Prior research evidence shows that within-team interdependence moderates the process-performance relationship in small groups. Data collected from 94 top management teams (TMTs) replicated and extended the small groups finding. Specifically, TMTs with high interdependence (i.e., real teams) had higher team and subsequent firm performance when the team was more cohesive and had more communication. However, teams with low interdependence (i.e., working groups) had higher performance when communication and cohesion were lower. This constructive replication provides the first examination of the moderating effect for team interdependence within TMTs on both team and firm performance.

Top management teams (TMTs) have long been studied as an important determinant of corporate success (Certo, Lester, Dalton, & Dalton, 2006; Cohen & Bailey, 1997; Hambrick & Mason, 1984). Yet research documenting the impact of TMT processes on organizational performance has been slow to accumulate (Carpenter, Geletkanycz, & Sanders 2004; Kozlowski & Bell, 2003; Lawrence, 1997). In fact, a current article sums up the state of TMT process research by stating that “researchers have not gained a good understanding of the nature of TMT process” (Simsek, Veiga, Lubatkin, & Dino, 2005: 69). Why? The challenge of gaining access to these teams and past claims that the direct assessment of TMT processes is unnecessary (Pfeffer, 1983) both contribute to the problem; however, a recent review also noted that “one troubling aspect of [TMT research]...is its relative independence of the broader work teams literature” (Kozlowski & Bell, 2003: 336). Thus, the lack of integration of established findings from small groups research into new TMT research is another reason why researchers have not gained a good understanding of TMT processes.

One of the most important topics in current small groups research is that of within-team interdependence. Meta-analytic results suggest that interdependence moderates the process and performance relationship in small groups (Beal, Cohen, Burke, & McLendon, 2003; Gully, Devine, & Whitney, 1995; Gully, Incalcattera, Joshi, & Beaubien, 2002), leading Kozlowski and Bell (2003) to conclude that research that fails to address interdependence has limited value for building knowledge about team effectiveness. Thus, in small groups research within-team interdependence is understood to be a defining characteristic of teams and an important contingency condition (Kozlowski & Bell, 2003; Ilgen, Hollenbeck, Johnson, & Jundt, 2005).

However, existing research on interdependence has been limited primarily to cross-sectional studies of short-term project teams (Beal et al., 2003; Gully et al., 2002). This has left important gaps in scholars’ understanding of potential boundary conditions for the contingency finding. First, no sample to date has examined within-team interdependence as a moderator of the process and performance relationship in TMTs. It is critical to examine whether a contingency model of team interdependence applies specifically to TMTs and their outcomes, because relationships among team constructs often differ in different types of teams (Cohen & Bailey, 1997; Zaccaro & Marks, 1999). For example, TMTs are unique in their composition of high-status, highly paid executives with a clearly defined leader, a CEO. Furthermore, TMTs are perceived as having chief responsibility for their organizations and multiple stakeholders, making
them an important influence on organizational level outcomes. Given these differences between TMTs and the teams traditionally assessed in small groups research, there is a need to constructively replicate the contingency finding of team interdependence in TMTs.

Second, the vast majority of the small groups data showing interdependence as a moderator variable is cross-sectional (Beal et al., 2003; Gully et al., 1995, 2002). Finding that these results exist with a lagged measure of performance would further underscore the strength of the contingency relationship. Third, studies in the small groups literature have only focused on team performance as a reflection of team effectiveness. Yet, given their central role in organizations and their influence on organizational strategy, TMTs are expected to have a disproportionate impact on organizational success (Hambrick & Mason, 1984). Thus, although upper echelons research has focused on firm performance measures, the small groups literature has not done so, even though there is often an implicit assumption that the broad adoption of work teams positively affects firm performance. Consequently, this study captured measures of team performance and the ultimate criterion, organizational performance.

The construct of behavioral integration (Hambrick, 1994; Simsek et al., 2005) represents the best attempt to understand TMT process to date. It is a “meta-construct” for describing various elements of group process and is defined as the degree to which a group engages in mutual and collective interaction. Hambrick’s concept of behavioral integration includes information exchange, collaborative behavior, and joint decision making. However, behavioral integration also appears to incorporate elements of interdependence. Given that interdependence has been shown to moderate the process and performance relationship in small groups and is a defining characteristic of teams (Kozlowski & Bell, 2003), we argue that distinguishing between team interdependence and team processes is vital to understanding how TMT functioning relates to team and organizational outcomes.

Thus, the purpose of this study was to conduct a constructive replication of the finding that team interdependence moderates the process and performance relationship in small groups, using both ratings of team performance and a lagged objective measure of firm performance in the previously unstudied context of TMTs. A constructive replication is research that tests the same relationships among the same constructs as an earlier study but varies the operationalization of those constructs. Eden (2002) argued persuasively that replications that are different from previous studies are needed to advance theory. Our study is dissimilar from others in that it tests team interdependence as a moderator in the context of TMTs with a lagged objective measure of organizational performance, in addition to team performance. Because no studies have empirically examined the impact of within-TMT interdependence on organizational performance, this study not only contributes to small groups research on team interdependence but also advances understanding of the impact of within-TMT processes.

