussed above, high stakes contexts are characterized as playoffs in which teams compete in a winner-takes-all tournament. As such, the dependent variable reflects how far teams advanced into the playoffs and is operationalized in terms of the final round reached by the team. Since the playoffs are comprised of only six rounds, ordinal logistic regression was used to generate the regression estimates. Specifically, the results were generated in STATA using the *xtologit* command with robust standard errors invoked.

RESULTS

Table 1 presents descriptive statistics of the variables as well as a correlation matrix. The correlation matrix reveals the first measure of team performance, *team league points*, as being significantly correlated with dispersion in offensive as well as defensive skills and abilities ($r = 0.51$, $r = 0.27$, respectively). Both measures are also significantly correlated with an alternative measure of team performance, *team winning percentage* ($r = 0.35$, $r = 0.35$, respectively). Dispersion in experience, the third measure of human capital, is not significantly correlated with either *team league points* ($r = -0.02$) or *team winning percentage* ($r = -0.02$). The *distribution of opportunities in low stakes* is positively correlated with both *team league points* ($r = 0.37$) and *team winning percentage* ($r = 0.29$). Lastly, the *distribution of opportunities in high stakes* is positively correlated with both *team league points* ($r = 0.23$) and *team winning percentage* ($r = 0.21$).

Table 2 presents the results of the regression analyses testing the theoretical model estimating the effects dispersion in human capital and the distribution of

opportunities have on a team's performance in terms of points. Model 1 serves as a control model. The effects dispersion in human capital and the distribution of opportunities have on team performance are explored in Model 2. Models 3 through 5 provide a test of Hypothesis 1a & 1b wherein the effects dispersion in human capital have on team points are moderated by the distribution of opportunities provided to players. To test the hypotheses concerning interactions, all variables were mean-centered prior to tests of moderation (Cohen, Cohen, Aiken, & West, 2003). Subsequent analyses were conducted in which the variables were not centered to test the robustness of the results. The results of these analyses did not significantly differ from those reported in a statistically significant manner.

The direct effects of dispersion in human capital and the distribution of opportunities on team points are presented in Model 2 in Table 2. Controlling for the mean level of game experience, dispersion in experience on team performance is not statistically significant ($\beta = -0.0004$, $p > 0.10$). This result indicates that an increase in the dispersion in experience held by members of a team does not have a meaningful impact (in either magnitude or statistical significance) on team performance. The interaction between dispersion in experience and distribution of opportunities, shown in Model 3, is positive and statistically significant ($\beta = 0.041$, $p < 0.001$). A plot of the interaction, shown in Figure 2, reveals that while the interaction is statistically significant, there is no significant or meaningful difference in the slopes. Together, these results fail to support Hypothesis 1a.

Dispersion in human capital is also explored through dispersion in two types of skills and abilities—offensive and defensive. As shown in Model 2, dispersion in

offensive skills and abilities has a positive and statistically significant effect on team points ($\beta = 2.73$, $p < 0.001$). This result suggests that a one-unit increase in the dispersion in offensive skills and abilities translates into an increase of approximately three points for the team. These findings provide support for the argument suggesting dispersion in human capital as having a positive effect on the performance of teams. However, as hypothesized here, how such dispersion is managed through the distribution of opportunities provided to individuals on the team is just as important for team performance (in terms of levels of effects). As shown in model 4, the interaction between dispersion in offensive skills and abilities and the distribution of opportunities is found to be positive and statistically significant ($\beta = 0.17$, $p < 0.01$). A plot of the interaction shown in Figure 3 reveals that teams comprised of players with varying levels of offensive skills and abilities, team performance improves when there is a broader distribution (a one standard deviation increase above the mean) of opportunities among players. These results provide general support for Hypothesis 1b.

Dispersion in defensive skills and abilities has a positive and significant effect on team points, as shown in Model 2 ($\beta = 5.69$, $p < 0.001$). This result highlights the significant impact dispersion in defensive skills and abilities have on overall team performance. Specifically, an increase in the CV of defensive skills and abilities results in an increase of approximately six points for the team. This effect is approximately twice the size of that shown for offensive skills and abilities. Model 5 in Table 2 tests for the effect the interaction between dispersion and the distribution of opportunities has on team points. The interaction term is positive and statistically significant ($\beta = 0.57$, $p < 0.001$), providing initial support for Hypothesis 1b. A plot of the interaction, shown in

Figure 4, reveals that the positive relationship between dispersion in defensive human capital and team performance becomes even more positive when opportunities are more broadly distributed among team players. The interaction plot is based upon a one standard deviation increase in the distribution of minutes among players.

As a check for the robustness of the results, Hypotheses 1a and 1b are tested using an alternative measure of team performance—specifically, a team's winning percentage. While these two measures are significantly correlated (r = 0.53), they represent different aspects of team performance. As previously noted, team winning percentage merely captures the portion of games a team has won, whereas team points provides a more nuanced gauge of performance by accounting for games that were lost in overtime. Losing a game in overtime reflects a closer, more competitive game in which the difference between winning and losing was significantly smaller. Despite this limitation, team winning percentage is used as an alternative measure of team performance to examine the robustness of the results presented in Table 2. Team winning percentage is only used to test the robustness of the results for Hypotheses 1a and 1b as winning percentage is not an appropriate measure of team performance in the high stakes context examined here (i.e., playoffs). As previously mentioned, high stakes contexts are examined in terms of the round reached by a given team in the playoffs. Since the ultimate goal of the playoffs for teams is to win the final round of the Stanley Cup finals, this measure was used to capture the performance of teams in high stakes contexts.

Table 3 presents the results of the regressions estimated to test Hypotheses 1a and 1b when team performance is measured using team winning percentage. Similar to the approach taken in the previous analysis, Model 1 provides the results for the control

model. As shown in Model 2, controlling for the mean level of experience possessed by players, dispersion in experience is not related to team winning percentage in terms of magnitude or statistical significance ($\beta = 0.00$, $p > 0.10$). The interaction between dispersion in experience and the distribution of opportunities was also found to be insignificant ($\beta = 0.00$, $p > 0.10$). As a result, the interaction between dispersion in experience and the distribution in opportunities was not plotted. Overall, the result does not support the positive moderating relationship hypothesized.

Similar to the results obtained in Table 2, Model 2 shows a positive and significant relationship between dispersion in skills and abilities and team winning percentage. Specifically, dispersion in defensive skills and abilities is positive and significantly related to team winning percentage ($\beta = 1.55$, $p < 0.01$) as is dispersion in offensive skills and abilities ($\beta = 1.27$, $p < 0.01$). Moreover, the dispersion in defensive skills and abilities is significantly more related to team performance, in terms of both magnitude and statistical significance, relative to offensive skills and abilities—a result consistent with the previous findings. Models 4 and 5 provide a test of Hypothesis 1b in which the positive relationship between dispersion in skills and abilities (both offensive and defensive) are posited to be even more positive when opportunities are more broadly distributed among players. As shown in Models 4 and 5, the interactions between the distribution in opportunities and both offensive and defensive skills and abilities are not significant ($\beta = 0.00$, $p > 0.10$). These results do not provide evidence to support Hypothesis 1b.

While the results presented in Table 3 fail to support for Hypotheses 1a and 1b—which hypothesize that the positive relationship between dispersion in human capital and

team performance becomes even more positive when opportunities are more broadly distributed among individuals—when team performance is measured in terms of points, as shown in Table 2, the results provide support for both hypotheses. Moreover, when team points are used as a measure of team performance, plots of the interactions provide support for both hypotheses. Overall, the results provide evidence that support both Hypothesis 1a and Hypothesis 1b—suggesting that teams with higher dispersion in the human capital possessed by individuals on the team will outperform other teams to the extent that opportunities are broadly distributed among individuals.

Hypotheses 2a and 2b posit that the interaction between dispersion in human capital and how opportunities are distributed among team members in high stakes influence overall team performance as a function of how opportunities were distributed in low stakes contexts. Put differently, for teams who embraced a strategy for broadly distributing opportunities in low stakes contexts—to further develop human capital as well as reduce their reliance on higher skilled and more experienced individuals—are more likely to benefit from concentrating opportunities in a high stakes context. To determine whether teams who provided a broader distribution of opportunities in past low stakes contexts were more likely to outperform their peers in subsequent high stakes contexts, I first converted measures of dispersion in opportunities into z-scores. Higher, positive values indicate teams that employed a broader, more balanced distribution of opportunities, relative to their peers. Next, a dummy variable is created and set equal to one if a team embraced a strategy of balanced distribution of opportunities in low stakes contexts, zero otherwise. Using the dummy variable, I explore whether the interaction

between deployment strategies in high stakes contexts and dispersion in human capital is more positively related to the playoff round reached by teams.

