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A Meta-Analysis of Team-Efficacy, Potency, and Performance: Interdependence and Level of Analysis as Moderators of Observed Relationships

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Meta-analytic techniques were used to examine level of analysis and interdependence as moderators of observed relationships between task-specific team-efficacy, generalized potency, and performance. Sixty-seven empirical studies yielding 256 effect sizes were identified and meta-analyzed. Results demonstrated that relationships are moderated by level of analysis. Effect sizes were stronger at the team level ($\rho = .39$) than at the individual level ($\rho = .20$). At the team level, both team-efficacy and potency had positive relationships with performance (ρs = .41 and .37, respectively). Interdependence significantly moderated the relationship between team-efficacy and performance, but not between potency and performance. The relationship between team-efficacy and performance was stronger when interdependence was high ($\rho = .45$) than when it was low ($\rho = .34$).

The focus of how work is performed in organizations increasingly has shifted from individuals to teams (Devine, Clayton, Philips, Dunford, & Melner, 1999; Guzzo & Shea, 1992; Hackman, 1992; Sundstrom, De Meuse, & Futrell, 1990). Top management teams regularly make strategic decisions that influence the long-term viability of organizations (Amason, 1996; Korsgaard, Schweiger, & Sapienza, 1995), and the criticality of team functioning has been highlighted by instances in which breakdowns in team processes have led to disastrous consequences such as airline accidents (Foushee, 1984). Similarly, positive team functioning has been linked to increased team effectiveness for a variety of teams (Guzzo & Dickson, 1996), including road crews (Tesluk & Mathieu, 1999). Such outcomes have motivated researchers to develop a better understanding of determinants of team performance outcomes (Cannon-Bowers, Tannenbaum, Salas, & Volpe, 1995; Kozlowski, Gully, Nason, & Smith, 1999).

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Researchers have theorized that task specific team-efficacy (Gist, 1987; Lindsley, Brass, & Thomas, 1995; Mischel & Northcraft, 1997) and generalized group potency (Guzzo, Yost, Campbell, & Shea, 1993; Shea & Guzzo, 1987a) are important determinants of team performance. Team-efficacy refers to perceptions of task-specific team capability, whereas potency refers to broader perceptions of team capability spanning tasks and situations (Gibson, 1996). The sense of confidence generated by high levels of efficacy and potency is believed to help teams persevere in the face of adversity. Research has demonstrated that both team-efficacy and generalized potency are linked to team effectiveness (Campion, Medsker, & Higgs, 1993; Campion, Papper & Medsker, 1996; Gibson, 1999; Gibson, Randel, & Earley, 2000; Mitchell, 1997; Shea & Guzzo, 1987b).

Despite promising findings, several limitations of existing research impede knowledge advancement. First, because of practical limitations, many studies have relied on relatively small samples, resulting in large sampling error. This can influence the consistency and quality of research conclusions, and the disparate effect sizes make it difficult to determine the true strength of relationships (Hunter & Schmidt, 1990). Second, most studies have not considered interdependence when examining the relationships between team-efficacy or potency and performance. Third, although researchers have become increasingly savvy about levels of analysis, we still know little about how the level of analysis may influence our conclusions.

The purpose of the current study was to test theoretically derived hypotheses regarding the relationships between team-efficacy, potency, and performance and to examine the moderating effects of level of analysis and interdependence on observed relationships. First, we provide theoretical background on the constructs of task-specific team-efficacy and generalized potency.

Second, we highlight similarities and differences between the two constructs. Third, we review the concept of level of analysis and explain how it might influence observed relationships. Fourth, we describe why interdependence may be an important moderator. We then use meta-analytic techniques to empirically evaluate hypotheses and address limitations of previous research.

Team-Efficacy

Research on individual performance is a potential source of theory regarding determinants of team effectiveness. Findings suggest that self-efficacy is a strong predictor of self-set goals, task-related effort, and individual task performance across a variety of domains (Phillips & Gully, 1997; Sadri & Robertson, 1993; Stajkovic & Luthans, 1998). Self-efficacy refers to one's belief in one's capability to perform a specific task (Gist, 1987). Self-efficacy is a comprehensive summary judgment of beliefs in one's capabilities to mobilize the motivation, cognitive resources, and courses of action needed to perform a specific task (Bandura, 1986, 1997; Wood & Bandura, 1989).

Team-efficacy, or collective-efficacy, refers to a team's belief that it can successfully perform a specific task (Lindsley et al., 1995). *Collective-efficacy* is a shared belief in a collective's capabilities to organize and execute the courses of action (Bandura, 1997, p. 477). Collective-efficacy differs from team-efficacy in the unit of focus. Collective-efficacy can refer to teams, departments, organizations, and even nations, whereas team-efficacy refers specifically to teams. As the focus of the current study is on groups and teams, we use the term *team-efficacy* instead of *collective-efficacy* to indicate our specific level of interest.

