Abstract

The strategic core theory of teams (SCT) argues that certain roles are more central to team tasks, and therefore are more strongly related to team performance than are other roles. However, we argue that team task interdependence serves as a contextual limitation of the SCT. Specifically, in contexts with team task interdependence (i.e., the highest level of coordination), we predict there will be no statistical difference in the effects of non-core and core role holder career experience, team experience, job skill, and resource allocation on team performance. Results from a multilevel model of National Basketball Association teams over the course of 28 seasons provide empirical support for our predictions. Our study makes a theoretical contribution that can guide future research on the SCT, as well as practical team staffing and compensation guidance for organizations.

Keywords: Strategic core theory; task interdependence; team performance

Team Task Interdependence:

A Contextual Limitation of the Strategic Core Theory of Teams

The strategic core theory of teams (SCT; Humphrey, Morgeson, & Mannor, 2009) suggests that certain roles within a team are most involved in team tasks and most central to the team workflow (Emery & Trist, 1969; Maynard, Resick, Cunningham, & DiRenzo, 2017). Prior research has provided evidence that team success is impacted by the skill level, overall career experience, and tenure with the team of those that occupy these core roles (Humphrey et al., 2009; Mathieu, Tannenbaum, Donsbach, & Alliger, 2014; Zhang, Liang, & Fan, 2017; Summers, Humphrey, & Ferris, 2012). Further, results have suggested that higher resource allocation (i.e., salaries) to strategic core roles is associated with elevated team performance (Humphrey et al., 2009). Collectively, these findings support arguments that the performance of teams largely is dependent on staffing core roles with high performers, and that high performance in non-core roles is not necessary for sustained competitive advantage (Delery & Roumpi, 2017; Delery & Shaw, 2001).

However, questions exist regarding the efficacy of SCT in contexts where core and non-core roles are highly interdependent (Delery & Shaw, 2001; Humphrey et al., 2009). Task interdependence, the degree to which members are required to interact to accomplish team tasks, varies across teams and impacts group outcomes (Saavedra, Earley, & Van Dyne, 1993). Thus, the relative importance of the strategic core to team performance could be diminished if core and non-core role-holders are highly dependent on each other to accomplish team tasks. Given that interdependence within and between groups is common within organizations, it is important to understand whether high levels of task interdependence limit the expected effects of the strategic core on team performance.

The purpose of this paper is to examine whether the tenets of the SCT hold in teams with high levels of task interdependence. To do so, we replicate the Humphrey et al. (2009) study with data from National Basketball Association (NBA) teams. Basketball teams have been noted for considerably more interdependence between members than baseball teams (Keidell, 1987), which Humphrey et al. (2009) used in their test of the SCT. Thus, by examining the SCT hypotheses with this sample, we are able to explore team task interdependence as a contextual limitation of the SCT. This approach aids theoretical refinement through insights gained from testing the theory in a situation where it should not hold (Popper, 1963).

Examining contextual limitations is theoretically important because they represent potential theoretical boundaries where relationship between constructs may break down (Maloney, Bresman, Zellmer-Bruhn, & Beaver, 2016). Without an understanding of the contextual limitations of SCT, research progress in this area could slow. However, knowledge of the boundary conditions could inform scholars during the design stages of studies, such that they could make better predictions about relationships influenced by SCT and select better samples with which to test those predictions. Additionally, understanding contextual limitations has practical significance because managers need to understand when and why certain policies and practices will be effective. For example, without an understanding of the limitations of the SCT, managers might invest resources in core roles when diminished returns are likely. Thus, knowledge of the contextual limitations of the SCT can help inform decisions with respect to human capital.

The Strategic Core Theory of Teams

Delery & Shaw (2001) developed a theory of the strategic core work force founded on the argument that certain roles are more closely related to the core competency of the

organization. They argued these were the roles where high productivity creates competitive advantage. High productivity in non-core roles certainly is beneficial (Delery & Shaw, 2001); however, a highly skilled and more experienced strategic core work force is necessary for sustained competitive advantage (Delery & Roumpi, 2017) and high levels of team performance (Humphrey et al., 2009; Mathieu et al., 2014; Zhang et al., 2017).

Drawing on the work of Delery & Shaw (2001), combined with theory on team role composition (Pearsall & Ellis, 2006; Stewart et al., 2005), Humphrey et al. (2009) developed a theory of the strategic core of teams (SCT). They defined strategic core roles as those that a) encounter more of the team's problems, b) have greater exposure to required team tasks, and c) are more central to the team's workflow. Because team roles differ in their value for achieving team performance, Humphrey and colleagues (2009) argued that higher levels of experience and skill in the team strategic core would have greater impact on team performance. Using a sample of Major League Baseball (MLB) teams over twenty-nine seasons, Humphrey et al. (2009) found career experience, team experience, and job-related skill all were related to team performance. Further, they found career experience, team experience, and job-related skill of strategic core role holders, defined as teams' pitchers and catchers, were more strongly related to team performance, relative to non-core role holders. Finally, the authors found that greater resource (i.e., salary in dollars) allocation to strategic core roles was associated with higher team performance.

Task Interdependence as a Contextual Limitation of SCT

In the discussion of their results, Humphrey et al. (2009) suggested that the effects of strategic core experience and skill might not be as prominent in teams with heightened task interdependence. This is consistent with previous arguments by Delery & Shaw (2001), who

suggested that the importance of the strategic core workforce would be diminished if it were highly interdependent with the non-core workforce. Despite these assertions that there are likely limitations to the predictions of strategic core theory, research has yet to more fully articulate the role of team task interdependence or to investigate it as a potential contextual limitation of the theory.