As shown in Table 4 Model 2, teams who provided a broader distribution of opportunities in the low stakes contexts were more likely to advance throughout the playoffs, and thus face a high stakes context, relative to those whose distribution of opportunities were more concentrated on a few individuals ($\beta = 0.93$, $p < 0.001$). This result suggest that teams who embraced a balanced distribution of opportunities in low stakes contexts were significantly more likely to outperform those who concentrated opportunities among a few individuals and, as a result, face a high-stakes context. While providing opportunities more broadly across individuals in low stakes contexts can help develop human capital as well as reduce the reliance on high skilled, more experienced individuals, and thus improve overall team performance, such strategies for providing opportunities in a high stakes context is hypothesized to negatively influence team performance. Consistent with this rationale, Model 2 in Table 4 shows a broader distribution of opportunities in a high stake context as being negatively related to team performance ($\beta = -0.01$, $p < 0.001$).

Models 3 and 4 provide a test for Hypothesis 2a. As shown in Table 4, the direct effect of dispersion in experience is positive and significantly related the performance of teams in high stakes contexts ($\beta = 0.0005$, $p < 0.001$). This finding suggests that greater dispersion in the level of experience held by members of a team has a positive direct effect on the likelihood that the team will advance through the playoffs. To test hypothesis 2a, which argued that the positive moderating effect the distribution in opportunities in high stakes has on the relationship between dispersion in experience and

team performance would be higher for teams who provided opportunities more broadly in low stakes contexts, Model 4 provides an estimate of the three-way interaction between dispersion in experience and how opportunities were distributed in both low and high stakes contexts. The estimate shown in Model 4 reveals a positive and statistically significant interaction ($\beta = -0.62$, $p < 0.001$). A plot of the interaction shown in Figures 5a and 5b reveal that for teams with greater dispersion in human capital, concentrating opportunities in high stakes contexts is more positively related to team performance among teams who provided opportunities more broadly in low stakes contexts. These results provide support for Hypothesis 2a.

The relationship between dispersion in offensive skills and abilities and team performance in high stakes contexts, shown in Models 2, is positive and statistically significant ($\beta = 0.49$, $p < 0.001$). Models 5 and 6 provide estimates for the models testing Hypothesis 2b when human capital is measured using offensive skills and abilities. The interaction between dispersion in human capital and distribution of opportunities in high stakes contexts, estimated in Model 6, is significantly stronger for those teams who embraced a balanced deployment strategy in low stakes contexts ($\beta = -0.54$, $p < 0.001$). Figures 6a and 6b present a plot of the interaction and reveals that for teams with greater dispersion in offensive skills and abilities, teams embracing a concentrated deployment strategy outperform those who provide opportunities less broadly in high stakes contexts. Moreover, the positive effect on team performance becomes even more positive for teams who provided opportunities more broadly in low stakes contexts. Together, these results yield support for Hypothesis 2b.

Similar to the effects of dispersion in offensive human capital on team performance in low stakes contexts, Model 2 in Table 4 reveals a positive and statistically significant direct effect of dispersion in defensive skills and abilities on team performance in high stakes contexts ($\beta = 1.03$, $p < 0.001$). Models 7 and 8 test for the interaction between dispersion in defensive human capital and the distribution of opportunities in low and high stakes. The three-way interaction shown in Model 8 is negative and statistically significant ($\beta = -1.15$, $p < 0.001$). To better interpret the nature of the interaction, the estimates are plotted in Figures 7a and 7b. Figures 7a and 7b reveal that the positive moderating effect a concentrated distribution of opportunities has on the positive relationship between dispersion in defensive human capital and team performance is even more positive for those who provided opportunities more broadly in low stake contexts. Put differently, teams with greater dispersion in defensive skills and abilities outperform their peers to the extent that they provide greater distribution of opportunities in low stakes, but a more concentrated distribution in high stakes. Together, these results provide strong support for Hypothesis 2b.

Additional Analyses

To test whether the moderating effect deployment has on the dispersion-performance relationship in high stakes contexts depends upon deployment strategies utilized in low stakes contexts (Hypotheses 2a & 2b) a three-way interaction is used. Another way to test these hypotheses is to conduct a subsample analysis in which the sample is partitioned by the strategy implemented in the low stakes context. One portion of the subsample reflects teams who took a concentrated deployment strategy in low stakes contexts—identified by a dummy variable set equal to one if the team has a

coefficient of variation one standard deviation below the average distribution for all teams, zero otherwise. The other portion of the sample reflects teams who implemented a balanced deployment strategy in low stakes contexts—identified by a dummy variable set equal to one if the team has a coefficient of variation one standard deviation above the average distribution for all teams, zero others. This analysis focuses on teams who took a relatively more concentrated or balanced deployment strategy, and removes those who took a more moderate strategy (i.e., somewhere between concentrated and balanced). As such, the negative moderating effect deployment in high stakes contexts had on the dispersion-performance relationship should become significantly more negative for those who took a balanced deployment strategy in the low stake context and less negative for those who implemented a concentrated deployment strategy.

Table 5 presents the results for the model predicting the moderating effect deployment has on the dispersion-performance relationship for teams who embraced a concentrated deployment strategy in the low stakes context. As shown in the table, the interaction between dispersion in experience and a concentrated deployment strategy among teams who embraced a broad deployment strategy in a low stake context is positive and statistically significant ($\beta = -0.54$, $p < 0.001$). A plot of the interaction reveals that the effect observed in Figure 5 is magnified when estimating the effects using the subgroup analysis. In comparison, the interaction between a concentrated deployment strategy and dispersion in experience among teams who embraced a concentrated deployment strategy in low stakes contexts reveals a slightly negative effect ($\beta = -0.00$, $p < 0.001$). A plot of the interaction reveals no statistically significant

difference between the two slopes—as evidenced by a simple slopes analysis. Overall, these results yield support for Hypothesis 2a.

This result was consistent for the interactions between a concentrated deployment strategy and dispersion in offensive skills and abilities ($\beta = -1.19$, $p < 0.001$) as well as defensive skills and abilities ($\beta = -1.60$, $p < 0.001$). These results are significantly stronger both in magnitude and statistical significance when compared to those for teams who embraced a concentrated deployment strategy in low stakes contexts, shown in Table 6 ($\beta = -0.22$, $p < 0.001$; $\beta = -0.17$, $p < 0.001$, respectively). Together, these results provide strong support for Hypothesis 2b.

DISCUSSION

In the decades since Becker (1964) first began the discussion of the importance of human capital for individual performance, scholarship in the strategic human capital domain has treated human capital as a valuable resource comprised of aggregate KSAs that can provide a competitive advantage for teams, units, and firms (Ployhart et al., 2014). The work presented here was motivated by a call (Ployhart, 2015; Ployhart & Moliterno, 2011) to bridge the more macro-oriented perspective—focused on how the average level of human capital relates to unit and firm level outcomes—with the micro-oriented perspective—focused on how differences between individuals relate to individual, team, and unit level outcomes—to examine how differences in the level of human capital possessed by individuals within a team can be managed to improve team performance across differing contexts.

Specifically, I develop theory to suggest that teams comprised of individuals with varying levels of experience and skills and abilities could capitalize on the value inherent

in such differences through the management of opportunities provided to individuals on the team. I also develop theory to suggest that the extent to which such deployment strategies moderate the dispersion-performance relationship depended upon the broader task context in which these strategies were implemented. In a higher stakes context, teams may alter their management of opportunities to capitalize on the higher level and more reliable performance provided by more skilled, experienced individuals. However, I suggest that the extent to which a team is able to utilize this strategy is dependent upon how opportunities were distributed in other, low stakes contexts. As such, I hypothesize that the human capital dispersion-performance relationship is contingent upon how such differences in human capital are managed through the distribution of opportunities. For teams faced with a high stakes context, I hypothesize that the effectiveness of a concentrated deployment strategy is contingent upon a team having utilized a balanced deployment strategy in prior low stakes contexts.

The results fail to support the positive moderating relationship between dispersion in experience and the distribution of opportunities on overall team performance. Specifically, the results reveal no significant interaction between dispersion in experience and how opportunities are managed. These results are consistent across both contexts. Additional analyses are conducted to determine whether an alternative operationalization of experience would yield significantly different results. For these analyses, dispersion in the level of experience is examined in terms of the number of years spent in the league. The results of these analyses were consistent with those in the main analysis. Overall, these results suggest that teams do not stand to significantly benefit from having greater dispersion in the level of experience possessed by individuals on the team.

Dispersion in human capital is also explored in terms of the level of skills and abilities possessed by team members. The results indicate that in a low stakes context, teams with greater dispersion in the level of skills and abilities will outperform other teams if they embrace a balanced human capital deployment strategy. By providing opportunities more broadly in a low stakes contexts, teams are able to develop the competencies of the team as a whole as well as reduce their reliance on more experienced, higher skilled individuals. As such, I hypothesized that such strategies complement a strategy of concentrated deployment in high stakes contexts. The results support this prediction. Specifically, the results indicate that for teams with greater dispersion in the level of skills and abilities among team members, providing opportunities less broadly among individuals improves overall team performance in a high stakes context. These effects become even more positive for teams who provide opportunities more broadly in a low stakes context. Overall, the results support the hypothesis that the positive moderating effect of the distribution of opportunities on the dispersion-performance relationship in the high stakes context is dependent upon how teams distributed opportunities previously in low stakes contexts.