Team-efficacy is not simply the sum of the efficacy beliefs of individual members (Bandura, 2000; Chan, 1998). Mischel and Northcraft (1997) suggested that the cognition of "can *we* do this task?" is different from the cognition of "can *I* do this task?" As Bandura (1997) has noted, effective collective action involves complex paths of interwoven and reciprocal social influence, more so than does individual self-direction. Members must coordinate their actions, and they are likely to be influenced by the beliefs, motivation, and performance of their coworkers. The construct of team-efficacy thus can be meaningfully distinguished from self-efficacy.

Bandura (1982, 1986, 1997) suggested that team-efficacy influences what people choose to do as a team, how much effort they put into it, and their staying power when collective efforts fail to produce results. Research seems to support his assertion. For example, Prussia and Kinicki (1996) found that collective-efficacy was related to collective goals and performance, and Gibson (1999) found team-efficacy to be related to performance of nursing teams. However, several studies have reported a weak or negative relationship between team-efficacy and performance (e.g., Kellett, Humphrey, & Sleeth, 2000). It is possible that variation in observed effect sizes could be due to sampling error. In the present study, we used meta-analytic techniques to obtain a precise estimate of the relationship between team-efficacy and performance. We hypothesized that we would find a positive relationship, after controlling for sampling error.

> *Hypothesis 1:* Team-efficacy will be positively related to team performance.

Bandura's (1997) definition clearly argues for shared perceptions of collective capability. Unfortunately, in its inception there was ambiguity as to whether team-efficacy referred to individual or shared perceptions (Zaccaro, Blair, Peterson, & Zazanis, 1995). Some researchers focused on individual perceptions regarding the collective (Cannon-Bowers et al., 1995; Mischel & Northcraft, 1997; Riggs & Knight, 1994; Shamir, 1990), whereas others suggested that team-efficacy should focus on shared perceptions (Lindsley et al., 1995; Zaccaro et al., 1995). This issue is further discussed in the section on levels of analysis.

Potency

The concept of group potency (hereinafter referred to as potency) was proposed by Shea and Guzzo (1987a) to be a key determinant of team effectiveness. Although there are many parallels between potency and team-efficacy, a critical point of departure is that potency refers to a broader sense of the group or team (Guzzo et al., 1993). Potency refers to generalized beliefs about the capabilities of the team across tasks and contexts (i.e., our team will be successful no matter what the task).

Potency is related to team-efficacy because both constructs address beliefs in team capability. Also common is the notion that positive evaluations of the team are expected to have positive effects on collective motivation and performance. Despite similarities, Gibson (1996) suggested that these constructs are distinguishable on the basis of sharedness and task specificity. It is possible that efficacy and potency can exhibit differential relationships with performance. For example, members of an engineering team might believe that they can design a specific new product (high team-efficacy) but might not believe that they can effectively produce, market, and sell the product (low potency). The predictive utility of team-efficacy and potency thus may vary depending on prediction of performance on a specific task or generalized performance.

Shea and Guzzo (1987a) proposed that potency leads to high levels of team effectiveness. Research has shown that teams high in potency perform better than teams low in potency (Duffy & Shaw, 2000; Guzzo et al., 1993). Campion et al. (1993, 1996) found significant positive associations between potency and productivity, employee satisfaction, and managerial ratings of performance. In general, the higher the potency, the more positive were the collective outcomes. Consistent with the theory developed by Shea, Guzzo, and colleagues, we hypothesized that potency would be positively related to team performance.

> *Hypothesis 2:* Potency will be positively related to team performance.

Levels of Analysis

Level refers to a plane of interest in a hierarchy of systems, and level of analysis refers to the unit to which the data are assigned for hypothesis testing and analyses (Rousseau, 1985). Organizations, by their very nature, are multilevel. Individuals interact and work in dyads, teams, departments, and organizations. Accordingly, no construct in the organizational behavior domain is completely free of levels issues (Chan, 1998; Guzzo, 1995; K. J. Klein, Dansereau, & Hall, 1994).

Potency always has been articulated and measured as a shared, collective-level construct. In contrast, team-efficacy has been defined and measured at both individual and collective levels, potentially creating problems with levels of analysis. Research suggests that teams have characteristics that are distinct from individuals because social systems involve complexities not apparent in individual-level phenomena (Bandura, 1997; K. J. Klein et al. 1994). Thus, teams must be studied as intact social systems (Katz & Kahn, 1978), and it is not immediately clear whether we can generalize from research conducted with individuals to make predictions about what will occur within teams. Variation in the level at which team efficacy and potency are measured and analyzed is potentially problematic because statistical results obtained at one level of analysis are not always generalizable to another level (K. J. Klein & Kozlowski, 2000; Rousseau, 1985).