Task interdependence refers to the level of team member interaction required to complete team tasks (Liden, Wayne, & Bradway, 1997). Team members, or groups of team members, are task interdependent if they must coordinate efforts and share knowledge or materials to achieve team outcomes (Van der Vegt & Van de Vliert, 2002). Levels of task interdependence vary in terms of complexity, in that the "greater the requirements that group members depend on and directly support each other in task accomplishment, the more complex the nature of the interdependence" (Saavedra et al., 1993, p. 61). The classic conceptualization of task interdependence comes from Thompson (1967), who described interdependence as either pooled, sequential, or reciprocal. Scholars subsequently expanded the conceptualization to include team interdependence (Van de Ven, Delbecq, & Koenig, 1976).

Pooled interdependence refers to relatively independent team roles, where members' contributions essentially are compiled or aggregated to dictate team performance. Members on teams marked by pooled interdependence rely on each other very little to accomplish their work and complete team tasks. Sequential interdependence refers to teams where there is a prescribed order of tasks performed by very specific roles, such that one member's output becomes another member's inputs (Saavedra et al., 1993). Thus, team performance depends on more coordinated effort of team members. Reciprocal task interdependence exists when a subset of team members relies on a separate subset of team members to complete the team's work. In this context, mutual

adjustment is required (Keidell, 1987), as groups of employees rely heavily on other groups to complete team tasks. Finally, under conditions of team task interdependence, members engage in simultaneous work interactions (Van de Ven et al., 1976), and typically have greater discretion over their jobs (Saavedra et al., 1993).

These types of interdependence have been described as hierarchically complex, in that increases in interdependence (i.e., movement from pooled to sequential to reciprocal to team task interdependence) are associated with increases in the contingencies placed on the interdependent team members (Saavedra et al., 1993; Thompson, 1967; Victor & Blackburn, 1987). As a result, increases in interdependence inherently require increases in coordination. Thus, in teams marked by pooled interdependence, members largely are stand-alone entities, such that there is "an absence of workflow between" them (Victor & Blackburn, 1987, p. 486). In fact, Drucker & Maciariello (2008) described this group dynamic as indicative of group members being *on* a team, but not operating *as* a team. However, in more interdependent teams, members' actions "must be adjusted to the actions of one or more others" (Thompson, 1967, p. 55). Further, under conditions of team task interdependence, there is a great deal of coordination required, as members must "decide the particular course of inputs and outputs among members" (Saavedra et al., 1993, p. 63)

Thus, in teams with team task interdependence, substantially more interaction among team members is required to accomplish team tasks than in teams with pooled interdependence. As a result, with team task interdependence, members of the strategic core must rely heavily on their non-core counterparts. Consequently, the ability of the strategic core to impact team outcomes is contingent upon more than just their own independent high performance. Therefore, consistent with prior arguments (e.g., Delery & Shaw, 2001; Humphrey et al., 2009), we suggest

that the relative impact of the strategic core on team performance is limited in contexts of team task interdependence.

Method

We conducted a replication of the Humphrey et al. (2009) study, testing each of the hypotheses they presented using the same variables and models, but with a sample of teams that operate under team task interdependence. More specifically, we tested the hypotheses that a team's cumulative career experience, team experience, and job skill are positively related to team performance. Additionally, because the strategic core of a team encounters more of the problems the team faces and is more central to the team's workflow, we tested the hypotheses that the experience and skill of the strategic core will be more strongly related to team performance. Finally, as investment in strategic core roles is argued to create competitive advantage (Delery & Shaw, 2001; Humphrey et al., 2009), we tested the hypothesis that teams with more resources allocated to strategic core roles will have higher levels of team performance. If, as we expect, team task interdependence represents a contextual limitation for the SCT, team member skill and experience will be related to team performance, but the experience and skill of core role-holders will not be more strongly related to team performance. Further, if reciprocal task interdependence serves as a boundary condition of SCT, teams that allocate more resources to strategic core roles will not have significantly higher levels of team performance.

Sample

We used a sample of teams from the National Basketball Association (NBA). Sports data provide several advantages for examining organizational science topics (Day, Gordon, & Fink, 2012; Wolfe et al., 2005). In addition to the clear rules and meticulous records kept for sports teams (Day et al., 2012), Keidell (1987) argued that the world of sports mirrors the world of

work, such that conducting organizational research with sports data provides a controlled environment similar to a laboratory.

More specific to the present research question, different sports differ in terms of the level of interaction between team members. To this point, Keidell (1987, p. 592) noted, "baseball is a metaphor for the autonomy of organizational parts…and basketball, for voluntary cooperation among the parts." Building from this, Wolfe et al. (2005, p. 201) suggested, "the impact of interdependencies (e.g., pooled, sequential, reciprocal) …can be examined by collecting data from different sports." Baseball teams are representative of pooled interdependence (Keidell, 1987; Wolfe et al., 2005), which requires relatively little coordination between team members during the completion of team tasks (Swaab, Schaerer, Anicich, Ronay, & Galinsky, 2014). Therefore, it is possible that the Humphrey et al. (2009) results, from a sample of Major League Baseball (MLB) teams, may have supported the SCT hypotheses because of the low levels of interdependence between teams' core and non-core groups.

In contrast to baseball, basketball team members are highly interdependent (Bloom, 1999; Halevy, Chou, Galinsky, & Murnighan, 2012; Keidell, 1987; Wolfe et al., 2005). Wageman (2001, p. 198-199) has described the interaction of basketball team members as "interdependence in which the actions of individual members elicit and constrain the actions of others." This level of coordination matches the descriptions of team task interdependence. Further, scholars (c.f., Swaab et al., 2014) recently have conducted investigations analyzing hypotheses regarding coordination across interdependence contexts using MLB and NBA samples. Thus, NBA teams represent an ideal context in which to examine whether team task interdependence represents a contextual limitation for the SCT.