Theoretical and Practical Contributions

Overall, my dissertation underscores the importance of differences in the human capital possessed by individuals, how the performance implications associated with such differences can be realized through differences in how opportunities to contribute to team routines are managed, and the importance of context. As such, the work integrates and contributes the literatures on strategic human capital, strategic HRM, and teams.

Strategic Human Capital

My dissertation seeks to contribute to the growing literature on strategic human capital. The relationship between aggregate measures of human capital and unit as well as firm level outcomes has been relatively well established both theoretically and empirically (Nyberg & Wright, 2015). However, this literature has primarily focused on delineating the performance implications associated with aggregate measures of human capital through a focus on average levels of human capital possessed by individuals within a given collective (Ployhart, 2015; Ployhart & Moliterno, 2011; Ployhart, Nyberg, Reilly, & Maltarich, 2014; Sirmon, Gove, & Hitt, 2008). Here, I extend the literature by focusing on differences in the level of human capital possessed by individuals, controlling for the average level. By focusing on the potential benefits associated with differences in the *level*, rather than in the type, of human capital possessed by individuals within the team, I am able to extend the SHC literature by integrating some of the theoretical contributions made by group and team scholars. Specifically, I draw upon the groups and teams literature to explore the benefits associated with differences among individuals within a given collective. Such integration extends the SHC literature by proposing benefits associated with teams comprised of individuals who may possess lower levels of human capital. In doing so, I am able to explore how many of the potential benefits associated with differences among individuals can be realized through resource management decisions.

Strategic HRM

Several reviews have noted a growing body of SHRM research that aims to explicate how organizations or units can enhance the positive relationship between

employee human capital and key outcomes (Jackson, Schuler, & Jiang, 2014; Jiang, Lepak, Hu, & Baer, 2012). While this line of scholarship has provided valuable insights into how the management of human resources relates to performance, significantly less attention has been paid to the management, given differences across employees in terms of their human capital. Furthermore, this study addresses recent calls for work that explicitly examines how external environments influence the effectiveness of resource management decisions (Holcomb, Holmes, & Connelly, 2009; Jackson, Schuler, & Jiang, 2014). While I focus on one specific way in which human resources can be managed, I provide a more nuanced perspective for how such practices can be more or less effective depending upon the context in which such practices are implemented. That is, I develop theory to further suggest that the effectiveness of these management decisions depends on the task environment faced by the team at that time. This further contributes to the SHRM literature by examining how resource management decisions should be made in light of the context, as opposed to a prescribing universal "best practices".

Teams Literature

My dissertation also contributes to the literature on teams. First, while the literature on teams has explored the importance of human capital on team performance, the literature has narrowly focused on the type of human capital of importance. That is, a review of the literature revealed a reliance on cognitive ability as the focal measure of human capital (Devine & Philips, 2001), despite calls for research focusing on human capital attributes beyond cognitive ability (Stevens & Campion, 1994). Here, I develop theoretical insights to suggest that differences in the level of experience as well as skills and abilities possessed by individuals on a team as being beneficial for team performance

when managed in light of the task context. In doing so, I extend the literature to examine the benefits associated with differences in human capital attributes beyond those typically examined in the teams literature.

Second, my dissertation contributes to the recent call for research on the dynamic nature of teams (Aime, Humphrey, DeRue, & Paul, 2014; Crawford & Lepine, 2013; Humphrey & Aime, 2014; Tannenbaum, Mathieu, Salas, & Cohen, 2012) in which research moves beyond the static view of teams and towards a longer-term perspective in which team structure and management have implications for the medium and long-term. Here, I develop rich theory to suggest that the moderating effect of how opportunities are managed on the dispersion-performance relationship in a high stakes context depends upon how such dispersion was managed previously in low stakes contexts. This focus extends prior literature by taking a longer-term perspective on how differences among team members can best be managed across temporal contexts.

Lastly, my dissertation serves to build upon and extend the literature on SHC, SHRM, and teams through an integration of the theoretical frameworks and empirical findings present in each literature. This integration also answers a call within the SHC and SHRM literatures for an increased focus on the importance of human resource management in understanding the role of differences in human capital for outcomes at the unit and team level (Hollenbeck & Jamieson, 2015).

Practical Implications

My dissertation also has practical implications for the management of a workforce possessing varying levels of human capital attributes. In a recent research symposium, Kryscynski and Ulrich (2015) note that while the SHC and SHRM fields are full of

scholarship related to the relationship between human capital and firm performance, much of this work falls short of delineating how firms and managers can both deploy their valuable human capital and how such decisions should be made in light of the broader task environment. They note that the emerging domain of strategic human capital research has a unique opportunity to bridge the gaps between theory and practice by focusing on *how* managers can influence the human capital-performance relationship through decisions regarding the structuring, bundling, and deployment of human capital. By focusing on how managers are able to influence this relationship through the deployment of human capital, my dissertation highlights some of the practical aspects of managing human capital for a competitive advantage.

Practitioners have progressed beyond the notion of hiring and utilizing the "best and the brightest" individuals and moved toward a more pragmatic approach in which the focus shifts to the portfolio of human capital within the firm (Sirmon & Hitt, 2009; Sirmon et al., 2007). That is, firms are likely faced with constraints that limit their ability to attract or select the most talented individuals. As such, managers are tasked with managing groups, teams, or units comprised of individuals with varying levels of human capital. My dissertation seeks to reveal some of the benefits associated with taking this approach towards viewing a given workforce as a portfolio of human capital, and also investigates how greater variety in the human capital possessed by those individuals can improve performance in light of how those resources are managed..

Limitations and Future Directions

Despite efforts to better examine how differences in the human capital possessed by individuals on a team can be best managed to positively influence team performance,

the work presented here is not without its limitations. Such limitations offer avenues for future research to further examine the relationships explored here.

First, the study presented here is limited by the focus on teams operating in an interdependent task context. While not all teams are likely to operate in a context where they depend upon the actions of their colleagues, task interdependence has been shown to be one of the most critical factors that influence the ability of groups, teams, and units to perform (Saavedra, Earley, & Van Dyne, 1993). Future work is needed to examine how such relationships may differ across different levels of interdependence. Such research could reveal how the moderating effect of opportunity management on the dispersion-performance linkage weakens at lower levels of task interdependence.

Second, differences in the human capital possessed by individuals may hold implications beyond just the performance of the collective. That is, while the work presented here explicitly focuses on performance, such differences have been shown to influence cohesion (Webber & Donahue, 2001), innovation (Al-Laham, Tzabbar, & Amburgey, 2011), group member turnover (Jackson, Brett, Sessa, Cooper, Julin, & Peyronin, 1991), information use (Dahlin, Weingart, & Hinds, 2005), and likelihood of conflict (Cronin & Weingart, 2007). Future work is needed to explore the interaction between dispersion in human capital and outcomes beyond the performance of the collective. This research is necessary given the notion that differences in attributes among individuals in a team may be a "double edged sword". That is, while such dispersion may lead to superior team performance, this may come at the expense of developing the human capital competency of the collective. Or, it may be that

performance implications in the short term come at the expense of longer-term team dynamics such as cohesion and supportive climates.

Third, the work presented here focuses on the role of resource management as a key factor moderating the relationship between dispersion in human capital and team performance. The literature on resource orchestration (Sirmon, Hitt, & Ireland, 2007; Sirmon et al., 2011) posits that resource management is comprised of the structuring, bundling, and leveraging of resources. However, the work presented here focuses on how managers can leverage their human capital resources through one specific form of leveraging—specifically, deployment strategies. Human capital deployment strategies are explored in terms of how opportunities are distributed among individuals on a team. This focus highlights two avenues for future research. First, leveraging consists of the mobilizing, coordinating, and deployment strategies of resources (Sirmon, Hitt, & Ireland, 2007; Sirmon et al., 2011). Questions remain regarding how the mobilizing and coordinating of human capital resources can influence the dispersion-performance relationship. Second, and more broadly, future work could focus on how the other two aspects of resource management, structuring and bundling, influence the relationships explored here. Lastly, scholarship is needed to further examine how the alignment between the three aspects of resource management collectively influences the dispersion-performance relationship. Such a "systems" perspective could elucidate how the three aspects of resource management complement one another and must align to effectively capitalize on the benefits associated with differences in the human capital possessed by individuals within a team.

Fourth, the findings presented here rely upon data collected in a sports context. Some scholars have dismissed organizational research utilizing sports samples as being non-generalizable to the organizational context (Day, Gordon, & Fink, 2012; Katz & Koenig, 2001). However, sports, and for the purposes of the research presented here, hockey, serves as a context where such concerns are less merited. As described previously, professional athletes are employed and compensated by their team's organization and operate in a labor market where employees and employers serve as the two main entities—increasing the similarities between sports and non-sport contexts. Moreover, professional sports represent an organizational context of their own. That is, professional sports have evolved from an entertainment-oriented task towards a "more work than play" context that closely mirrors a corporate environment (Day, Gordon, & Fink, 2012; Katz & Koenig, 2001). As such, the relationship between athletes and the team they play for are synonymous with that between more traditional employees and their organization.