The level of theory should dictate the level at which a construct is measured and analyzed (Chan, 1998; Morgeson & Hofmann, 1999; Rousseau, 1985). For example, if one measures and correlates individual self-efficacies with individual performance, the level of analysis is the individual. Alternatively, if one uses the mean of team-efficacies or potencies and then correlates these means with team performance, the level of analysis is the team. If members fail to share perceptions, then the appropriate level of analysis is individual.

Some team constructs exist at the team level apart from individual perceptions. For example, team size and longevity can be measured as team constructs at the team level. However, by definition, efficacy and potency perceptions reside within individuals, so they must be measured at the individual level and aggregated to the team. Logically, team-efficacy and potency cannot be measured at the team level unless one assumes that a single observer can reliably report on a team's true level of potency or efficacy. Alternatively, one might use a consensus measure, but this presumes that consensus truly reflects the team as a unit despite the underlying social processes that yield consensus. Bandura (1997, p. 479) argued against the use of consensus measures, whereas Guzzo et al. (1993, p. 96) argued for their use. It is not possible for us to resolve these differing perspectives. However, we can evaluate whether use of consensus measures influences findings.

Sharedness of perceptions is a crucial determinant of the appropriate level of analysis (K. J. Klein & Kozlowski, 2000). Shared perceptions imply that the social fabric of the team is tightly interwoven and that the perception of any single individual is likely to be influenced heavily by the behaviors, attitudes, and motivations of other members. In such cases, shared perceptions effectively capture the internal dynamics of the team. For example, members may have strong and shared perceptions about whether the team is capable of performing a task. If these shared perceptions are positive, then the efficacy or potency perceptions can create positive self-fulfilling spirals that yield high levels of performance. On the other hand, if the shared perceptions are negative, then the spirals will become self-defeating, such that the lack of motivation and drive of each member will induce the other members to withdraw further. Furthermore, sharedness may produce a vitality or resilience that pulls individual members back as they drift away. Thus, shared perceptions of efficacy or potency are powerful levers for lifting or lowering the goals, efforts, and persistence of team members (Lindsley et al., 1995).

In contrast, if perceptions are not shared, then the construct is operating at the individual rather than team level. One can imagine a team in which each of the individual members has varying perceptions of their team's capability. This suggests that the efficacy or potency of the team has not yet crystallized into a coherent collective perception. In such a case, interactive dynamics are driven less by the intensity of team-efficacy or potency perceptions, and any one member's perceptions will be less strongly linked to the actual performance of the team as a unit.

These arguments are consistent with the work of Indik (1968), who argued that variables at the same level of analysis should be related more strongly than variables at different levels. This is due in part to construct consistency and proximity of casual relations. Team-efficacy and potency, operationalized as collective variables, should have a stronger relationship to team performance than team-efficacy or potency operationalized as individual variables because team performance is an outcome of collective processes.

When researchers have analyzed data at the team level, they typically have examined the sharedness of perceptions to prevent aggregation bias (James, 1982). Thus, data operationalized and analyzed at the team level also effectively capture the powerful nature of shared beliefs of team-efficacy or potency among members. In contrast, data operationalized and analyzed at the individual level typically do not include examination of sharedness among team members. Because individual perceptions may or may not be shared, the link between efficacy or potency and performance is expected to be weaker at the individual level than at the team level.

To date, we have limited empirical evidence suggesting that the level of analysis influences empirical findings or qualitative conclusions regarding efficacy and potency. Our intent is to examine whether the level of analysis will influence obtained findings. A meaningful difference in effect sizes across levels will support the assertion of Ostroff and Harrison (1999) that there is no accurate theoretical description for a parameter that combines correlations from different levels. Strong theoretical reasons exist for hypothesizing that findings at the team level should be stronger than findings at the individual level.

> *Hypothesis 3:* The positive relationships between team-efficacy and performance and potency and performance will be stronger at the team level of analysis than at the individual level.

Interdependence

Kozlowski and Bell (in press) suggested that research that fails to consider interdependence has limited value for building knowledge about team effectiveness. Our conceptualization of interdependence begins with the task, but it extends to include collective goals, rewards, and outcomes. The notion that these variables are key determinants of team effectiveness is present in many lines of research, including sociotechnical theory (Trist, 1981), Shea and Guzzo's (1987a, 1987b) theory of work group effectiveness, input–process–output models (Gladstein, 1984; Hackman, 1987; Hackman & Morris, 1975), and work on collective goals (O'Leary-Kelly, Martocchio, & Frink, 1994). We first review these various perspectives and then discuss implications for understanding the impact of team member interdependence.