Our measures were compiled from NBA archival records available online (www.basketball-reference.com), and were used to construct a multi-level dataset. The level-2 (i.e., higher level) observations were NBA teams. The level-1 observations consisted of team-seasons nested within their respective NBA teams. For example, the Atlanta Hawks 2002-2003 season and 2003-2004 season were separate level-1 observations, both of which were nested within the Atlanta Hawks. Our dataset included 816 level-1 observations nested within the 30 NBA teams. We chose the 1990-1991 through 2017-2018 regular seasons (i.e., excluding playoffs) as our level-1 observations because this timeframe included the longest, most recent span of available full-season data for the variables used in this study and provided a sufficient sample size to test the SCT hypotheses.

Measures

Team performance. Consistent with Humphrey et al. (2009), we operationalized the dependent variable (i.e., team performance) as the team winning percentage for an entire season of play. Winning percentage is calculated as the total games won by a team divided by the total games played by the team in a given season.

Operationalization of the strategic core. Humphrey et al. (2009) defined the strategic core of the team as those roles that encounter more of the team's problems, have greater exposure to required team tasks, and are more central to the team's workflow. Using this definition, we identified primary aspects of both offense (i.e., dribbling, passing, shooting, and rebounding) and defense (i.e., stealing, blocking, and rebounding) in basketball. Then, each author reviewed descriptions for each of the positions (i.e., roles) and identified which are more focused on each aspect of the game. Using our collective evaluations, we determined the core to be made up of point guards and small forwards. Together, these two positions are more likely to

encounter the team problems (e.g., setting up offensive possessions and defending key opponents), have greater exposure to the team tasks (e.g., dribbling, passing, defending, and rebounding), and are more central to the team's workflow (e.g., offensive team possessions often move through these two positions).

This operationalization of the core also makes sense when thinking conceptually about the game of basketball. That is, the point guard is responsible for starting each offensive possession. Additionally, because point guards typically defend opposing point guards, they also are central to the team's defense. Small forwards are similarly involved in both offense and defense. More specifically, this position typically is required to play both "inside" (i.e., closer to the goal) and "outside" (i.e., outside the perimeter established by the 3-point line) on both offense and defense. Thus, the versatility required to fill this role makes them central to team problems, tasks, and workflow throughout the game.

In some instances, players changed positions from one season to the next. For example, because the San Antonio Spurs had all-star center David Robinson on their team, Tim Duncan played power forward for them for his first nine seasons in the NBA. However, after David Robinson retired, Tim Duncan played center. In other instances, players changed positions when traded from one team to another. In both instances, we used the assigned position for the specific team and year from www.basketball-reference.com. Thus, it is possible that some players were part of their team's core in some, but not all, seasons. Similarly, it is possible that when players switched teams, they moved from being part of the core for one team to being non-core for another.

Career experience. Some measures of experience, such as years in the league or games played, fail to distinguish between those players who are on the court for a large portion of each

game from those players who play only a few minutes in each game (but have the same amount of time spent in the league). To avoid this problem, we measured career experience as the number of minutes played in the NBA prior to the focal season. We rescaled experience by dividing by 1,000 to create variables that were closer in scale to the dependent variable.

Team experience. We measured team experience as the mean number of minutes played for their current team prior to the focal season. We included a player on a team if they appeared on a team's roster at any point in the year, but the data are team-specific for each player. For example, if someone played for Atlanta in the first half of the 2006 season and Portland in second half of that season, our analyses include that player's Atlanta-specific statistics (position, minutes played, salary, PER, etc.) and Portland-specific statistics. However, because our IVs (i.e., other than salary) are time-lagged, we would use that player's 2005 and earlier data to build 2006 team-level variables. So, that player's cumulative minutes played with Atlanta prior to 2006 would be included in Atlanta's team experience score for 2006. Because the player was new to Portland in mid-2006 and has thus played zero minutes with Portland prior to 2006, that score of zero minutes was factored into Portland's team experience score in 2006. Similarly, if a player was treated as one position in Atlanta but a different position in Portland, we treated them as having different positions on those teams. Team experience also was rescaled by dividing by 1,000.

Job skill. We measured job skill using the player efficiency rating (PER) statistic, which is designed to "credit" a player for positive accomplishments (i.e., made shots, assists, rebounds, blocks, and steals) and "debit" a player for negative accomplishments (i.e., missed shots, turnovers, and personal fouls) on both offense and defense. We averaged core and non-core players' PER scores to form core and non-core job skill measures for each team-season.

Consistent with Humphrey et al. (2009), a one-year lag was incorporated such that PER for the previous season was used as a measure of job skill for the current season, which precludes rookies from being included in the job skill analyses.

Resource allocation. Consistent with Humphrey et al. (2009), annual player salaries were used as a measure of team resource allocation. We totaled all core player salaries to form core resource allocation and totaled all non-core player salaries to form non-core resource allocation. We rescaled resource allocation by dividing the salary totals by 1,000,000. Furthermore, to test our curvilinear hypothesis, we constructed *Salary Percentage*, which was formed by dividing the total core salary for a team by the team's total core and non-core salary.

Conference. Each NBA team belongs to either the Eastern or the Western conference. Although the rules are consistent across conferences, scheduling and travel differences may affect winning percentages between the two conferences. Thus, we created a dichotomous *Conference* variable to control for any potential effects of schedule differences on winning percentage. In our data, the Eastern conference is coded as 0 and the Western conference is coded as 1.