In addition to the similarities between the relationship between an athlete and their team and the more traditional relationship between and his/her organization, the theory used to posit the relationship tested was developed outside of the sports context. That is, the theory was developed to generalize beyond the sports context and to organizations where (i) employees work in an interdependent task context (ii) there is a shared knowledge of a common goal for the collective in which individuals operate, and (iii) there is a shared responsibility among the individuals for the common goal. Previously, the example of law firms was used in discussing the importance of context as a factor likely to influence the effectiveness of management decisions on the relationship

between human capital dispersion and team performance. In addition to law firms, the theory developed here would also apply to consulting firms who rely on teams of consultants who work together on certain projects to acquire a new client through a bid. Having dispersion in the level of human capital possessed by the individuals on the team allow for managers to capitalize upon these differences and concentrate relative more opportunities among the more experienced individuals when the outcome holds more implications for the firm (e.g., a well-known client). Together, while the hockey context does generalize to these and other contexts, future research could be conducted to determine whether the result obtained here are consistent with a sample of teams in an organizational setting. Such research could confirm the extent to which the performance implications associated with dispersion in human capital mirror those found here.

Fifth, several of the assumptions made regarding the task context may limit the generalizability of the model. It is assumed that the low-stake context precedes the high-stakes context. As previously mentioned, many HRO organizations operate such that there is no predictability regarding when a high-stake context occurs. For example, teams managing a nuclear power plant cannot anticipate exactly when the next disaster will occur. A third assumption made about the context is that the performance of the team in the low-stakes context will influence the likelihood of facing a high-stakes context. That is, in sports, the likelihood that a team will face a high-stake context is highly determined by their performance in a low-stake context. While not all organizations, or even teams, face such sequential task contexts where the performance in the first context determines the likelihood of progressing to the second context where the stakes are heightened, such situations are not unique to the sports context. For example,

firms that help facilitate the process of initial public offerings (IPOs) are often determined through a trial period in which they receive a small portion of the shares being offered by the company and conduct a scaled down version (commonly referred to as "shelf offerings" or "shelf registrations"). These scaled down versions are used to test whether the issuing company (i.e., those facilitating the IPO) has the people, technology, and overall ability to successfully accomplish the IPO. As such, their performance in the low-stake context where the success or failure hold relatively less implications for the firm, performance in this low-stakes context determines whether they will hired for the IPO process-a significantly higher-stakes context (Vogus & Welbourne, 2003).

Sixth, the work presented here focuses on how managers are able to influence the dispersion-performance relationship through strategies of distributing opportunities among individuals within a team. While there are opportunities to further unpack the other resource management decisions mangers may make, it may also be fruitful to further examine the role of managerial human capital. That is, the work presented here explicitly focuses on the human capital possessed by players, and merely controls for managerial human capital. Future work could explore how different human capital attributes possessed by managers influence these relationships. For example, it may be that the effectiveness certain management decisions have on overall team performance depends upon the ability of the manager to implement these strategies. Alternatively, future research could determine how certain human capital attributes possessed by managers relate to the selection of optimal and efficient deployment strategies. Moreover, my dissertation assumes that the head coach serves as the individual determining the distribution of opportunities. While this may be a logical assumption,

the reality is that there are numerous other individuals involved in the management of the team. As such, future research is needed on the role of assistant managers and how they influence the dispersion-performance relationship.

Corollary to the research presented here would be efforts for greater integration with the literature on stars. Stars can be conceptualized in terms of their ability to create value for a team either directly through task performance, indirectly through others, or both (Kehoe, Lepak, Bentley, in press). While my findings suggest significant benefits associated with dispersion in the human capital possessed by individuals on teams, whether such effects are enhanced by the presence of a star player is unknown. The presence of a star player—possessing both exceptionally high levels of performance as well as status and visibility—could enhance the benefits associated with dispersion indirectly through their effects on their inexperienced, lesser skilled peers. Additionally, while the most obvious avenue for future research here would be on the role of star players, it is important to note the potential for research on both star players as well as star coaches. The "star power" of the coach can be conceptualized in terms of their status and prestige as a former player or as a coach. Interestingly, while some former star players would turn out to be terrible coaches (e.g., Wayne Gretzky), some of the most talented and recognized coaches were not noted for their abilities as players (e.g. Joe Quinville, Dan Bylsma). Future work is needed to determine the role of star players and star managers in the dispersion-performance relationship.

Lastly, obtaining additional game-level data could facilitate a richer, more fine-grained analysis of the relationships examined here. While the work presented here treats the stakes of a game with a sense of objectivity at the team level, it is possible for

individual team members to vary in their perceptions of stakes. That is, while some individuals on a team may perceive a game as a low stakes context, others might see the game as holding significant stakes. For example, a player with a contract about to expire is likely to perceive their performance and the performance of the team as significant for their long-term viability, whereas a player whose contract is far from expiring is less concerned with ensuring their contract through performance. Alternatively, it may be the case that a player is approaching retirement and is becoming concerned about their legacy. As such, it may be the case that several players perceive the game as high stakes, but for different reasons. While this shifts the focus of stakes away from implications for the team and to those of the individual, it provides another dimension for which to view stakes. Such subjective perceptions of stakes hold implications for the motivations individuals have to perform across varying contexts. Moreover, it provides theoretical insights into how different individuals can perceive a given context as being high stakes, but for different reasons.

Conclusion

In summary, my dissertation serves as a study into the benefits associated with differences in the human capital possessed by individuals in teams and how such differences can be best managed to provide teams with a competitive advantage. Moreover, I develop theory to further suggest that the extent to which managers can effectively manage their human capital resources through different deployment strategies depends upon how those resources were managed across varying contexts. The results highlight the importance context plays in the abilities of managers to capitalize on dispersion in human capital to benefit team performance. These findings contribute

towards our understanding of the role of managers in unlocking the benefits associated with dispersion in human capital.

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TABLES & FIGURES

Table 1. Means, standard deviations, and bivariate correlations

Variables	Mean	SD	1	2	3	4	5	6
1. Team league points	81.17	19.5						
2. Team winning percentage	47.09	16.06	0.53					
3. Playoff round[a]	0.91	1.31	0.2	0.19				
4. Dispersion in offensive skills & abilities	3.79	1.36	0.51	0.35	0.18			
5. Dispersion in defensive skills & abilities	1.72	0.57	0.27	0.35	0.11	0.24		
6. Distribution of opportunities (high stakes)[a]	106	61	0.23	0.21	0.36	0.27	0.09	
7. Distribution of opportunities (low stakes)	523.6	79.03	0.37	0.29	0.09	0.39	0.24	0.08
8. Dispersion in game experience	1054	551	-0.02	-0.02	-0.02	0.07	0.04	-0.05
9. Playoff experience	67.3	122.6	0.51	0.25	0.00	0.37	0.39	0.06
10. Past team performance (Points)	80.92	19.55	0.23	0.35	0.09	0.16	0.10	0.09
11. Coaching experience	480.96	500.4	0.18	0.22	0.29	0.03	0.04	0.35
12. Division (Campbell)	0.14	0.34	-0.12	-0.27	0.04	0.04	-0.18	0.05
13. Division (Eastern)	0.17	0.38	0.02	0.12	-0.01	-0.02	-0.12	0.01
14. Division (Western)	0.20	0.40	0.08	0.15	0.01	-0.04	-0.01	0.04
15. Awards	4.22	2.63	0.11	0.10	0.04	0.10	0.09	0.04
16. Distribution of shots	69.99	12.45	0.55	0.18	0.06	0.65	0.25	0.19
17. Penalty minutes	16.69	4.97	-0.19	-0.31	0.00	-0.01	-0.13	0.01

Correlations above 0.05 are significant at the 1% level; n = 42,659

Table 1. (Continued)

	7	8	9	10	11	12	13	14	15	16
8. Dispersion in game experience	-0.06									
9. Playoff experience	0.16	0.05								
10. Past team performance	0.08	-0.01	0.13							
11. Coaching experience	0.13	-0.11	0.07	0.10						
12. Division (Campbell)	-0.19	0.15	0.03	-0.04	-0.12					
13. Division (Eastern)	0.10	-0.12	-0.08	0.06	0.08	-0.29				
14. Division (Western)	0.19	-0.03	-0.02	0.08	0.27	-0.28	-0.34			
15. Awards	0.04	0.01	0.06	0.04	0.03	-0.02	-0.02	0.02		
16. Distribution of shots	0.31	0.07	0.27	0.07	-0.05	0.10	-0.16	0.19	0.07	
17. Penalty minutes	-0.25	0.18	0.03	0.03	-0.18	0.45	-0.25	-0.20	-0.04	0.06

Table 2. Fixed-effects regression results of the effects of dispersion in human capital and opportunities on team performance (points) in low stakes contexts.