THEORETICAL BACKGROUND AND HYPOTHESES MODEL

Team Mechanisms

In the traditional inputs-process-outputs (IPO) framework for teams (Hackman, 1987; McGrath, 1964; Steiner, 1972), processes are the linking variables between inputs and outcomes (e.g., Pelled, Eisenhardt, & Xin, 1999). Recent research has broadened the process domain to also include emergent states that dynamically represent how a team is doing and vary over time with team inputs, processes, outcomes, and context (Ilgen et al., 2005; Marks, Mathieu, & Zaccaro, 2001). Emergent states describe cognitive, motivational, and affective states of teams, as opposed to team member interaction. In this study, we examine the relationships of both a conceptually pure team process (communication) and an emergent state (cohesion) with team and organizational performance. We refer to these jointly as team mechanisms to reflect the broadened IPO model (Ilgen et al., 2005).

Within-team processes describe the nature of interactions among team members (Marks et al., 2001; McGrath, 1984). Communication is a key team process, as it clarifies “how” a team interpersonally orchestrates its work to get things done and perform effectively. Communication is particularly important to executives who coordinate and cooperate with other TMT members to achieve collective goals. Hyatt and Ruddy (1997) and Campion, Papper, and Medsker (1996) found within-team communication was related to effective team performance.

Cohesion is an affective, psychological state that reflects the shared commitment, attraction, and team pride that emerges from the experiences and interactions among team members. Cohesion is an important indicator of the bond among team members, which influences the execution of subsequent teamwork processes and outcomes (Beal et al., 2003; Gully et al., 1995). Marks and colleagues (2001) specifically referred to cohesion as an emer-
gent state because it is dynamic and varies as a function of previous team inputs, processes, context, and outcomes. Recent meta-analyses (Beal et al., 2003; Gully et al., 1995; Mullen & Copper, 1994) provide compelling evidence that team cohesion is significantly related to measures of team performance. However, Gully et al. (1995) and Beal et al. (2003) found that interdependence could change the magnitude of this relationship.

We examined the impact of communication and cohesion on team and organizational performance for three reasons: (1) communication and cohesion capture key aspects of interpersonal mechanisms, thereby reflecting the importance of the larger social component to teams; (2) communication is a relatively pure measure of team member process, but cohesion is an emergent state; and (3) communication captures behavioral contributions to a team, but cohesion represents the affective or motivational states of team members.

Despite considerable evidence indicating that both communication and cohesion are important antecedents to team performance (Beal et al., 2003; Campion et al., 1996; Hyatt & Ruddy, 1997), results regarding the effects of these TMT processes on firm performance have been mixed. For example, Smith, Smith, Olian, Sims, O'Bannon, and Scully (1994) found that communication and cohesion (labeled “social integration”) improved firm performance, but Glick, Miller, and Huber (1993) did not. These conflicting results suggest the presence of moderator variables. Thus, we do not propose original hypotheses about direct relationships between team mechanisms and team or organizational performance. Instead, for the first time, we explore the critical question of whether within-team interdependence moderates the relationship between TMT mechanisms and both team and firm performance.

**Team Interdependence**

We argue that the mixed results regarding TMT processes and firm performance are due, in part, to researchers’ not considering within-team interdependence. Interdependence is defined as the extent to which contextual features outside an individual and his or her behavior (i.e., tasks and outcomes) define a relationship between entities as collective, so that one entity should affect and be affected by the other (Campion et al., 1993; Stewart & Barrick, 2000; Wageman, 2001). Interdependence among members is an important characteristic of teams (Campion et al., 1993; Kozlowski & Bell, 2003; Stewart, 2006) because it determines the degree to which members need to rely on one another to complete projects and fulfill member needs. A team with high interdependence is often referred to as a “real team,” whereas teams with low interdependence are more commonly labeled “working groups” (Katzenbach & Smith, 1993).

Essentially, there are two different conceptions of team interdependence: (1) structural and (2) psychological (Thompson, 1967; Wageman, 1995). In the structural conception, the level of interdependence among a team’s members differs according to the nature of the team’s task or technological requirements (e.g., Thompson, 1967). In the psychological conception, interdependence begins with the task requirements of work, but it extends to the social demand to work together to achieve collective outcomes such as goals and rewards (McGrath, Arrow, & Berdahl, 2000; Wageman, 1995). Although some previous research has examined the differential impacts of various types of interdependence (e.g., Wageman, 1995), our study remains consistent with most prior research on interdependence as a moderator, in that we examine the overall impact of a composite measure of team interdependence (Gully et al., 2002).