Analysis

Because our data were hierarchically structured (i.e., there were multiple season-level performance outcomes for each team), multilevel analysis was an appropriate analytical method (Raudenbush & Bryk, 2002). The first level consisted of season-specific data (i.e., 1990-1991 Atlanta Hawks), which were nested within teams (i.e., Atlanta Hawks). The outcome variable, winning percentage, is a season-level (or level-1) variable. Our level-1 predictor variables consisted of player-relevant measures: career experience, team experience, job skill, and resources allocated. These variables change with each season because team compositions change

each season, thus altering the amount of experience on the team, skill of the players on the team, and resources (i.e., salaries) allocated to specific roles (i.e., players). The only level-2 predictor variable was the conference dummy variable. All independent variables, at both levels, were grand-mean centered, as is typical in multilevel analysis (Raudenbush & Bryk, 2002) and recommended for multilevel applications in management research (Aguinis, Gotfreddson & Culpepper, 2013).

Results

Table 1 presents descriptive statistics and bivariate correlations. We ran a series of 12 models to replicate Humphrey et al. (2009). Tables 2 and 3 present the results. Model 1 is the fully unconditional model, which allowed us to calculate the percentage of variance in the outcome variable explained by level-1 and level-2 variables (Raudenbush & Bryk, 2002). Model 1 results reveal that 16.0% of the total variance in winning percentage exists between teams, and the remaining 84.0% of variance exists within teams (i.e., between team seasons). Multilevel modeling is justified when at least 10% of the variance exists between level 2 units (Aguinis, et al., 2013; Kahn, 2011), so based on this rule of thumb our multilevel approach is appropriate for our data.

Insert Tables 1-3 about here

We added total career experience in Model 3 and found that its effect on team performance was positive and statistically significant (.222, $p < .001$). In Model 4, we analyzed total team experience and the standard deviation of total team experience. Total team experience was positive and statistically significant (.344, $p = .001$), but the standard deviation of total

experience was not statistically significant. In Model 5, we found job skill to be positively related (.040; $p < .001$) to team performance. We included all three predictors in Model 6 (i.e., total career experience, total team experience, and total job skill), and found that all three variables were positively and statistically significant at the $p < .001$ level. Thus, our results provided additional support for the Humphrey et al. (2009) hypotheses that the career experience, team experience, and job skill of all team members, regardless of role, are positively related to team performance.

In the next series of models, we attempted to replicate the results of the Humphrey et al. (2009) hypotheses that the career experience, team experience, and job skill of core role holders would be stronger predictors of team performance than that of non-core role holders. In Model 7, we found that the influence of core career experience and non-core career experience on team performance (0.057 and 0.153, respectively) were both statistically significant ($p < .001$). However, as the non-core coefficient was higher, there is no evidence to suggest core career experience is more strongly related to team performance.

We repeated the approach used in Model 7 to compare the effects of core and non-core team experience (Model 8) and core and non-core job skill (Model 9). In Model 8 we found that non-core team experience (.189) was statistically significant ($p < .001$), but that core team experience (.052) and the standard deviations of non-core and core team experience were not statistically significant predictors of team performance. In Model 9, we found that both core and non-core job skill were statistically significant predictors of team performance (0.015 and 0.024, respectively, $p < .001$ for both). Again, given the magnitude of the coefficients, there was no evidence that core team experience or job skill were more strongly related to team performance.

In Model 10, we included all eight of the variables tested in Models 7-9: non-core and core measures of career experience, team experience (including standard deviation), and job skill. In this model, both core and non-core career experience again were statistically significant predictors of team performance (0.030 and 0.118, $p < .001$), but core career experience was not more strongly related to team performance). Both core and non-core job skill were again statistically significant (0.010 and 0.016, $p < .001$ for both), but core job skill was not a stronger predictor than non-core job skill. No measure of team experience was statistically significant for either group. Thus, we find evidence that there is no statistical difference between the influence of core and non-core role holders' career experience, team experience, or job skill in a context of team task interdependence.

Finally, in Model 11 and Model 12, which are presented in Table 4, we examined the effect of resource allocation. In Model 11, we included the measure of total resources (i.e., player salaries). This measure was positive (.020) and significant ($p < .001$). In Model 12, we added the measure of core salaries. By including the measure of total resource allocation as a control, the core resource allocation variable essentially served as a proxy for the proportion of resources allocated to core role holders. In Model 12, total resource allocation (.020) was statistically significant at $p < .001$; however, core resource allocation was not a statistically significant predictor of team performance.

Post-hoc Analyses

As a robustness check, we conducted a series of post-hoc analyses examining the Humphrey et al. (2009) hypotheses for the SCT with different combinations of core positions. Recognizing that point guards have the most central role due to their responsibilities for running offensive possessions and as first line of defense for opponents' offensive possessions, we held

them constant in the core. Then, we ran the above analyses for a point guard + shooting guard core, point guard + power forward core, and point guard + center core. In all instances, we found no support for the Humphrey et al. (2009) hypotheses that core skill, team experience, and career experience would be more strongly related to team performance, or that greater resource allocation to the core would result in better team performance. These post-hoc results provide additional support for the contention that team task interdependence represents a contextual limitation of the SCT.

However, have referred to basketball as a position-less game (https://www.theguardian.com/sport/blog/2018/may/01/how-and-why-position-less-lineups-have-taken-over-the-nba-playoffs). Therefore, it is possible that the roles might not be position-based, and that any of the five players on the court at any given moment may play different roles depending on a variety of factors. Although this is difficult to accurately operationalize, a conservative test would be to consider starters as core and bench players as non-core. In doing so, we can still apply the same three criteria from the Humphrey et al. (2009) definition of the core – roles that (a) encounter more of the team's problems, (b) have greater exposure to the required team tasks, and (c) are more central to the team's work flow. In this case, players playing the starter role are greater on all three dimensions than bench role players.

We performed the analyses again using the starters versus bench conceptualization of the core. The results are displayed in Table 4. Not surprisingly, higher resource allocation to starters was more strongly related to team performance. Additionally, we found that starter and bench career experience and team experience were all positively and statistically significantly related to team performance. However, starter experience was not more strongly related to team performance than bench experience. Finally, both starter job skill and bench job skill were

positively and statistically significantly related to team performance. Further, we conducted a test of the coefficients following Cohen, Cohen, West, & Aiken (2003) and found that the difference in their effects was statistically different than zero ($Z = 7.760$, $p < .001$ in Model 15 and $Z = 5.984$, $p < .001$ in Model 16).