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	21.64***	20.23***	21.93***	21.30**	27.85**
	[5.48]	[6.38]	[6.32]	[7.52]	[6.97]
Past performance (prior season)	0.23*	0.17	0.19*	0.16†	0.19*
	[0.09]	[0.09]	[0.08]	[0.09]	[0.06]
Coaching experience	0.00**	0.00*	0.00**	0.00**	0.00*
	[0.01]	[0.00]	[0.00]	[0.00]	[0.00]
Division (Campbell)	5.29*	5.50**	5.36**	4.71*	3.44
	[2.41]	[1.71]	[1.65]	[1.88]	[1.96]
Division (Eastern)	3.89	4.27*	0.93	1.47	0.19
	[2.68]	[1.78]	[1.40]	[1.62]	[1.18]
Division (Western)	11.68**	10.09**	6.53*	6.94*	4.33
	[3.22]	[3.06]	[2.94]	[3.14]	[2.93]
Penalty minutes	-0.54***	-0.41***	-0.39***	-0.32**	-0.24*
	[0.14]	[0.11]	[0.09]	[0.11]	[0.10]
Playoff experience	15.68***	11.02***	11.79***	12.05***	12.21***
	[1.40]	[1.67]	[1.61]	[1.59]	[1.70]
Awards	1.03**	0.30	0.33	0.382	0.36*
	[0.29]	[0.25]	[0.26]	[0.23]	0.17
Distribution of shots taken	0.74***	0.49***	0.27***	0.29**	0.06
	[0.07]	[0.08]	[0.09]	[0.09]	[0.08]
Mean game experience		0.00	0	0.00	0.00
		[0.00]	[0.00]	[0.00]	[0.00]
Dispersion in game experience (DGE)		-0.00	-0.02***	-0.00	-0.00
		[0.00]	[0.00]	[0.00]	[0.00]
Dispersion in offensive skills & abilities (DOSA)		2.73***	2.84**	-7.25*	2.86**
		[0.72]	[0.80]	[2.91]	[0.81]
Dispersion in defensive skills & abilities (DDSA)		5.69***	3.96***	3.75**	-28.72***
		[0.84]	[0.83]	[1.08]	[3.03]
Distribution of opportunities (DO)		0.64	0.00***	-4.35***	-6.04***
		[1.26]	[0.00]	[1.05]	[1.21]
DGE*DO			0.04***		
			[0.00]		
DOSA*DO				0.17**	
				[0.04]	
DDSA*DO					0.57***
					[0.01]
Overall R^2	0.52	0.60	0.65	0.66	0.72
Change in R^2		0.08***	0.05***	0.06***	0.12***
F-Statistic	114	75	101	65	206

Robust standard errors in []; *** p < .001, ** p < 0.01, * p < 0.05; *n* = 42,659
Change in R^2 statistics are relative to Model 2

Table 3. Fixed-effects regression results of the effects of dispersion in human capital and opportunities on team performance (winning percentage) in low stakes contexts.

	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	48.50***	48.70***	46.33***	46.56***	46.58***
	[2.36]	[3.12]	[2.92]	[3.37]	[3.27]
Past performance (prior season)	0.33***	0.30***	0.30***	0.30***	0.30**
	[0.04]	[0.04]	[0.04]	[0.04]	[0.03]
Coaching experience	0.00*	0.00*	0.002*	0.00*	0.00*
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Division (Campbell)	0.93	0.98	0.976	1.05	1.09
	[1.81]	[1.88]	[1.89]	[1.84]	[1.83]
Division (Eastern)	0.86	0.70	0.60	0.96	0.90
	[1.35]	[1.06]	[1.05]	[1.01]	[0.97]
Division (Western)	4.43	3.74	3.63	4.05	4.06
	[2.21]	[2.19]	[2.17]	[2.18]	[2.15]
Penalty minutes	-0.43***	-0.39***	-0.39***	-0.40***	-0.40***
	[0.09]	[0.08]	[0.08]	[0.08]	[0.08]
Playoff experience	3.14***	1.41	1.42	1.31	1.34
	[0.58]	[0.77]	[0.78]	[0.79]	[0.79]
Awards	0.79***	0.49**	0.49**	0.48**	0.48**
	[0.15]	[0.14]	[1.37]	[0.14]	[0.14]
Dispersion in shots taken	0.11***	0.11**	0.05	0.02	0.02
	[0.20]	[0.04]	[0.04]	[0.04]	[0.04]
Mean game experience		0.00	0.00	0.00	0.00
		[0.00]	[0.00]	[0.00]	[0.00]
Dispersion in game experience (DGE)		0.00	0.001	0.00	0.001
		[0.00]	[0.00]	[0.00]	[0.00]
Dispersion in offensive skills & abilities (DOSA)		1.27**	1.27**	2.28*	1.26**
		[0.48]	[0.48]	[1.09]	[0.48]
Dispersion in defensive skills & abilities (DDSA)		1.55**	1.57**	1.75**	3.53
		[0.48]	[0.49]	[0.48]	[1.87]
Distribution of opportunities (DO)		0.76	0.69	1.26	1.14
		[0.67]	[0.65]	[0.87]	[0.81]
DGE * DO			0.00		
			[0.00]		
DOSA* DO				-0.00	
				[0.01]	
DDSA * DO					-0.00
					[0.00]
Overall R^2	0.28	0.34	0.34	0.34	0.34
Change in R^2		0.06***	0.00	0.00	0.00
F-Stat	113	94	92	88	89

Standard errors in []; *** p < .001, ** p < 0.01, * p < 0.05; *n* = 42,659
Change in R^2 statistics are relative to Model 2

Table 4. Ordered logit models estimating the effects of dispersion in human capital and the distribution of opportunities on team likelihood of advancing through additional playoff rounds.

	Control	Main	Two-way	Three-way	Two-way	Three-way	Two-way	Three-way
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Past performance in low stakes (points)	0.03***	0.03***	0.02***	0.02**	0.02***	0.02**	0.02***	0.02***
Coaching experience	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Division (Campbell)	0.54***	1.66***	0.33***	0.43**	0.34***	0.34***	0.36***	0.35***
Division (Eastern)	-0.44***	0.28	0.13	0.14	0.13	0.14	0.06	0.05
Division (Western)	0.56***	0.33**	0.17**	0.20***	0.18**	0.19**	0.13*	0.37**
Penalty minutes	-0.17***	-0.15***	-0.09***	-0.09***	-0.09***	-0.09***	-0.09***	-0.10***
Playoff experience	0.17***	0.16***	0.16**	0.16**	0.16***	0.16***	0.17***	0.24***
Awards	0.23***	0.26**	0.24***	0.24***	0.24***	0.24**	0.24***	0.24***
Dispersion in shots taken	0.02**	0.011*	0.01***	0.04***	0.04***	0.04***	0.04***	0.04***
Mean game experience		0.00**	0.00**	0.00***	0.00**	0.00**	0.00**	0.00**
Explanatory								
Dispersion in game experience (DGE)		0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Dispersion in offensive skills & abilities (DOSA)		0.49***	0.49***	0.49***	0.30**	0.36***	0.50***	0.52***
Dispersion in defensive skills & abilities (DDSA)		1.032***	1.07***	1.07***	1.06***	1.05***	3.07***	2.81***
Distribution of opportunities in low stakes (DOL)		0.93***	0.00**	0.00**	0.00**	0.03***	0.05**	0.02***
Distribution of opportunities in high stakes (DOH)		-0.01***	-0.53***	-0.51***	-0.55***	-0.54***	-0.49***	-0.53***
Two Way Interactions								
DGE*DOH			0.00	0.00				
DGE*DOL			0.00	0.00				
DOSA*DOH					-0.01***	-0.00*		
DOSA*DOL					0.00	-0.00		
DDSA*DOH							-0.00***	-0.01***
DDSA*DOL							-0.00*	-0.00*
DOL*DOH			0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Three Way Interactions								
EDGE*DOH*DOL				-0.62***				
DOSA*DOH*DOL						-0.54***		
DDSA*DOH * DOL								-1.15***
Pseudo R^2	0.03	0.10	0.20	0.36	0.36	0.37	0.36	0.38
Wald χ^2	1633	1062	5573	8069	5498	5513	5499	5625
Change in Wald χ^2			4511***	2496***	4436***	15**	4437***	126***

*** p < .001, ** p < 0.01, * p < 0.05; *n* = 9,245

Model change statistics for two-way models are relative to Model 2; Three-way models are compared to two-way models.