Sociotechnical Theory

Sociotechnical theory is based on the notion that any collective, including a team, contains both technological and social elements (Kolodny & Kiggundu, 1980). Technology is defined as a system of components directly involved in acting on and/or changing an object from one state to another. Tasks are a subcomponent of technology (Goodman, Ravlin, & Schminke, 1987). The social system includes the fabric of interactions between human operators with the technology and among themselves. Social properties of the team are thought to be interdependent, with the technology used to achieve an outcome (Porter & Beyerlein, 2000; Trist, 1981). From this perspective, attempts to optimize either system alone will result in suboptimization of the whole (Guzzo & Shea, 1992). Goodman and colleagues (Goodman & Garber, 1988; Goodman & Leyden, 1991) argued that every workplace is a configuration of machines, materials, environment, people, technology, and tasks. The sociotechnical perspective highlights the important impact of task–technology factors and human interactions on work team effectiveness (Hackman, 1992).

Task Typologies

Steiner (1972) proposed that the optimal process for a group or team depends on various task characteristics. Additive tasks require member resources to be summed for productivity (e.g., typing in a typing pool), and disjunctive tasks require that only one member perform effectively for the team to succeed (e.g., solving a puzzle). Conjunctive tasks require all members to perform effectively (e.g., playing football), and discretionary tasks are those for which resources can be combined in any way (e.g., writing a business report). Similarly, Thompson (1967) discussed three types of interdependencies (pooled, sequential, reciprocal) that could be used to describe whole organizations or subunits within an organization. Their work further highlights the importance of contextual variables such as task characteristics.

Input–Process–Output Models

Gladstein (1984) and Hackman and colleagues (Hackman, 1987; Hackman & Morris, 1975, 1983) have proposed that task characteristics, goal clarity, and reward systems (inputs) can influence interaction within teams (processes), thereby influencing effectiveness (outcomes). Gladstein (1984) argued that interdependence could moderate the relationship between process and outcome. Although she failed to find evidence for moderation, she suggested that insufficient variation in the task may have been the cause. The current study circumvents this problem by meta-analytically combining results across many tasks.

Team Goals

Research has demonstrated that collective goals can influence performance and interactions within teams (O'Leary-Kelly et al., 1994). Goals help teams to define member tasks, coordinate their actions, and develop efficient work procedures (H. J. Klein & Mulvey, 1995). Potential mechanisms mediating the team goal effect include planning, cooperative strategies, extra-role behaviors, effort, and member interactions (Crown & Rosse, 1995; Mitchell & Silver, 1990; Weingart, 1992; Weldon & Weingart, 1993).

The work summarized above suggests that consideration of contextual effects, particularly interdependence, is crucial for understanding team effectiveness. Indeed, interdependence is often the reason teams are formed (Campion et al., 1993). Team interdependence stems from several sources, including the nature of the team task, the manner in which goals are defined and achieved, and the basis for determining performance outcomes (Campion et al., 1996; Wageman, 1995; Van der Vegt, Emans, & Van de Vliert, 2001).

Types of Interdependence

Task interdependence refers to the degree of task-driven interaction among members (Shea & Guzzo, 1987a). Interdependence may vary across teams, increasing as workflow goes from pooled to sequential to reciprocal to team (Saavedra, Earley, & Van Dyne, 1993; Thompson, 1967; Van de Ven, Delbecq, & Koenig, 1976). However, interdependence among members can be driven by factors other than task characteristics (Mitchell, 1997; Wageman, 1995). Shea and Guzzo (1987a) emphasized that groups and teams often exercise discretion in establishing the levels of interaction and cooperation necessary for effective task performance. Thus, teams can vary in interdependence, even in identical technological environments. Collective goals and outcomes are believed to be key factors that influence how members self-organize within teams.

Goal interdependence refers to the interconnections among members implied by the type of goal (e.g., individual or team) that guides their performance and efforts (Saavedra et al., 1993). Individual goals may encourage task strategies that maximize individual performance, whereas team goals may facilitate the development of cooperative strategies. Collective goals have been shown to affect collective performance, particularly on interdependent tasks (Crown & Rosse, 1995; Mitchell & Silver, 1990).

Outcome interdependence refers to interdependent feedback and rewards. Teams vary in terms of the rewards, punishments, and feedback that are contingent on individual or collective performance. Outcome interdependence refers to the existence of consequences and outcomes that are shared by team members (Shea & Guzzo, 1987a). Competitive and individual distribution of outcomes can inhibit team effectiveness through blocking, undermining, and hindering behaviors (Miller & Hamblin, 1963). In contrast, shared outcomes are likely to enhance effectiveness by motivating members to cooperate and assist in the performance of other members.