Given this result, we were curious whether there were specific instances where the core, when conceptualized as starters, was more or less important to team performance. Thus, we performed game-level analyses to see whether the core (conceptualized as starters) was more strongly related to team performance (operationalized as a binary win or loss) when facing more or less difficult opponents (operationalized as teams with better or worse records as the time of the focal game). We again tested the Humphrey et al. (2009) hypotheses, but also included a test of core versus non-core usage on a per game basis. Our results indicated that for weaker opponents, core usage and skill (still operationalized as PER, but adjusted in "real time" by recalculating on a per-game basis) were both more strongly related to team performance. However, against stronger opponents, we saw a different pattern. In these games, core team experience was more strongly related to team performance. Interestingly, in the full model, core job skill and usage were not more strongly related to team performance. Thus, it seems that when facing easier tasks, greater core skill and usage can drive team performance. However, when facing more difficult tasks, core skill and involvement are not more relevant, but their team-specific experience is.

Insert Tables 4-6 about here

Discussion

The strategic core theory of teams (SCT; Humphrey et al., 2009) has argued in favor of increased investment in roles considered to be central to team workflow, as these roles (i.e., the strategic core) facilitate the competitive advantage that drives performance (Delery & Shaw, 2001). However, classic management research (i.e., Thompson, 1967) long has noted that collective outcomes are contingent upon interdependence levels, and more recent efforts have suggested that team task interdependence might represent a contextual limitation of the SCT (Humphrey et al., 2009). Thus, consistent with calls for increasing understanding of the validity of results in organizational research (Hochwarter et al., 2011), we conducted a constructive replication of Humphrey and colleagues' (2009) test of SCT to see whether the hypotheses were supported in a context with team task interdependence.

Consistent with prior results (i.e., Humphrey et al., 2009; Mathieu et al., 2014; Zhang et al., 2017), career experience, team experience, and job skill all were positively related to team performance. Contrary to prior results, but consistent with our expectations, the career experience, team experience, job skill, and salary of core role holders were not more strongly related to team performance than that of non-core role holders. Further, our post-hoc analyses indicated this was the case for multiple position-based configurations of the core. Together, these results provide evidence that team task interdependence serves as a contextual limitation for the SCT, as we were unable to replicate the Humphrey et al. (2009) results with a sample of teams that operate under conditions of team task interdependence. However, additional post-hoc analyses indicated that in a position-less operationalization of the core, some aspects were more strongly related to team performance. Further, game-level analyses provided some insight into when these core roles might be more important for team performance.

Implications for Theory

Our study contributes to the organizational sciences literature in three ways. First, our results indicate that team task interdependence may serve as a contextual limitation for the strategic core theory of teams. Although scholars (i.e., Delery & Shaw, 2001; Humphrey et al., 2009) have speculated about the limited impact of the strategic core in highly interdependent contexts, research to date has yet to test the efficacy of the strategic core outside of teams characterized by pooled task interdependence. Thus, we contribute to the organizational sciences literature by providing theoretical rationale and empirical evidence that refines our understanding of SCT. This knowledge is valuable, as scholars can use it to guide future research efforts. Researchers investigating SCT should consider the study context carefully and determine whether the interdependence between core and non-core employees might impact the relationships they expect to observe.

Second, our results provide support for arguments regarding the meaningful contributions possible from conducting constructive replications (Hochwarter et al., 2011). Testing theories under different conditions is an important pursuit that can lead to conceptual refinement (Popper, 1963). As Hochwarter and colleagues noted, constructive replications are somewhat rare in the organizational sciences. Although many scholars now use multi-study packages, where the results are replicated across samples, these efforts typically do not attempt to replicate results in contexts where theories are not expected to hold. As our results demonstrate, these types of replications can provide valuable theoretical insights by delineating the contextual limitations of theories. We hope our results encourage other researchers to examine theories, to determine where contextual limitations might exist, and to conduct studies that contribute to our understanding of organizations through the delineation of theoretical boundaries.

Third, our post-hoc results indicate that it might be helpful to consider a broader definition of roles to determine what constitutes the strategic core and when it might be more strongly related to team performance. More specifically, our post-hoc analyses suggests the merit in considering conceptualization of the core where roles are more fluid. This could be critical to understanding the nature of the core in highly interdependent contexts, as members of these teams have been noted as having a high degree of role discretion. Thus, it is possible that the nature of the work facing teams with the highest level of interdependence requires malleable roles. Additionally, because this set of analyses was performed at the game-level, we were able to explore when certain attributes of the strategic core of teams might matter more for team performance. Interestingly, these results indicated that greater core skill and involvement in team tasks drive team performance when highly interdependent teams face simpler tasks. However, this was not the case when facing more difficult tasks. This suggests that for difficult tasks, everyone on the team needs to "step up" for the team to be successful.

Implications for Practice

The results of our study also have important practical implications for staffing and compensation in organizations, as we expect these findings to generalize beyond the world of organized sports. Some teams (e.g., consulting, financial management, product development, marketing, etc.) are structured in such a way that successful teamwork requires constant coordination and mutual adaptation by all members. Whereas disproportionate allocation of salaries to core roles in teams with pooled interdependence may benefit organizations through heightened team performance (Humphrey et al., 2009), our results indicate that weighting pay towards core roles in teams with higher interdependence does not have the same effects.