Table 5. Ordered logit models estimating the effects of dispersion in human capital and the distribution of opportunities on team likelihood of advancing through additional playoff rounds for teams who embraced a broad deployment strategy in low stakes contexts

	Model 1	Model 2	Model 3	Model 4	Model 5
Past performance (low stakes)	0.03***	0.03***	0.03***	0.02***	0.03***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Coaching experience	0.00***	0.00**	0.00*	0.00*	0.00*
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Division (Campbell)	0.51***	0.52***	0.53***	0.55***	0.57***
	[0.07]	[0.07]	[0.07]	[0.07]	[0.07]
Division (Eastern)	0.42***	0.35***	0.35***	0.28***	0.29***
	[0.05]	[0.06]	[0.06]	[0.06]	[0.06]
Division (Western)	0.39***	0.33***	0.33***	0.25***	0.30***
	[0.05]	[0.06]	[0.06]	[0.05]	[0.06]
Penalty minutes	-0.14***	-0.13***	-0.13***	-0.14***	-0.15***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Playoff experience	0.26***	0.26***	0.26***	0.26***	0.26***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Awards	0.21***	0.13***	0.13***	0.13***	0.14***
	[0.05]	[0.05]	[0.05]	[0.05]	[0.04]
Dispersion in shots taken	0.01***	0.02***	0.02***	0.02***	0.02***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Mean game experience	0.00*	0.00	0.00	0.00	0.00
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Dispersion in game experience (DGE)		0.00***	0.00	0.00***	0.00***
		[0.00]	[0.00]	[0.00]	[0.00]
Dispersion in offensive skills & abilities (DOSA)		0.28***	0.28***	-0.81***	0.27***
		{0.01]	[0.02]	[0.11]	[0.01]
Dispersion in defensive skills & abilities (DDSA)		0.60***	0.60***	0.57***	3.82***
		[0.04]	[0.04]	[0.04]	[0.24]
Distribution of opportunities (DOH)		-0.11***	-0.08***	-0.05***	-0.10***
		[0.03]	[0.00]	[0.00]	[0.00]
DGE * DOH			-0.54***		
			[0.00]		
DOSA* DOH				-1.19***	
				[0.00]	
DDSA * DOH					-1.60***
					[0.00]
Pseudo R^2	0.21	0.23	0.22	0.23	0.23
Wald χ^2	5831	5186	5190	5569	5664
Change in χ^2					

Standard errors in []; *** p < .001, ** p < 0.01, * p < 0.05;
Change in χ^2 statistics are relative to Model 2

Table 6. Ordered logit models estimating the effects of dispersion in human capital and the distribution of opportunities on team likelihood of advancing through additional playoff rounds for teams who embraced a concentrated deployment strategy in low stakes contexts

	Model 1	Model 2	Model 3	Model 4	Model 5
Past performance (low stakes)	0.02***	-0.02***	-0.04***	-0.04***	-0.04***
	[0.00]	[0.00]	[0.01]	[0.01]	[0.01]
Coaching experience	0.00**	0.00**	0.00**	0.00***	0.00***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Division (Campbell)	-0.63***	-0.64**	-0.60**	-0.60**	-0.60**
	[0.16]	[0.21]	[0.22]	[0.22]	[0.22]
Division (Eastern)	-0.89***	-0.86***	-0.58***	-0.59***	-0.60***
	[0.12]	[0.13]	[0.15]	[0.14]	[0.15]
Division (Western)	-0.59***	-0.57***	-0.54***	-0.56***	-0.56***
	[0.13]	[0.14]	[0.14]	[0.15]	[0.13]
Penalty minutes	-0.14***	-0.15***	-0.03**	-0.03**	-0.03**
	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]
Playoff experience	0.37***	0.36***	0.35***	0.36***	0.36***
	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]
Awards	0.20**	0.19*	0.19*	0.19*	0.19*
	[0.08]	[0.08]	[0.08]	[0.08]	[0.08]
Dispersion in shots taken	0.05***	0.03***	0.04***	0.04***	0.04***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Mean game experience	-0.00	0.00	0.00	0.00	0.00
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Dispersion in game experience (DGE)		0.00***	0.01***	0.00***	0.00***
		[0.00]	[0.00]	[0.00]	[0.00]
Dispersion in offensive skills & abilities (DOSA)		0.30***	0.38***	1.87***	0.44***
		[0.03]	[0.03]	[0.16]	[0.04]
Dispersion in defensive skills & abilities (DDSA)		0.49***	0.66***	0.74***	11.81***
		[0.10]	[0.11]	[0.11]	[1.61]
Distribution of opportunities (DOH)		-0.01***	0.17***		0.03***
		[0.00]	[0.00]		[0.01]
DGE * DOH			-0.00***		
			[0.00]		
DOSA* DOH				-0.22***	
				[0.00]	
DDSA * DOH					-0.17***
					[0.00]
Pseudo R^2	0.20	0.23	0.24	0.24	0.24
Wald χ^2	910	1796	1857	1909	1802
Change in χ^2					

Standard errors in []; *** p < .001, ** p < 0.01, * p < 0.05;
Change in χ^2 statistics are relative to Model 2

Figure 1. The relationship between human capital dispersion and team performance moderated by the distribution of opportunities in low and high stakes contexts.

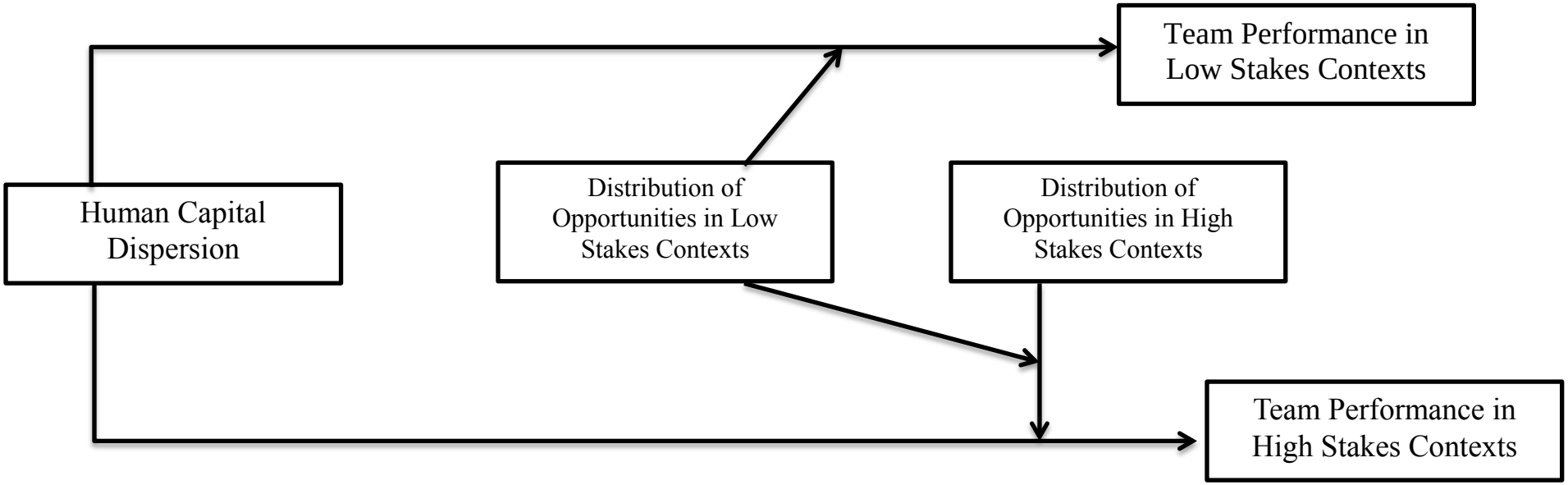

Figure 2. Plot of the interaction between dispersion in experience and distribution in opportunities on team performance (points) in low stakes contexts.

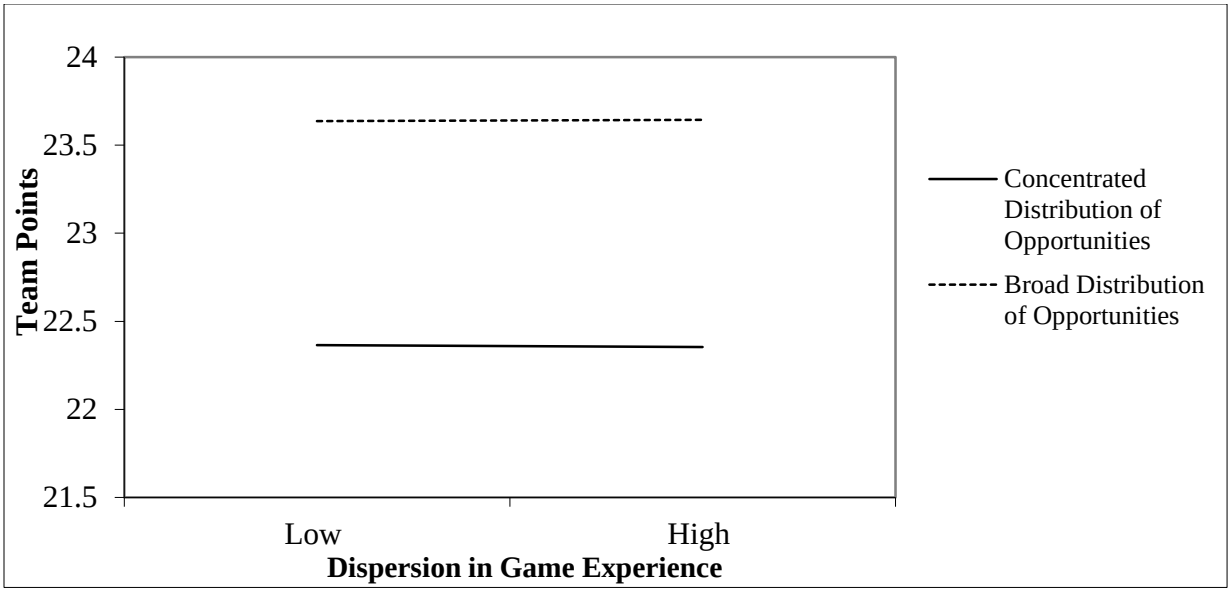

Figure 3. Plot of the interaction between dispersion in offensive skills and abilities and dispersion of opportunities on team performance (points) in low stakes contexts.