The more that team members need to coordinate their work to achieve collective tasks, goals, and rewards, the more team performance should be influenced by team communication and cohesion. When team members are highly interdependent, there is greater need to communicate to achieve high performance. Similarly, a shared commitment to, attraction to, and pride in the team (i.e., high cohesion) should have a greater impact on performance as team interdependence increases (Beal et al., 2003). Members of a highly cohesive team will be motivated to work to achieve the shared goals that characterize interdependent teams because of their commitment to the team. Conversely, because teams with low levels of interdependence require less coordination among members, communication and cohesion should be less important for effective functioning. This view underscores the importance of the fit between team mechanisms and the level of team interdependence. In a meta-analysis of 46 studies, Gully and colleagues (1995) found that cohesion had a stronger impact on team performance when tasks were highly interdependent ($\rho = .46$) than when they were less interdependent ($\rho = .21$). The fit between team mechanisms and the level of team interdependence will also affect firm performance, since gains in within-team functioning in TMTs should translate into better decision making and enable firms to more effectively achieve their goals, ultimately resulting in higher firm performance. Thus, as shown in Figure 1, our initial model of top management team performance, we hypothesize that team interdependence moderates
the relationships between team mechanisms (communication and cohesion) and team performance and, ultimately, firm performance.

**Hypothesis 1.** Team interdependence moderates the positive relationship between team mechanisms (communication and cohesion) and team performance in such a way that these mechanisms are more strongly, positively related to team performance when interdependence is high rather than low.

**Hypothesis 2.** Team interdependence moderates the positive relationship between team mechanisms (communication and cohesion) and subsequent organizational performance in such a way that these mechanisms are more strongly, positively related to organizational performance when team interdependence is high rather than low.

**METHODS**

**Procedures and Sample**

A nonprofit organization dedicated to conducting research about credit unions identified 117 organizations interested in participating in this research; 96 ultimately provided data. Hence, all respondents in this study were from the credit union industry. CEOs identified members of their TMTs and, approximately four months later, we surveyed CEOs and their TMT members. The actual size of the TMTs ranged from 4 to 14 members, with an average of 6.4 (s.d. = 1.9) members. The size of the firms ranged from 23 employees to 800 employees, with an average of 147 employees in each firm (s.d. = 139.7). We required that at least 3 TMT members respond if we were to retain data for that team. As a result, 2 firms were dropped from the analysis. Thus, our sample consisted of members of the TMTs from 94 different firms. A total of 517 out of a possible 601 team members (an average of 5.5 of the 6.4 members on each team) responded to surveys representing the 94 TMTs, giving us a response rate of 86 percent. The high response rate supported the use of the data at the team level of analysis.

Fifty-four percent of the respondents were male; 11 percent were 26–35 years old; 27 percent, 46–55 years old; and 16 percent, over 55 years old; 93 percent were Caucasian; none of the respondents had less than a high school degree; 4 percent had a high school degree; 26 percent had associate’s degrees or some college coursework; 42 percent had bachelor’s degrees; 9 percent had some graduate coursework beyond a bachelor’s degree; and 19 percent had graduate degrees. The average organizational tenure was 11.5 years, and the average tenure on their TMT was 7.1 years.

**Measures**

All constructs except for organizational performance were measured with multi-item scales based on standard scales from previous research. TMT members rated their team’s cohesion, communica-
tion, and degree of interdependence on a response scale ranging from 1, “strongly disagree,” to 6, “strongly agree.” We averaged ratings to create team-level variables and report reliability estimates (α’s) for both individual- and team-level data. To rule out common method bias as an explanation for relationships with performance, we relied solely on CEO ratings of team performance (also using a six-point scale) and objective financial data for firm performance.

**Team performance.** CEOs completed Kirkman and Rosen’s (1999) six-item measure of team performance. Examples of items are, “This team meets or exceeds its goals” and “This team completes its tasks on time.” The alpha reliability for this measure was .81.

**Subsequent firm performance.** We assessed firm performance the year following survey administration using data provided by the National Credit Union Administration. This federal agency charters and supervises credit unions and uses the following as the four key financial ratios of their performance: net worth to total assets, which assesses the capital adequacy of a firm; delinquent loans to total loans and net charge-offs to average loans, which both assess the asset quality of the firm; and return on average assets (ROA), which assesses the earnings of the firm. Each score was converted to a Z-score, and the final score reflects the mean over these four measures of organizational performance for the year following the TMT surveys. The alpha reliability for this measure was .65.

**Communication.** We assessed communication using the four items from the Lester, Meglino, and Korsgaard (2002) scale that focus on communication rather than coordination. Items were, “Members are willing to share information with other team members about our work,” “Members of this team enjoy talking to each other,” “When members talk to each other, there is a great deal of understanding,” and “Team members are comfortable talking to each other about what needs to be done.” Across TMT members, the reliability of the scale was .92 at the individual level and .97 at the team level, and checks for aggregating team cohesion yielded acceptable values ($F_{93, 506} = 3.44, p < .01; ICC[1] = .31; ICC[2] = .71; r_{wg} = .91$).

**Cohesion.** We combined three underlying facets identified by Beal et al. (2003) to comprehensively assess team cohesion, including measures of social cohesion (Seashore, 1954), group pride (Festinger, 1950), and team commitment (Kirkman & Rosen, 1999). Items included, “Members of this team get along with each other very well,” “I really value being a member of this team,” and “My team members are all committed to our team.” Across all TMT members, the reliability of the 13-item scale was .93 at the individual level and .97 at the team level, and checks for aggregating team cohesion yielded acceptable values ($F_{93, 506} = 3.61, p < .01; ICC[1] = .32; ICC[2] = .72; r_{wg} = .91$).