Individual team contribution is more apparent with pooled interdependence, which may make it easier to justify investing additional resources in some roles instead of others. However, increased interdependence inhibits the ability to clearly recognize individual contributions. Thus, organizations should consider alternative (i.e., to heavy investment in core roles) compensation strategies for highly interdependent teams. For example, organizations may be better served to invest salary to acquire as much relevant skill and experience as possible, regardless of core versus non-core role designation. Additionally, organizations might consider structuring compensation (i.e., bonus pay or merit raises) such that it is driven by team performance, which would increase outcome interdependence (Van der Vegt, Emans, & Van de Vliert, 2001), and facilitate the increased cooperation necessary for highly interdependent roles (Thompson, 1967).

Conclusion

The present study identifies team task interdependence as a potential contextual limitation for the SCT. This provides a theoretical contribution that can guide future research in this area, as well as practical team staffing and compensation guidance for organizations. Additionally, our results demonstrate the value of pursuing constructive replications of existing theories to facilitate theoretical refinement. We hope our results generate interest in identifying contextual limitations for other theories, as well as interest in testing additional elements of the SCT.

References

Adams, J. S. (1963). Toward an understanding of inequity. *Journal of Abnormal and Social Psychology*, *67*, 422-436. DOI: 10.1037/h0040968

Adams, J. S. (1965). Inequity in social exchange. In L. Berkowitz (Ed.), *Advances in experimental social psychology*, (Vol. *2*, pp. 267-299). New York: Academic Press.

Aguinis, H., Gottfredson, R. K., & Culpepper, S. A. (2013). Best practice recommendations for estimating cross-level interaction effects using multilevel modeling. *Journal of Management*, *39*(6), 1490-1528. DOI: 10.1177/0149206313478188

Basketball Stats and History: Statistics, Scores, and History for the NBA, ABA, WNBA, and Top European Competition. http://www.basketball-reference.com.

Bloom, M. (1999). The performance effects of pay dispersion on individuals and organizations. *Academy of Management Journal, 42*, 25–40.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences. 3rd ed*. Mahwah, NJ: Erlbaum.

Day, D. V., Gordon, S., & Fink, C. (2012). The sporting life: Exploring organizations through the lens of sport. *The Academy of Management Annals*, *6*(1), 397-433. DOI: 10.1080/19416520.2012.678697

Delery, J. E. & Roumpi, D. (2017). Strategic human resource management, human capital and competitive advantage: Is the field going in circles? *Human Resource Management Journal*, *27*(1): 1-21. DOI: 10.1111/1748-8583.12137

Delery, J. E., & Shaw, J. D. (2001). The strategic management of people in work organizations: Review, synthesis, and extension. In G. R. Ferris (Ed.), *Research in personnel and human resources management* (Vol. 20, pp. 165-197). Oxford, UK: JAI Press/Elsevier Science.

Drucker, P. F., & Maciariello, J. A. (2008). *Management Rev Ed*. New York, NY: Collins Business.

Emery, F. E., & Trist, E. L. (1969). Socio-technical systems. In F. E. Emery (Ed.), *Systems thinking* (pp. 281–296). London: Penguin Books.

Halevy, N., Chou, E. Y., & Galinsky, A. D. (2011). A Functional Model of Hierarchy: Why, How, and When Vertical Differentiation Enhances Group Performance. *Organizational Psychology Review*, *1*(1), 32-52. DOI: 10.1177/2041386610380991

Halevy, N., Chou, E. Y., Galinsky, A. D., & Murnighan, K. (2012). When hierarchy wins: Evidence from the National Basketball Association. Social Psychological & Personality Science, 3, 398–406.

Hill, A. D., Aime, F., & Ridge, J. W. (in press). The performance implications of resource and pay dispersion: The case of major league baseball. *Strategic Management Journal*. DOI: 10.1002/smj.2616

Hochwarter, W., Ferris, G., & Hanes, T. (2011). Multi-study packages in organizational science research. In D.J. Ketchen Jr. & D.D. Bergh (Eds.), *Building methodological bridges - Research methodology in strategy and management.* (pp. 163-199). Bingley, UK: Emerald Group Publishing Limited.

Humphrey, S. E., Morgeson, F. P., & Mannor, M. J. (2009). Developing a theory of the strategic core of teams: A role composition model of team performance. *Journal of Applied Psychology*, *94*(1), 48-61. DOI: 10.1037/a0012997

Kahn, J. H. (2011). Multilevel modeling: Overview and applications to research in counseling psychology. *Journal of Counseling Psychology*, *58*(2): 257-271. DOI: 10.1037/a0022680

Keidell, R. W. (1987). Team sports models as a generic organizational framework. *Human Relations*, *40*(9), 591-612. DOI: 10.1177/001872678704000904

Liden, R. C., Wayne, S. J., & Bradway, L. K. (1997). Task interdependence as a moderator of the relation between group control and performance. *Human Relations*, *50*(2), 169-181. DOI: 10.1177/001872679705000204

Maloney, M. M., Bresman, H., Zellmer-Bruhn, M. E., & Beaver, G. R. (in press). Contextualization and context theorizing in teams research: A look back and a path forward. *Academy of Management Annals*. DOI: 10.1080/19416520.2016.1161964

Mathieu, J. E., Heffner, T. S., Goodwin, G. F., Salas, E., & Cannon-Bowers, J. A. (2000). The influence of shared mental models on team process and performance. *Journal of Applied Psychology*, *85*, 273–283.

Mathieu, J. E., Tannenbaum, S. I., Donsbach, J. S., & Alliger, G. M. (2014). A review and integration of team composition models: Moving toward a dynamic and temporal framework. *Journal of Management*, *40*(1), 130-160. DOI: 10.1177/0149206313503014

Maynard, M. T., Resick, C. J., Cunningham, Q. W., & DiRenzo, M. S. (2017). Ch-Ch-Ch-changes: How action phase functional leadership, team human capital, and interim vs. permanent leader status impact post-transition team performance. *Journal of Business and Psychology*, 1-19. DOI: 10.1007/s10869-016-9482-5

Pearsall, M. J., & Ellis, A. P. (2006). The effects of critical team member assertiveness on team performance and satisfaction. *Journal of Management*, *32*(4), 575-594.