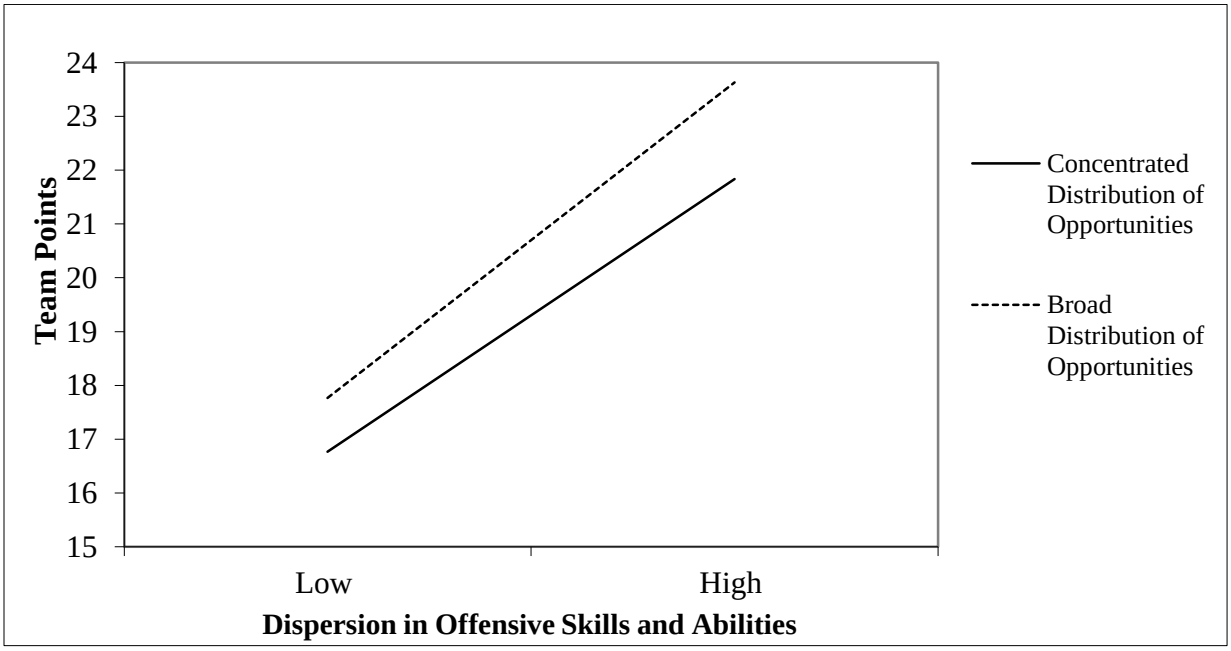

Figure 4. Plot of the interaction between dispersion in defensive skills and abilities and distribution of opportunities on team performance in low stakes contexts (points)

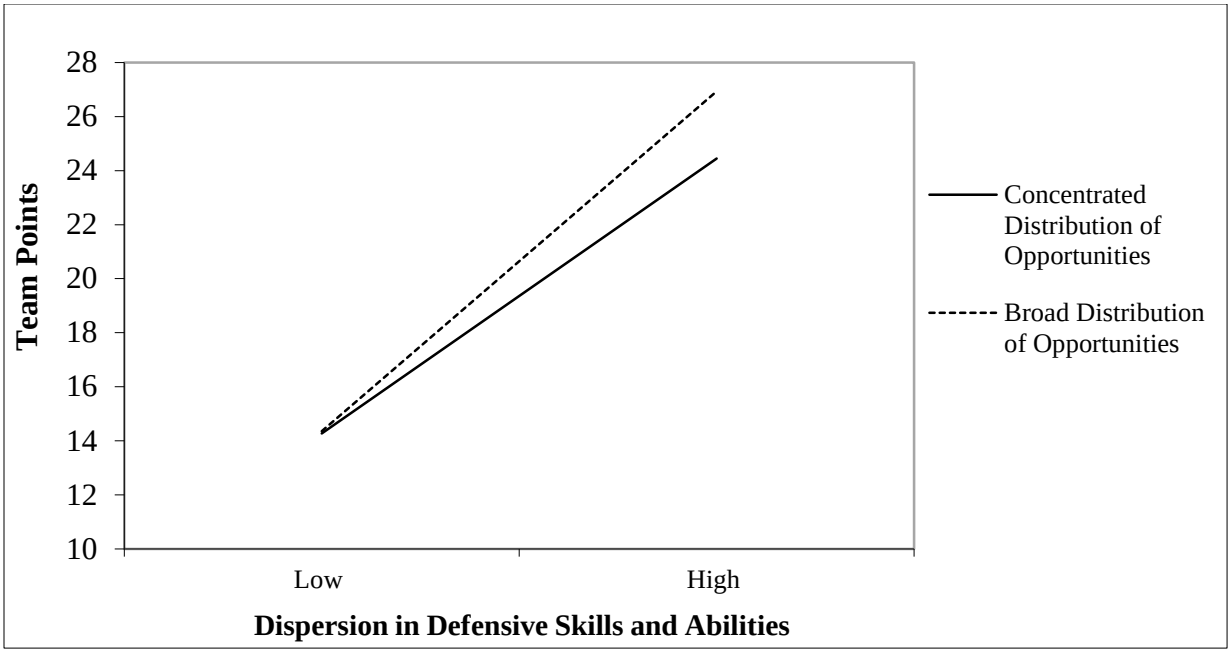

Figure 5a. Plot of the interaction between dispersion in experience and of opportunities on team performance (playoff outcome) in high stakes contexts for teams who employed a balanced deployment strategy in low stakes contexts.

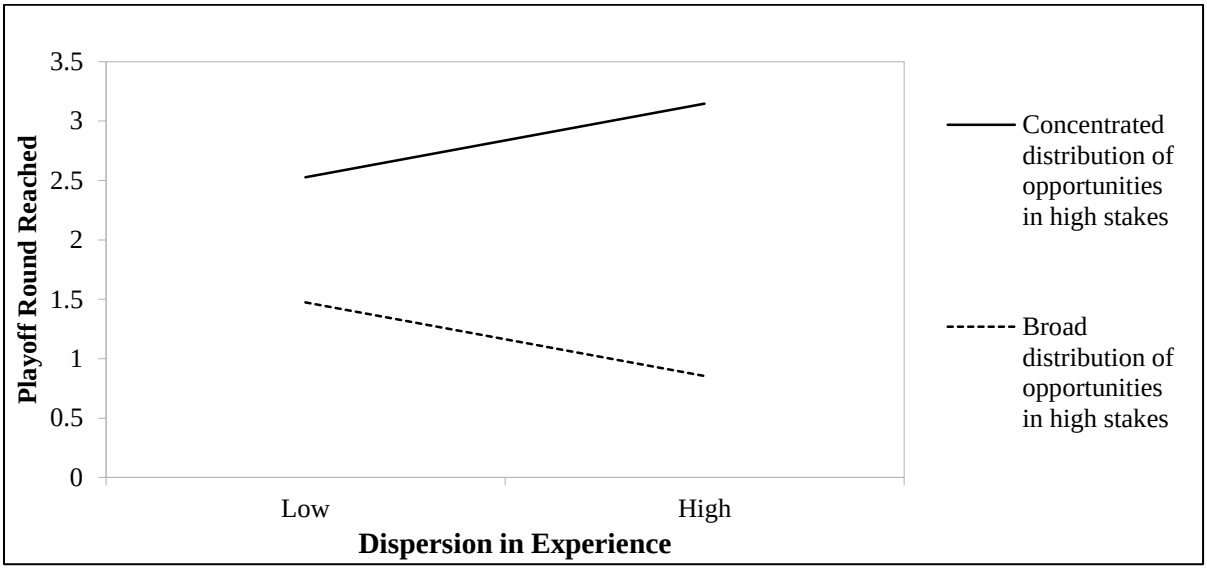

Figure 5b. Plot of the interaction between dispersion in experience and of opportunities on team performance (playoff outcome) in high stakes contexts for teams who employed a concentrated deployment strategy in low stakes contexts.