**Interdependence.** We measured interdependence with 12 items, 9 from Campion et al.’s (1993) scale, and 3 new items added to enhance reliability (the original alphas ranged from .59 to .68). Items focused on the extent to which tasks performed by members were interrelated within a team and whether member goals, rewards, and feedback were related to the team’s objectives and success. Examples included, “I do very few activities that are not related to goals of the senior management team” and “Within my team, work performed by other team members is dependent on another’s work.” The scale reliability was .80 at the individual level and .95 at the team level, and checks for aggregating team interdependence were acceptable ($F_{93, 506} = 2.49, p < .01; ICC[1] = .21; ICC[2] = .60; r_{wg} = .94$).

**Covariates.** Firm size, firm age, and team size have been shown to relate to firm performance, and so we included them as covariates (Carpenter et al., 2004; Cohen & Bailey, 1997; Hambrick, 1994; Michel & Hambrick, 1992). Additional covariates included the demographic composition of a TMT with regard to team tenure, age, education, and sex, all of which have been demonstrated to influence team mechanisms and performance (Smith et al., 1994; Tsui & Gutek, 1999). Racial composition did not vary enough among teams to examine. Survey respondents reported each characteristic with a single item. For team tenure, we considered both the average length of team members’ time on a TMT (Smith et al., 1994) and the variability of team tenure among members (Pelled et al., 1999). We used the standard deviation to assess the variability of tenure and age, rather than the often-used coefficient of variation, which is better suited for ratio data (Bedian & Mossholder, 2000; Harrison & Sin, 2006). Because sex and education are categorical variables, we used Teachman’s (1980) index to assess their variability in the teams (Pelled et al., 1999).

**RESULTS**

**Measurement Evaluation**

To investigate the factor structure of the three team-level variables (communication, cohesion, and interdependence) prior to testing hypotheses, we specified three measurement models using LISREL 8.7 (Jöreskog & Sörbom, 1996) at the TMT level. Both a three-factor measurement model ($\chi^2 =$
332.21, $df = 249$, $p < .01$; NNFI = .94, CFI = .95, IFI = .95, RMSEA = .06) and a two-factor model with communication and cohesion items loading on the same factor ($\chi^2 = 333.56$, $df = 251$, $p < .01$; NNFI = .94, CFI = .95, IFI = .95, RMSEA = .06) provided good fits to the data. However, the fit statistics for the one-factor model did not indicate a good fit to the data ($\chi^2 = 804.32$, $df = 252$, $p < .01$; NNFI = .88, CFI = .89, IFI = .89, RMSEA = .15). Because the difference in chi-squares between the two- and three-factor models was not significant ($\Delta \chi^2 = 1.35$, $df = 2$, $p > .05$) and because the two-factor model, which combined communication and cohesion into one factor (which we call “team mechanisms”), was more parsimonious, we used it in all subsequent analyses. Thus, although communication and cohesion are theoretically distinct, in our sample they empirically load on one factor.

**Descriptive Statistics, Correlations, and Effects of Covariates**

Table 1 presents means, standard deviations, and correlations among the variables and with the covariates. Table 2 reports the results of the regression analyses including only covariates as predictors of team mechanisms, team interdependence, team performance, and firm performance. As shown, the only significant regression model was the one used to predict team mechanisms, where we found differences in age, education, and team tenure significantly related to these mechanisms. In addition, firm size was a significant predictor of team mechanisms and team interdependence. Since the remaining covariates did not alter the results of the regression models, and because our sample was modest in size, the following tables report regression results with only the four significant covariates.

**Hypothesized Relationships with Performance**

To test the hypotheses examining whether team interdependence is an important moderator of the relationships between team mechanisms and outcomes, we used moderated hierarchical regression analysis. In step 1, we entered the significant covariates and in step 2, the main effects of team interdependence and team mechanisms (the average score on communication and cohesion). In step 3, we entered their product term to signify the interaction of interdependence and team mechanisms. To test an interaction, we examine the change in variance explained ($\Delta R^2$) yielded in step 3. Table 3 reports the results from a series of hierarchical models. When a model was predicting team performance, the interaction effect was significant for team mechanisms and interdependence ($\Delta R^2 = .10$, $p < .01$), supporting Hypothesis 1. Similarly, when a model predicted subsequent firm performance, team mechanisms interacted with interdependence ($\Delta R^2 = .07$, $p < .05$), supporting Hypothesis 2. However, it should be noted that the main effects from the team mechanisms were not