Although task, goal, and outcome interdependence are conceptually distinct, it is difficult to disentangle their effects because they tend to be related in practice. In general, members working on an interdependent task (e.g., complete a business case study) also tend to have interdependent goals (e.g., get a high collective grade) and interdependent outcomes (e.g., receive the same feedback and grade for all team members). Conversely, members working on individual tasks (e.g., doing office work) also tend to have individual goals (e.g., complete individual tasks quickly) and individual outcomes (e.g., individual pay).

Empirical evidence supports the notion that task, goal, and outcome interdependence tap into a general interdependence fac-

tor. Campion et al. (1993, 1996) measured task interdependence, goal interdependence, and interdependent rewards and feedback. In both studies, using factor analysis, the authors found that all three interdependence items loaded on a single factor. In Campion et al. (1996), the coefficient alpha for the overall interdependence factor was reported as .78 (it is not reported for the overall factor in the 1993 study). These findings support the notion that task, goal, and outcome interdependence are likely to influence conjointly the degree to which members must work together to perform effectively.

Team tasks are often characterized by higher levels of interdependence than their individual-level analogues, and team members often share goals and outcomes (Saavedra et al., 1993). Some tasks such as flying a jet, performing surgery, or playing hockey require a high degree of interaction among members (Sundstrom et al., 1990). Similarly, these tasks often have collective goals and outcomes (e.g., land on time, complete the operation safely, win the game). Recent evidence suggests that team-efficacy influences critical team processes that enhance team performance on interdependent tasks (Marks, 1997). Additionally, as members become more interdependent, it becomes harder to cognitively separate one's own performance from that of the team (Lindsley et al., 1995). Team-efficacy is likely to affect motivational factors, which will in turn, affect team processes and performance. Thus, we expect team-efficacy to strongly affect team processes and performance when tasks require members to work together and when goals and outcomes are dependent on collective performance. The result should be a strong team-efficacy–performance relationship when interdependence is high (Mischel & Northcraft, 1997).

Other tasks, such as playing golf, solving anagrams, and typing manuscripts, can be performed by nominal teams, but they primarily involve the execution of individual tasks. Similarly, such tasks tend to have individually focused goals and outcomes (e.g., shoot below par, complete the puzzle quickly, type accurately, and receive individual pay). These tasks necessitate less team interaction and are less influenced by team processes because there is little need to coordinate, communicate, or cooperate to perform effectively. We expect team-efficacy to be related less strongly to performance when interdependence is low because team process is less important for team effectiveness.

We hypothesize that interdependence will moderate the observed relationships between team-efficacy and performance, but we should note that the moderating effect of interdependence cannot be tested without explicitly considering the effects of level of analysis. Team-level studies, almost by definition, are likely to have higher levels of interdependence than individual-level studies. Thus, we hold the level of analysis constant when proposing the following hypothesis.

> *Hypothesis 4:* Interdependence will moderate the positive relationship between team-efficacy and performance such that team-efficacy will be related more strongly to performance when interdependence is high.

In contrast to team-efficacy, we expect potency to be influenced less by interdependence. First, potency is a generalized perception across tasks and situations. Thus, potency should be less influenced by specific task characteristics, including interdependence. Second, although tasks have externally observable characteristics that make them more or less amenable to cooperative teamwork, team members also frequently have some latitude in how they self-organize their tasks. Shea and Guzzo (1987a) suggested that teams higher in potency are more likely to organize tasks so members can work more interdependently. In contrast, when teams are lower in potency, members are more likely to work independently. Because potency is hypothesized to influence how members self-organize, we expect the potency–performance relationship to be influenced less by externally observable task characteristics. Thus, we do not expect the potency–performance relationship to be moderated by externally driven interdependence.

Gibson (1999) found that the relationship between team-efficacy and performance was moderated by task interdependence. Our study extends her earlier findings in four important ways. First, there was a limited sample size in the previous study (71 teams), creating the possibility of sampling error. Quantitatively combining multiple studies can provide a more precise estimate of the relationships of interest. Second, Gibson's study included only nursing teams. Although the results obtained with self-reported task interdependence are promising, it remains to be seen whether findings will hold across a broad range of tasks with externally driven interdependence. The cumulation of studies in a variety of settings provides an opportunity for a robust test of interdependence as a moderator. Third, we use a broader perspective of interdependence that includes tasks, goals, and outcomes. Fourth, we are able to evaluate the impact of interdependence on the relationship between performance and both potency and team-efficacy.