Pierce, J. R., & Aguinis, H. (2013). The too-much-of-a-good-thing effect in management. *Journal of Management*, *39*(2), 313-338.

Popper, K. R. (1963). *Conjectures and refutations* (Vol. 28). London: Routledge & Kegan Paul.

Pritchard, R. D. (1969). Equity theory: A review and critique. *Organizational behavior and human performance*, *4*(2), 176-211. DOI: 10.1016/0030-5073(69)90005-1

Raudenbush, S.W., & Bryk, A.S. (2002). *Hierarchical linear models. Applications and data analysis methods, 2nd ed*. Thousand Oaks, CA: Sage Publications.

Saavedra, R., Earley, P. C., & Van Dyne, L. (1993). Complex interdependence in task-performing groups. *Journal of Applied Psychology*, *78*(1), 61. DOI: 10.1037/0021-9010.78.1.61

Siegel Christian, J., Christian, M. S., Garza, A. S., Ellis, A. P. J. 2012. Examining retaliatory responses to justice violations and recovery attempts in teams. *Journal of Applied Psychology*, *97*(6): 1218-1232. DOI: 10.1037/a0029450

Siegel Christian, J., Pearsall, M. J., Christian, M. S., Ellis, A. P. J. 2014. Exploring the benefits and boundaries of transactive memory systems in adapting to team member loss. *Group Dynamics: Theory, Research, and Practice*, *18*(1): 69-86. DOI: 10.1037/a0035161

Stewart, G. L., Fulmer, I. S., & Barrick, M. R. (2005). An exploration of member roles as a multilevel linking mechanism for individual traits and team outcomes. Personnel Psychology, 58, 343–365. DOI: 10.1111/j.1744-6570.2005.00480.x

Summers, J. K., Humphrey, S. E., & Ferris, G. R. (2012). Team member change, flux in coordination, and performance: Effects of strategic core roles, information transfer, and cognitive ability. *Academy of Management Journal*, *55*(2): 314-338. DOI: 10.5465/amj.2010.0175

Swaab, R. I., Schaerer, M., Anicich, E. M., Ronay, R., & Galinsky, A. D. (2014). The too-much-talent effect: Team interdependence determines when more talent is too much or not enough. *Psychological Science*, *25*(8), 1581-1591.

Thompson, J.D. (1967). *Organizations in Action.* New York, NY: McGraw-Hill.

Van der Vegt, G., Emans, B. J. M., & Van de Vliert, E. (2001). Patterns of interdependence in work teams: A two-level investigation of the relations with job and team satisfaction. *Personnel Psychology*, *54*, 51– 69. DOI: 10.1111/j.1744-6570.2001.tb00085.x

Van der Vegt, G., & Van de Vliert, E. (2002). Intragroup interdependence and effectiveness: Review and proposed directions for theory and practice. *Journal of Managerial Psychology*, *17*(1), 50-67. DOI: 10.1108/02683940210415924

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

Victor, B. & Blackburn, R. S. 1987. Interdependence: An alternative conceptualization. *Academy of Management Review*, *12*(3), 486-498. DOI: 10.5465/AMR.1987.4306563

Wageman, R. (2001). The meaning of interdependence. *Groups at work: Theory and research*, 197-217.

Wolfe, R. A., Weick, K. E., Usher, J. M., Terborg, J. R., Poppo, L., Murrell, A. J., Dukerich, J. M., Core, D. C., Dickson, K. E., & Jourdan, J. S. (2005). Sport and organizational studies exploring synergy. *Journal of Management Inquiry*, *14*(2), 182-210. DOI: 10.1177/1056492605275245

Yorton, T. (2015). 3 improv exercises that can change the way your team works. Retrieved March 5, 2017 from *Harvard Business Review* website: https://hbr.org/2015/03/3-improv-exercises-that-can-change-the-way-your-team-works.

Zhang, Y., Liang, Q., & Fan, P. (2017). Strategic core change, faultlines and team flux: Insight from punctuated equilibrium model. *Journal of Organizational Change Management*, *30*(1): 54-75. DOI: 10.1108/JOCM-01-2016-0003

Table 1
Bivariate Correlations and Descriptive Statistics

Var	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Career Exp	0.93	0.31	-														
2 Team Exp.	0.32	0.17	0.57	-													
3 Team Exp SD	0.47	0.27	0.59	0.88	-												
4 Team Job Skill	13.62	1.35	0.34	0.29	0.25	-											
5 Team Salary	9.70	2.60	0.49	0.18	0.26	0.27	-										
6 Core Career Exp	0.95	0.42	0.71	0.43	0.44	0.28	0.37	-									
7 NC Career Exp	0.93	0.37	0.88	0.51	0.52	0.28	0.39	0.32	-								
8 Core Team Exp	0.34	0.27	0.37	0.70	0.60	0.23	0.08	0.49	0.22	-							
9 Core Team Exp SD	0.43	0.34	0.39	0.69	0.68	0.21	0.16	0.47	0.25	0.88	-						
10 NC Team Exp	0.33	0.20	0.53	0.86	0.78	0.22	0.18	0.26	0.55	0.28	0.32	-					
11 NC Team Exp SD	0.46	0.32	0.53	0.77	0.88	0.20	0.24	0.28	0.54	0.26	0.31	0.87	-				
12 Core Job Skill	13.68	2.08	0.17	0.20	0.15	0.54	0.08	0.27	0.06	0.36	0.29	0.01	0.01	-			
13 NC Job Skill	13.69	1.84	0.29	0.22	0.21	0.81	0.27	0.15	0.30	0.05	0.06	0.28	0.24	-0.02	-		
14 Core Salary	0.35	0.12	0.01	0.03	0.00	0.03	0.04	0.21	-0.14	0.13	0.17	-0.05	-0.10	0.16	-0.08	-	
15 Winning Percentage	0.50	0.16	0.48	0.42	0.37	0.39	0.35	0.29	0.46	0.26	0.27	0.37	0.34	0.18	0.34	-0.06	-

$N = 816$; Correlations with an absolute value greater than or equal to 0.10 are significant at $p < .001$; those with an absolute value greater than or equal to 0.09 are significant at $p < .01$; those with an absolute value greater than or equal to 0.08 are significant at $p < .05$.