**TABLE 1**

<table>
<thead>
<tr>
<th>Variables²</th>
<th>Mean</th>
<th>s.d.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Team interdependence</td>
<td>4.28</td>
<td>0.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Communication</td>
<td>4.65</td>
<td>0.60</td>
<td>.38**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Cohesion</td>
<td>4.64</td>
<td>0.61</td>
<td>.34**</td>
<td>.89**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Team mechanisms</td>
<td>4.64</td>
<td>0.60</td>
<td>.37**</td>
<td>.97**</td>
<td>.99**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Team performance</td>
<td>4.06</td>
<td>0.51</td>
<td>.17</td>
<td>.24*</td>
<td>.27**</td>
<td>.27**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Firm performance</td>
<td>0.00</td>
<td>0.69</td>
<td>−0.01</td>
<td>.01</td>
<td>.08</td>
<td>.04</td>
<td>.15</td>
<td></td>
</tr>
<tr>
<td>Firm size</td>
<td>147.30</td>
<td>139.00</td>
<td>.24*</td>
<td>.07</td>
<td>.11</td>
<td>.10</td>
<td>.09</td>
<td>.15</td>
</tr>
<tr>
<td>Firm age</td>
<td>51.97</td>
<td>18.20</td>
<td>−0.16</td>
<td>−0.03</td>
<td>.01</td>
<td>−0.01</td>
<td>−0.17</td>
<td>−0.04</td>
</tr>
<tr>
<td>Team size</td>
<td>6.39</td>
<td>1.91</td>
<td>.05</td>
<td>.04</td>
<td>.03</td>
<td>.03</td>
<td>.05</td>
<td>−0.07</td>
</tr>
<tr>
<td>Mean age</td>
<td>46.40</td>
<td>5.25</td>
<td>−0.02</td>
<td>−0.09</td>
<td>−0.05</td>
<td>−0.05</td>
<td>−0.05</td>
<td>.14</td>
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<tr>
<td>Age diversity</td>
<td>7.57</td>
<td>3.04</td>
<td>−0.04</td>
<td>.18*</td>
<td>.15</td>
<td>.16</td>
<td>.09</td>
<td>−0.11</td>
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<tr>
<td>Sex diversity</td>
<td>0.76</td>
<td>0.19</td>
<td>−0.04</td>
<td>.03</td>
<td>.02</td>
<td>.02</td>
<td>−0.09</td>
<td>−0.11</td>
</tr>
<tr>
<td>Education diversity</td>
<td>0.77</td>
<td>0.30</td>
<td>.23*</td>
<td>.23*</td>
<td>.29**</td>
<td>.27**</td>
<td>.28**</td>
<td>.23*</td>
</tr>
<tr>
<td>Mean team tenure</td>
<td>8.91</td>
<td>3.75</td>
<td>−0.01</td>
<td>−0.02</td>
<td>.04</td>
<td>.04</td>
<td>−0.01</td>
<td>.25*</td>
</tr>
<tr>
<td>Team tenure diversity</td>
<td>6.80</td>
<td>3.23</td>
<td>−0.16</td>
<td>−0.07</td>
<td>−0.07</td>
<td>−0.07</td>
<td>.03</td>
<td>0.12</td>
</tr>
</tbody>
</table>

* $n = 94$ (top management teams). Correlations below the gap are between the covariates and the team variables numbered 1–6.

¹ $p < .10$

² Age and team tenure diversity were calculated using standard deviations. Sex and education diversity used Teachman’s index.

³ $p < .05$

⁴ $p < .01$
significantly related to either team performance or firm performance in step 2. Yet, as shown in Table 1, team mechanisms were significantly correlated with team performance \((r = .27)\). These mixed results provide only limited support for the widely held notion that team processes and emergent states directly relate to team performance, and they suggest that a more complicated relationship is occurring.

Figure 2 shows the plot of the significant interaction (Aiken & West, 1991) between team interdependence and team mechanisms that occurs when we are predicting team performance, and Figure 3 shows the plot when we are predicting subsequent firm performance. Both graphs are plotted at the mean and one standard deviation above or below the mean (Cohen & Cohen, 1984). As Figures 2 and 3 show, team mechanisms were positively related to both team and firm performance for teams that were high in interdependence, and the mechanisms were negatively related to both team and firm performance for those low in interdependence. The most effective TMTs are those that match high interdependence with a high level of

<table>
<thead>
<tr>
<th>Variables</th>
<th>Team Mechanisms</th>
<th>Team Interdependence</th>
<th>Team Performance</th>
<th>Firm Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm size</td>
<td>.01 (.00)*</td>
<td>.01 (.00)*</td>
<td>.00 (.00)</td>
<td>.00 (.00)</td>
</tr>
<tr>
<td>Firm age</td>
<td>.01 (.00)</td>
<td>.00 (.00)</td>
<td>.00 (.00)</td>
<td>.00 (.00)</td>
</tr>
<tr>
<td>Team size</td>
<td>−.02 (.03)</td>
<td>.00 (.02)</td>
<td>.00 (.03)</td>
<td>−.02 (.04)</td>
</tr>
<tr>
<td>Mean age</td>
<td>−.03 (.01)*</td>
<td>−.01 (.01)</td>
<td>−.02 (.01)</td>
<td>.00 (.02)</td>
</tr>
<tr>
<td>Age diversity</td>
<td>.06 (.02)**</td>
<td>−.01 (.02)</td>
<td>.02 (.02)</td>
<td>−.02 (.03)</td>
</tr>
<tr>
<td>Sex diversity</td>
<td>.30 (.45)</td>
<td>−.17 (.30)</td>
<td>−.23 (.41)</td>
<td>.88 (.55)</td>
</tr>
<tr>
<td>Education diversity</td>
<td>.51 (.21)**</td>
<td>.32 (.14)*</td>
<td>.31 (.19)</td>
<td>.15 (.26)</td>
</tr>
<tr>
<td>Mean team tenure</td>
<td>.04 (.02)*</td>
<td>.01 (.02)</td>
<td>.01 (.02)</td>
<td>.05 (.03)*</td>
</tr>
<tr>
<td>Team tenure diversity</td>
<td>−.06 (.03)*</td>
<td>−.03 (.02)</td>
<td>.00 (.02)</td>
<td>−.01 (.03)</td>
</tr>
<tr>
<td>(F)</td>
<td>2.45*</td>
<td>1.96</td>
<td>0.94</td>
<td>1.30</td>
</tr>
<tr>
<td>(R^2)</td>
<td>0.22*</td>
<td>0.18</td>
<td>0.10</td>
<td>0.13</td>
</tr>
</tbody>
</table>