In summary, the purpose of the current study is threefold. First, we statistically combine findings from multiple studies to obtain more precise estimates of the true relationships between potency, team-efficacy, and team performance. Second, we examine whether or not findings obtained at one level of analysis are generalizable across levels. Third, we examine the impact of interdependence on the relationships between team-efficacy, potency, and performance.

Method

Identification of Studies

Five approaches were used to identify studies. First, we performed computer searches on *ABI/Inform, PsycLIT, Dissertations Abstracts, Academy of Management Journal, Academy of Management Review,* and *Journal of Management* databases. Second, we conducted manual searches using references from key articles (Bandura, 1997; Bettenhausen, 1991; Gibson, 1996, 1999; Guzzo & Dickson, 1996; Guzzo et al., 1993; Lindsley et al., 1995; Mischel & Northcraft, 1997; Zaccaro et al., 1995). Third, we conducted manual searches in the following journals for the preceding 3 years: *Administrative Science Quarterly, Group and Organization Management, Human Relations, Journal of Applied Psychology, Organizational Behavior and Human Decision Processes, Personnel Psychology, Small Group Research,* and *Human Relations*. We also conducted manual searches in the *Journal of Personality and Social Psychology* and the *International Journal of Sport Psychology* for the previous year. Fourth, we conducted computer and manual searches on conference presentations for the Academy of Management and the Society of Industrial and Organizational Psychology. Fifth, we wrote to researchers doing work on groups and teams and inquired about relevant research projects.

The criterion for initial selection in these search efforts was mention of "*group* or *team* or *collective* or *unit*" and "*efficacy* or *potency* or *esteem* or

expectancy or *feedback* or *beliefs* or *confidence* or *aspirations* or *perceived success* or *perceived failure* or *perceived ability* or *morale* or *spirit* or *confidence.*" Although we recognized that this would result in a broad initial search, we retained breadth because team-efficacy and potency concepts have appeared under a variety of names. Our initial efforts yielded 314 published and unpublished articles, of which 67 (21%) relevant empirical studies remained after unobtainable, nonempirical, irrelevant, and/or redundant studies were removed. As a result of our initial breadth, 117 (37%) studies were not relevant. Additionally, 8 (3%) contained insufficient data, 24 (8%) contained duplicate data, 25 (8%) were unobtainable, and 73 (23%) were theoretical. The unobtainable studies primarily consisted of unpublished theses, dissertations, conference papers, and reports; an effort was made to procure these studies by writing to authors multiple times.

Effect Sizes

Empirical studies were discarded if they failed to report a usable statistic relating team-efficacy or potency to performance and if they failed to report information for formula transformations. Studies also were dropped if they used a manipulation involving false feedback rather than directly measuring team-efficacy or potency. We wrote to authors to obtain original data when it appeared that team-efficacy or potency was measured but data were not sufficiently reported. Our final data set contained 67 empirical studies with 256 effect sizes relating team-efficacy or potency to performance across different levels of analysis. Because most studies provided multiple effect sizes, we used the techniques outlined by Hunter and Schmidt (1990, pp. 454–463) to combine effects to yield a single effect size estimate whenever possible. This reduced the original 256 effect sizes to 114.

Several studies contributed more than one effect size because it was inappropriate to combine them. For example, it is inconsistent with theory to combine team-efficacy and potency into a single effect size. Similarly, combining individual and team level estimates into a single effect size obviates our ability to test whether level of analysis is a moderator. Thus, 29 studies contributed more than one effect size estimate. Although each effect size is an unbiased estimate by itself, inclusion of multiple effect sizes potentially violates the assumption of independence and artificially inflates the total sample size.

We tested the possible impact of dependence by randomly selecting a single effect size from each study, ensuring independence and eliminating artificial inflation of the total sample size. Findings obtained with the randomly selected effect sizes were consistent with those from the 114 effect sizes. Next, we reran all of the meta-analyses using the full set of 256 effect sizes and obtained the same findings, but with more powerful significance tests. We again randomly selected a single effect size from each study, this time from the 256 effect sizes, and again obtained the same findings. We report the results of the 114 effect sizes.

Coding

Each of the 67 studies was read and coded by two or more of the four authors for interdependence, level of analysis, sample size, reliabilities of independent and dependent variables, and effect sizes. Sample sizes were taken directly from method and results sections of the articles. Classification of efficacy and potency was based on the descriptions of measures. Team-efficacy referred to task-specific perceptions of team capability and included both collective-efficacy and team-efficacy. Potency referred to measures described in Shea and Guzzo (1987a, 1987b) and Guzzo et al. (1993). Reliabilities of measurement instruments were recorded whenever reported. The average reliabilities were .88 for team-efficacy, .87 for potency, and .88 for performance. Effect sizes were calculated with standard formulas reported by Hunter and Schmidt (1990).