Table 2

Model Comparisons for Team Experience and Skill

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.498***	0.503***	0.302***	0.402***	-0.038	-0.024
Conference		-0.009	-0.019	-0.011	-0.005	-0.013
Career experience			0.222***			0.165***
Team Experience SD				-0.016		-0.072*
Team experience				0.344***		0.190***
Job-related skill					0.040***	0.026***
Variance, team level	0.160	0.159	0.079	0.063	0.117	0.058
Variance, season level	0.840	0.841	0.684	0.765	0.738	0.635
-2 log likelihood	-788.2	-782.7	-956.5***	-870.3***	-884.6***	-1006.0***
% variance explained	0	0	0.237	0.172	0.145	0.307

N = 816 at the season level, 30 at the team level. † p < .10, * p < .05, ** p < .01, *** p < .001.

Table 3

Model Comparisons for Core and Non-Core Relationships: (Core = Point Guard and Small Forward)

Variable	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Intercept	0.315***	0.407***	-0.027	-0.017	0.307***	0.333***
Conference	-0.023	-0.012	-0.005	-0.016	-0.010	-0.011
Career experience (C)	0.057***			0.030*		
Career experience (NC)	0.153***			0.118***		
Team experience SD (C)		0.030		0.021		
Team experience SD (NC)		0.013		-0.023		
Team experience (C)		0.052		-0.001		
Team experience (NC)		0.189***		0.090†		
Job skill (C)			0.015***	0.010***		
Job skill (NC)			0.024***	0.016***		
Total Resource Allocation					0.020***	0.020***
Core Resource Allocation						0.078†
Variance, team level	0.074	0.065	0.117	0.054	0.140	0.137
Variance, season level	0.692	0.774	0.741	0.649	0.740	0.738
-2 log likelihood	-942.0	-850.2	-871.6	-963.3	-877.3	-876.2
% variance explained	0.234	0.161	0.142	0.297	0.120	0.125

N = 816 at the season level, 30 at the team level. † p < .10, * p < .05, ** p < .01, *** p < .001.

Table 4

Model Comparisons for Core and Non-Core Relationships: (Core = Starters)

Variable	Model 13	Model 14	Model 15	Model 16	Model 17	Model 18
Intercept	0.305***	0.398***	-0.142**	-0.115*	0.307***	0.112***
Conference	-0.020	-0.010	0.003	-0.007	-0.010	-0.010
Career experience (C)	0.088***			0.042***		
Career experience (NC)	0.124***			0.095***		
Team experience SD (C)		-0.032		-0.043*		
Team experience SD (NC)		-0.033		-0.088*		
Team experience (C)		0.171***		0.077***		
Team experience (NC)		0.183*		0.191*		
Job skill (C)			0.034***	0.025***		
Job skill (NC)			0.007*	0.004†		
Total Resource Allocation					0.020***	0.020***
Core Resource Allocation						0.358***
Variance, team level	0.082	0.061	0.101	0.051	0.140	0.113
Variance, season level	0.689	0.759	0.649	0.585	0.740	0.656
-2 log likelihood	-944.2	-867.3	-979.7	-1047.0	-877.3	-974.1
% variance explained	0.229	0.180	0.249	0.364	0.120	0.232

Table 5

Model Comparisons for Game-Level Outcomes, Focal Team is Better than Opponent (Core = Starters)

Variable	Model 13	Model 14	Model 15	Model 16	Model 17
Intercept	0.603***	0.583***	-0.339	-0.447	-1.076*
Team Experience (C)	0.029*			0.008	0.009
Team Experience (NC)	-0.023†			-0.029*	-0.028*
Career Experience (C)		0.010†		-0.003	-0.001
Career Experience (NC)		0.000		0.002	0.002
Job Skill (C)			0.014***	0.015***	0.014*
Job Skill (NC)			0.003	0.005	0.006
Usage (C)					0.024*
Usage (NC)					0.008
Variance, team level	0.016	0.015	0.007	0.007	0.009
Variance, season level	0.979	0.984	0.977	0.976	0.972
-2 log likelihood	1433.7	1443.5	1431.2	1457.2	1468.0
% variance explained	0.006	0.001	0.016	0.017	0.020

Table 6

Model Comparisons for Game-Level Outcomes, Focal Team is Worse than Opponent (Core = Starters)

Variable	Model 18	Model 19	Model 20	Model 21	Model 22
Intercept	0.262***	0.305***	-0.642	-0.473	-0.686
Team Experience (C)	0.024†			0.016	0.014
Team Experience (NC)	0.029			0.019	0.019
Career Experience (C)		0.001		-0.009	-0.008
Career Experience (NC)		0.008		0.007	0.006
Job Skill (C)			0.014**	0.013*	0.011*
Job Skill (NC)			0.004	0.001	0.003
Usage (C)					0.015
Usage (NC)					-0.007
Variance, team level	0.038	0.034	0.021	0.017	0.017
Variance, game level	0.957	0.959	0.960	0.959	0.954
-2 log likelihood	1421.08	1428.25	1424.51	1447.48	1456.43
% variance explained	0.001	0.007	0.019	0.024	0.029