\(n = 94\) (top management teams). Values in parentheses are standard errors. Variance estimates use standard deviations for age and team tenure and Teachman’s index for sex and education.

\(p < .10\)

\(p < .05\)

\(p < .01\)

TABLE 3
Moderated Regression Analysis Results: Team Interdependence as a Moderator

<table>
<thead>
<tr>
<th>Variables</th>
<th>Team Performance</th>
<th>Firm Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Step 1</td>
<td>Step 2</td>
</tr>
<tr>
<td>Firm size</td>
<td>0.00 (0.00)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>Age diversity</td>
<td>0.02 (0.02)</td>
<td>0.02 (0.02)</td>
</tr>
<tr>
<td>Education diversity</td>
<td>−0.15 (0.41)*</td>
<td>−0.20 (0.41)</td>
</tr>
<tr>
<td>Team tenure diversity</td>
<td>0.00 (0.02)</td>
<td>0.00 (0.02)</td>
</tr>
<tr>
<td>Team interdependence</td>
<td>0.12 (0.16)</td>
<td>−2.94 (0.99)**</td>
</tr>
<tr>
<td>Team mechanisms</td>
<td>0.16 (0.10)</td>
<td>−2.68 (0.91)**</td>
</tr>
<tr>
<td>Interaction: Interdependence (\times) team mechanisms</td>
<td>0.67 (0.21)**</td>
<td></td>
</tr>
<tr>
<td>(F)</td>
<td>0.73</td>
<td>1.50</td>
</tr>
<tr>
<td>(R^2)</td>
<td>.03</td>
<td>.09</td>
</tr>
<tr>
<td>(F) for model change</td>
<td>2.40*</td>
<td>9.89**</td>
</tr>
<tr>
<td>(\Delta R^2)</td>
<td>.05*</td>
<td>.10*</td>
</tr>
</tbody>
</table>

\(n = 94\) (top management teams). Values in parentheses are standard errors. Variance estimates use standard deviations for age and team tenure and Teachman’s index for education.

\(p < .10\)

\(p < .05\)

\(p < .01\)
team mechanisms, or alternatively, match low interdependence with a low level of team mechanisms. The least successful teams were those reporting a “mismatch” between interdependence and team mechanisms.

However, inspection of the two figures also indicates that the benefit of matching a low level of team mechanisms with low interdependence differs for team and organizational performance. Specifically, firm performance for working groups with low levels of team mechanisms is nearly as high as it is for real teams with high levels of team mechanisms. However, team performance for working groups scoring low for team mechanisms is only marginally higher than for both mismatched groups—those scoring low on interdependence and high on mechanisms or high on interdependence and low on mechanisms. In addition, the cost of a mismatch is greatest for real teams with low levels of team mechanisms when firm performance is being predicted. These results suggest that the benefits and costs of matching the type of team (real team or working group) with team mechanisms differ slightly depending on the outcome, underscor-
ing the value of considering both performance measures.

**DISCUSSION**

Small groups research shows that within-team interdependence moderates the relationship between team mechanisms and performance (Beal et al., 2003; Gully et al., 1995; 2002; Kozlowski & Bell, 2003), yet research on TMTs has not differentiated and independently examined interdependence and TMT mechanisms. Using a combination of survey data collected from members of TMTs, CEO ratings of team performance, and subsequent objective organizational performance data, this study provides convincing evidence that TMT interdependence moderates the relationship of team mechanisms—that is, communication and cohesion—with the performance of a TMT and an organization.

This constructive replication is similar to past research in the small groups literature showing that team interdependence moderates the process and
performance relationship in small groups. We used a comprehensive operationalization of team interdependence, two common measures of team mechanisms, and a rating of team performance. In addition, the replication is distinct from this past research because it used the previously unstudied context of TMTs and incorporated a lagged objective measure of firm performance in addition to the rating of team performance. Thus, because no studies have empirically examined the moderating impact of within-TMT interdependence on organizational performance, this study not only contributes to small groups research on team interdependence but also advances understanding of the impact of within-TMT processes.