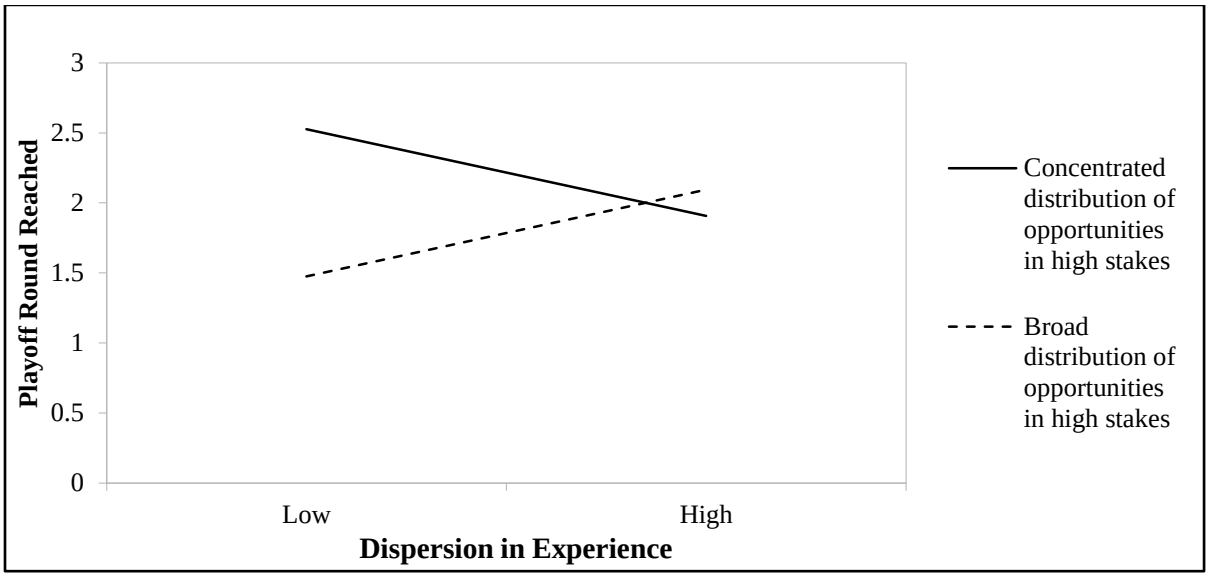

Figure 6a. Plot of the interaction between dispersion in offensive skills and abilities and of opportunities on team performance (playoff outcome) in high stakes contexts for teams who employed a balanced deployment strategy in low stakes contexts.

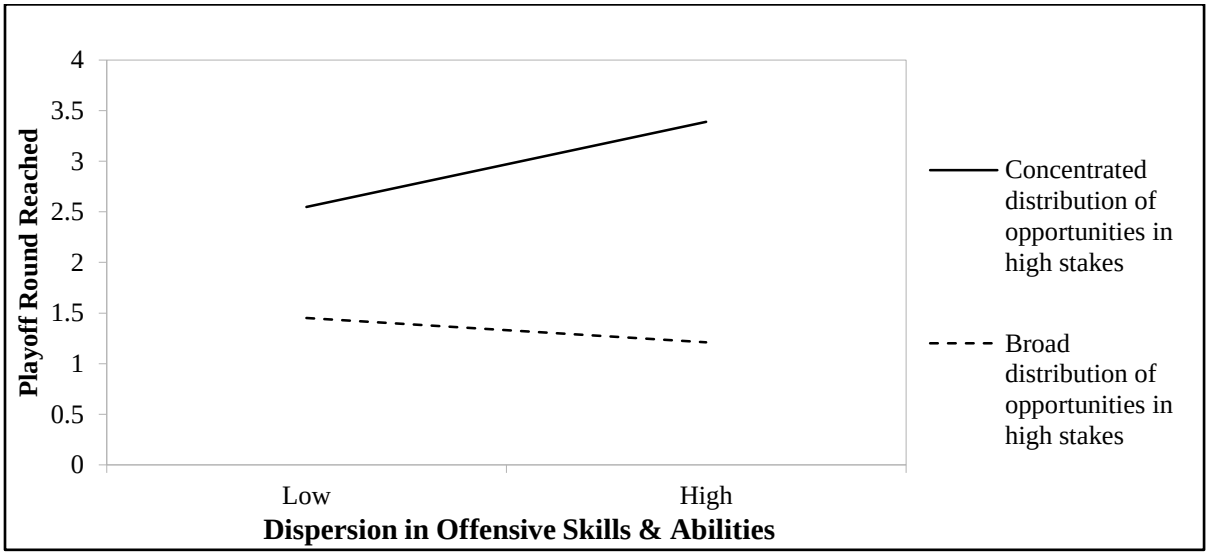

Figure 6b. Plot of the interaction between dispersion in offensive skills and abilities and of opportunities on team performance (playoff outcome) in high stakes contexts for teams who employed a concentrated deployment strategy in low stakes contexts.

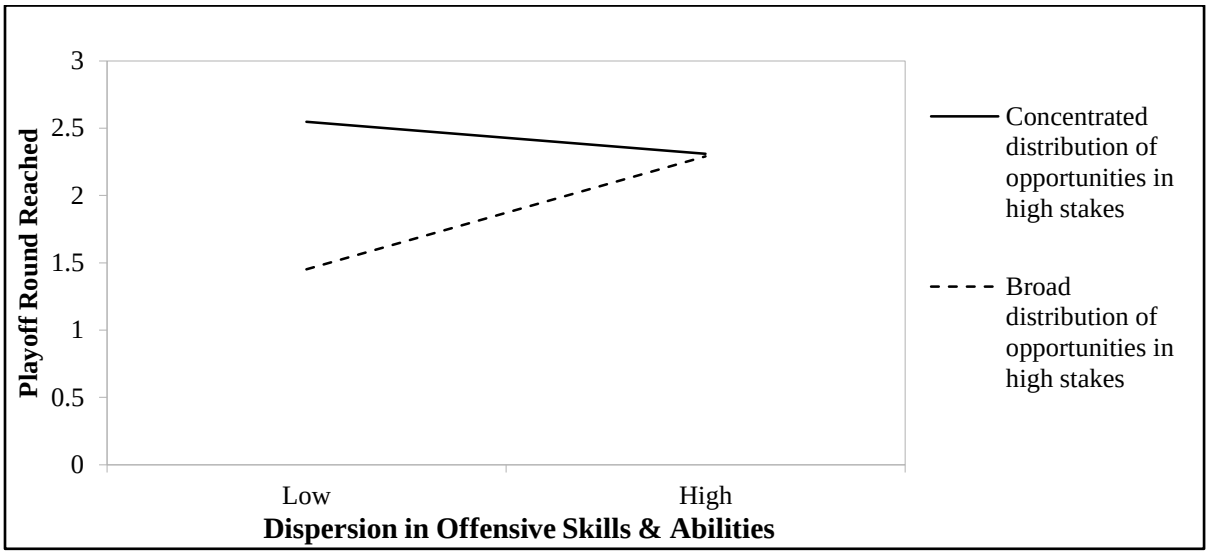

Figure 7a. Plot of the interaction between dispersion in defensive skills and abilities and of opportunities on team performance (playoff outcome) in high stakes contexts for teams who employed a balanced deployment strategy in low stakes contexts.

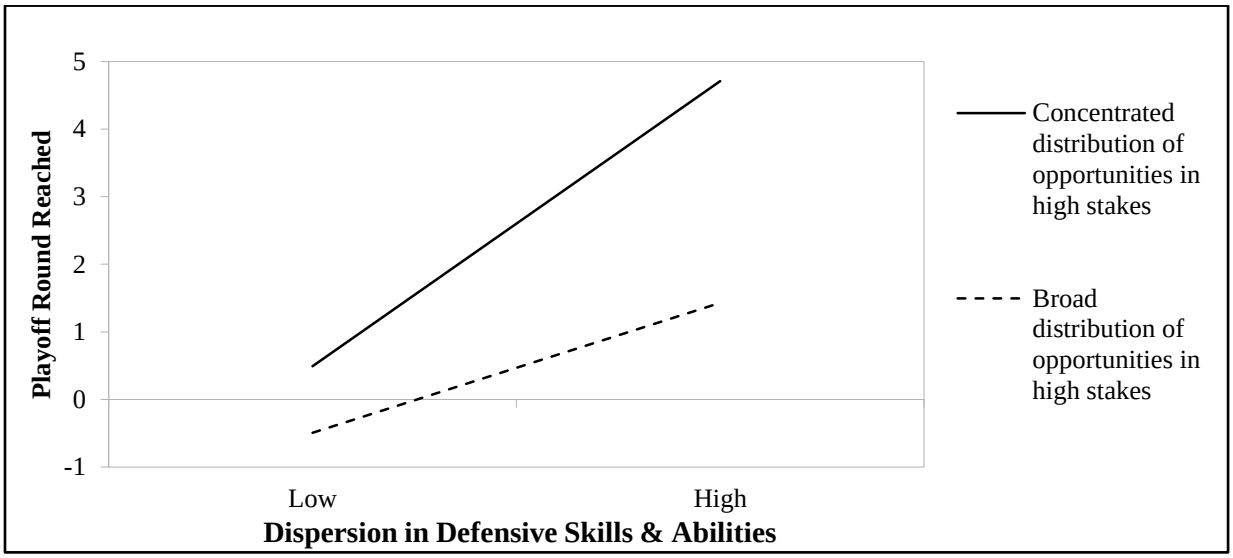

Figure 7b. Plot of the interaction between dispersion in defensive skills and abilities and of opportunities on team performance (playoff outcome) in high stakes contexts for teams who employed a concentrated deployment strategy in low stakes contexts.