Level of analysis was determined by coding whether effect sizes (e.g., correlations) were computed at the individual or the team level. For example, assume that a sample in a given study had 500 individuals assigned to 100 teams. If the correlation between potency and performance was computed with a sample size of 500 (individual level), then the level of analysis was coded as a 0. If the correlation was computed with a sample size of 100 (team level), then the level of analysis was team and was coded as a 1. Thus, this was a dummy code indicating whether or not the effect size was at the team level. We then included this variable in various general linear models to perform significance tests of the moderating influence of level of analysis (Hedges & Olkin, 1985). We also used this code to create subgroups when applying the Hunter and Schmidt (1990) techniques for detecting moderators. Level was determined by examination of the sample size of the study, the degrees of freedom in the significance tests, and the author(s)' description of the analyses. Average agreement among raters on level of analysis was 98%.

Interdependence was determined using ratings for task, goal, and outcome interdependence. These dimensions were derived from conceptual definitions of interdependence presented in previous research (e.g., Campion et al., 1993; Saavedra et al., 1993; Shea & Guzzo, 1987a). Task interdependence referred to whether a task was pooled, sequential, reciprocal, or team-oriented. Goal interdependence referred to whether members were striving for individual, mixed, or team goals. Outcome interdependence referred to the degree to which member outcomes were contingent on individual or team performance. Each dimension was rated on a 4-point scale ranging from zero to three and summed, providing a measure of interdependence ranging from zero to nine. The coefficient alpha for the three dimensions of interdependence collapsed across raters was .76. Ratings were made independently, and any disagreements greater than two were resolved by discussion. The average interrater reliability among interdependence ratings was .79. The average reliability between ratings from each rater and consensus decisions for interdependence was .85.

Analytical Techniques

The techniques used to cumulate the findings were those outlined by Hunter and Schmidt (1990) and Hedges and Olkin (1985). Both approaches yielded similar conclusions. However, an advantage of the Hedges and Olkin (1985) technique is that it provides methods for testing the effect of continuous moderators by fitting a general linear model to effect sizes using a weighted least-squares solution (pp. 237–241). Thus, the moderator analysis for interdependence did not require artificial categorization. We performed a median split on interdependence strictly for the purpose of interpreting and reporting results in our table. Another advantage of the Hedges and Olkin approach is that because it is a regression-based system we can enter continuous and dichotomous control variables, singly and in combination, to conduct more rigorous tests.

There were five steps involved in the meta-analysis. First, a meta-analysis was conducted that included all 114 effect sizes, without regard to moderators. We used the weighted mean correlation as the estimate of ρ, the population effect size. The first analysis focused on relationships between team-efficacy, potency, and performance, collapsed across constructs and levels of analysis, combined into a single analysis. This provided a baseline estimate of population variance and effect size that allowed us to evaluate potential moderators.

Second, all studies that used a self-report measure of productivity were removed because of the likelihood of method bias and low validity with objective productivity measures. Asking team members if they believe that they can be effective and then asking them if they actually were effective is likely to create method bias. Support for this assertion is found in the large effect sizes obtained with the use of self-reported performance (average $r = .59$, corrected for unreliability $\rho = .67$). Inclusion of these effect sizes artificially inflates observed relationships between efficacy or potency and performance. Removal of self-report measures of performance eliminated 18 effect sizes and resulted in a conservative test of our hypotheses.

Third, level of analysis was evaluated as a potential moderator of observed relationships. The 96 remaining effect sizes were divided into two groups: those analyzing relationships at the team level and those analyzing relationships at the individual level. Each group was analyzed separately. The effect of level of analysis was also tested by fitting a general linear model to effect sizes using level of analysis as a dummy code (Hedges & Olkin, 1985).

In the fourth step, team-level effect sizes ($k = 71$) were separated into team-efficacy–performance and potency–performance relationships. This allowed us to empirically test Hypotheses 1 and 2 and provided overall estimates at the team level of the relationships between efficacy and performance and between potency and performance. We used only team-level studies because, consistent with Ostroff and Harrison (1999) and Gully, Devine, and Whitney (1995), we felt that failure to separate the studies into different levels of analysis could lead to fallacious conclusions. The individual level of analysis is inconsistent with theoretical conceptualizations of team-efficacy and potency as team-level constructs, and the team is the appropriate level of focus.

In the fifth step, the moderating influence of interdependence on observed relationships between team-efficacy or potency and performance was tested by fitting a general linear model to effect sizes (Hedges & Olkin, 1985). This was performed for all of the studies without regard to efficacy and potency, then repeated separately for team-efficacy and potency. A median split on interdependence was performed to facilitate interpretation of findings. We examined the effect of the decision to include only team-level studies by rerunning moderator analyses involving interdependence at the individual level and on the combined sample, with similar conclusions.