Theoretical Implications

First, existing research on team interdependence from the small groups perspective has, to date, not used TMTs, which have a unique position and status in organizations (Cohen & Bailey, 1997; Hambrick, 1994). In addition, the literature has been limited primarily to cross-sectional research on short-term project teams (Beal et al., 2003; Gully et al., 1995, 2002) using only measures of team performance. The literature is strengthened because this constructive replication shows the relationship extends beyond these boundary conditions.

Second, our results advance understanding of the influence of team interdependence on TMT success. There is a widely held belief that TMT members must extensively rely on each other (i.e., act interdependently) to achieve optimal performance. A sample of CEOs, for example, reported the number one obstacle to TMT effectiveness was within-team fragmentation (Hambrick, 1995). Katzenbach and Smith (1993) also identified not being a “real team” as a clear limiter of success. Contradicting the opinions expressed by the sample of CEOs and Katzenbach and Smith (1993), our results reveal that increased levels of interaction among TMT members are not always beneficial to team or firm performance. Future research should adopt a contingency perspective, matching a team’s mechanisms (team processes and emergent states) with the demands of the team’s situation (the level of interdependence among the TMT members). Some TMTs will be very successful even when their members work independently of each other (have very low interdependence).

Third, our results offer some insight into the role that demographic composition plays in TMTs. Although extensive research has been conducted on the effects of TMT demographic composition on organizations, the results may be viewed as generally weak or inconsistent (Certo et al., 2004; Certo et al., 2006; Webber & Donahue, 2001; West & Schwenk, 1996). Our research suggests that demographic composition has a greater impact on team mechanisms than it has on team or firm performance (O’Reilly, Snyder, & Boothe, 1993) and that the impact of these mechanisms on performance depends on the level of team interdependence. Thus, it may be only in highly interdependent TMTs that demographic effects are likely to strongly impact performance.

Fourth, turning to an examination of the outcomes, our results powerfully demonstrate the important role TMT functioning has in influencing not just team performance, but also the success of an organization. The studied teams consisted of just 6.4 of the nearly 150 employees in these organizations on average, yet the results show how dramatically the organizations’ success varied with the functioning of these small yet dominant coalitions of top managers. When designing this study, we expected that measures of team interdependence and team mechanisms would relate more strongly to team performance than to organizational performance for two reasons. First, more potential influences on organizational performance are outside the control of a TMT than is true for team performance (a firm’s board of directors and its industry are examples of influences on organizational performance that a TMT does not control) (Beal et al., 2003). Second, organizational performance is not as closely tied to team mechanisms as team performance. The comparability of the results found for these two conceptually different outcomes supports the upper echelons argument that the effects stemming from a TMT are often as large for organizational performance as for team performance (Carpenter et al., 2004). Such findings persuasively reveal the value of aligning team mechanisms and within-team interdependence in TMTs.

Finally, our results contribute to upper echelons research by using both survey data and archival data to show that within-team interdependence moderates the process and performance relationship and thus should be evaluated separately from TMT mechanisms (processes and emergent states). These findings have important implications for the construct of behavioral integration proposed as a meta-construct of TMT process (Hambrick, 1994; Simsek et al., 2005). The contingency findings show that team interdependence and team mechanisms should be treated separately. Therefore, this study cautions against the use of behavioral integration as a meta-construct for the whole of TMT dynamics if it doesn’t separate within-team inter-
dependence from team processes and emergent states.

Managerial Implications

Our results also have practical implications for TMTs. The performance of a TMT is thought to be essential to a company’s survival and growth, yet very little research has clarified how a firm should design and utilize its TMT. The results indicate that practitioners need to align a team’s social psychology variables with the demands of the situation. If there is little need for TMT members to work together in view of the nature of the members’ tasks, goals, and rewards, then little communication or cohesion is necessary for team and firm to be successful. However, if a situation demands that TMT members rely on each other to accomplish their work, then the route to high performance appears to be through high levels of team mechanisms (i.e., communication and/or cohesion).

In addition, our results demonstrate the importance of a realistic appraisal of the level of interdependence among team members before resources are put into team-building efforts intended to increase cohesion and communication. In our study, the most effective TMTs were real teams (i.e., highly interdependent ones) who devoted more effort to team mechanisms. However, nearly as effective, in terms of organizational performance, were those teams with low interdependence (i.e., working groups) who spent little time on team mechanisms. If organizations strive to turn their TMTs into real teams (Hambrick, 1995; Katzenbach & Smith, 1993), they may waste a tremendous amount of time and money because, in actuality, many TMTs function well as working groups. Finally, managers should consider such antecedents to team interdependence as leadership style, as well as firm and industry characteristics, when considering the match between team interdependence and team mechanisms.

Limitations and Future Research

This study has the strength of employing both psychological and archival measures of 94 TMTs’ mechanisms, interdependence, and performance. However, it also has limitations. First, all of the team constructs relied on member perceptions; hence, no objective measures of team interdependence or mechanisms were available. However, research shows that a subjective assessment of interdependence or team mechanisms can effectively measure the extent to which team members should or do interact and rely on each other (Wageman, 2001; Ilgen et al., 2005; Wageman, 2001), and our interrater agreement indexes (ICCs and \(r_{wr} \)) supported aggregation. Second, despite coming from different sources (CEO and team), the team-level data are cross-sectional, which precludes making causal inferences. Nonetheless, consistent results were found with firm performance assessed a year after the TMT surveys were collected. Third, our relatively small sample of 94 TMTs limits statistical power and precludes the examination of more complex causal models. This sample size limitation underscores the inherent difficulty of studying teams, especially exclusive ones like TMTs. Fourth, data are drawn from a single industry, which limits alternative explanations for performance differences, but also may limit the generalizability of our findings. Finally, we did not control for prior organizational performance in this study, because TMT composition was quite stable (mean team member tenure was 8.9 years, and mean CEO team tenure was 16.2 years). Given this stability, the TMTs’ gains from better within-team functioning affected prior performance as well as subsequent firm performance. Controlling for past performance would have extracted relevant variance from subsequent firm performance that was due to the common influence of the degree of fit between the mediating team processes and team interdependence (i.e., within-TMT functioning). Thus, we cannot rule out a reverse causal direction between performance and TMT processes.

Future research should pursue at least three avenues. First, it should explore the distinctions between team processes and emergent states over time (Marks et al., 2001). Emergent states are likely to continue to evolve and change, because of reciprocal effects from team inputs, processes, context, and outcomes, and the lack of elapsed time between these measures in our study may have contributed to the lack of empirical distinction in our data. Thus, longitudinal analyses may allow future research to examine the distinct effects of team processes and emergent states. Second, TMT researchers could adapt the construct of behavioral integration to account for the critical distinction between team processes, emergent states, and interdependence. For example, behavioral integration could be modified to only include processes, and emergent states and interdependence could be measured separately. Finally, because interdependence is a critical contingency construct in team research, scholars should explore the factors that affect the level of interdependence in TMTs, such as leadership style, team and firm size, firm strategy, and industry characteristics. These findings may also have important practical implications.
CEO leadership style, for instance, may be one significant factor in determining the degree to which team members need to rely on each other because the managerial discretion of CEOs (Finkelstein & Hambrick, 1990) may influence the level of interdependence among TMT members. For example, TMTs led by a transformational CEO (Bass, 1985) may be highly interdependent, relying on each other for the resources and support necessary to achieve the goals to which they are collectively committed. In addition, team and firm size likely impact the level of within-TMT interdependence. Also, Michel and Hambrick (1992) argued that a firm’s diversification posture affected the degree of interdependence among business units. Therefore, whether firm strategy also affects within-TMT interdependence is an important question to answer.

Conclusion

Our results reveal that organizations don’t always need a “real team at the top” to improve organizational performance. Instead, reliance on high levels of team mechanisms, such as communication and cohesion among members, appears to impede organizational performance in settings where the TMT should function as a working group. In contrast, effective real teams not only structure their tasks and rewards in a way that encourages them to work as one, but also spend considerable time talking to each other and building a cohesive team spirit. These results have important implications for both real teams and working groups, as successful TMTs must “match” their design (i.e., high or low interdependence) with the team’s processes and the attitudinal states that emerge among its members.

Our intent in conducting this study was not to test a new theory. Instead, we examined whether the same hypothesized relationship found in prior studies of small groups would be confirmed in a different type of team than previously studied—specifically, TMTs. Our findings constructively replicate the importance of within-team interdependence as a moderator of the link between team mechanisms and performance. Our findings also support the notion that TMT functioning impacts organizational success, not just team performance, underscoring the critical need to better understand internal TMT dynamics. This study demonstrates that there is considerable value in drawing on small groups research to understand how TMTs function internally, as the contingent nature of this relationship makes a significant difference to organization success.

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Murray R. Barrick (mbarrick@mays.tamu.edu) is the Paul M. and Rosalie Robertson Chair in Business at the Mays Business School, Texas A&M University. He earned his Ph.D. in industrial/organizational psychology from the University of Akron. His research interests include assessing the impact individual differences in behavior and personality have on job and team performance and on methods of measuring and predicting such differences.

Bret H. Bradley (bret-bradley@uiowa.edu) is a doctoral candidate in organizational behavior at the Henry B. Tippie College of Business, University of Iowa. He holds a master’s degree in accounting from Brigham Young University. His research interests include team composition and dynamics, ethics and misbehavior, and the positive and negative effects of leadership.

Amy L. Kristof-Brown (amy-kristof-brown@uiowa.edu) is the Weissman/Sinicropi Research Fellow at the Henry B. Tippie College of Business, University of Iowa. She earned her Ph.D. in organizational behavior and human resource management from the University of Maryland. Her research interests include assessing the factors that contribute to individuals’ fit in jobs, teams, organizations, and expatriate assignments.

Amy E. Colbert (acolbert@nd.edu) is an assistant professor in the Department of Management at the University of Notre Dame. She received her Ph.D. in organizational behavior and human resource management from the University of Iowa. Her research interests include leadership, individual differences, and the connections that employees form with their work, their coworkers, and their organizations.