We also examined the potential impact of confounding factors. We found no evidence for effect size outliers, but we reran analyses after trimming the upper and lower 5% of the effect sizes. The conclusions were the same as for the full data set. We found evidence for some sample size outliers. We reran all analyses after eliminating all sample size outliers and obtained the same conclusions; therefore, we report the results of the full data set.

We also controlled for team longevity, presentation of justification for aggregation, use of consensus versus aggregated ratings, lab versus field setting, and team size. Team longevity was taken from method and results sections and described how long members had been together. Many articles did not explicitly state team age or longevity, and even when mentioned, teams with widely varying ages were often combined in a given sample. Also, we had to make a number of judgment calls about coding team longevity.

Justification for aggregation referred to whether authors provided statistical evidence justifying the aggregation of individual-level measures to the team level (e.g., intraclass coefficients, analysis of variance, within-and-between analyses, within-group agreement indices, etc.). If individual scores were low in agreement, then the greater reliability of aggregated data might be an alternative explanation for level of analysis findings. Approximately 75% of the studies that used aggregated measures justified aggregation.

The use of consensus versus aggregated ratings referred to whether team-efficacy or potency measures involved use of consensus ratings or only relied on aggregated individual ratings. Relatively few studies attempted to use a consensus measure and, when used, the measures often were combined with aggregated individual ratings. Approximately 25% of the studies used consensus ratings alone or in combination with aggregated ratings. Lab versus field setting was a dummy code indicating whether or not a study took place in a field setting. Team size referred to the number of members within each team.

The Hedges and Olkin (1985) technique allows for partialing of potential confounding effects when evaluating moderating effects. We reran all moderator analyses for level of analysis and interdependence while controlling for each of the above-mentioned variables, singly and in combination. We also reran analyses with substitution of average reliabilities for missing values. In every analysis, we drew the same conclusions as those reported below. Thus, the findings appear very robust to differences in judgment calls (Wanous, Sullivan, & Malinak, 1989). Conclusions are not altered by the choice of meta-analytic method, the method of combining effect sizes, elimination of outliers, team longevity, justification for aggregation, use of consensus versus aggregated measures, lab versus field setting, team size, or the reliability of measures.

Results

Results are presented in Table 1. For the overall meta-analysis, the uncorrected effect size was .31, with 114 effect sizes and a sample size of 10,793 ($p < .01$). The lower and upper endpoints of the 95% confidence interval were .27 and .35, respectively. The

Table 1
Meta-Analyses of Team-Efficacy, Potency, and Performance

Analysis	Total *N*	*k*	Mean *r*	Standard deviation *r*	Low 95%	High 95%	% variance sampling	Estimated ρ
Full	10,793	114	.31	.22	.27	.35	18	.35
Objective performance	8,978	96	.26	.19	.22	.30	26	.29
Individual	4,802	25	.18	.17	.11	.25	17	.20
Team	4,176	71	.35	.18	.31	.39	43	.39
Team level								
Team-efficacy	2,402	42	.36	.18	.30	.41	40	.41
Potency	1,774	29	.33	.17	.27	.39	48	.37
Low interdependence	2,368	40	.32	.19	.26	.38	40	.36
Team-efficacy	922	18	.29	.20	.20	.38	44	.34
Potency	1,446	22	.34	.18	.26	.41	39	.38
High interdependence	1,808	31	.38	.16	.33	.44	52	.43
Team-efficacy	1,480	24	.40	.16	.34	.47	44	.45
Potency	328	7	.31	.09	.21	.41	100	.35

Note. Total N = total sample size across studies; k = total number of effect sizes included in the analysis; low 95% = lower endpoint of 95% confidence interval; high 95% = upper endpoint of 95% confidence interval; % variance sampling = percentage of observed variance due to sampling error. Estimated ρ = estimated population parameter (weighted average effect size corrected for unreliability in independent and dependent variables).

estimated true effect size was .35 after correction for error of measurement in both independent (average r_{xx} = .88) and dependent (average r_{yy} = .88) variables. Sampling error accounted for approximately 18% of the variance in observed effect sizes. Results demonstrate that, in general, team-efficacy and potency are related positively to team performance.

In the analysis of objective performance, we eliminated self-ratings of performance. Use of more objective measures of performance (external raters, production rates, time to complete a task, etc.) resulted in an uncorrected weighted mean correlation of .26 (k = 96, N = 8,978, $p < .01$). The lower and upper endpoints of the 95% confidence interval were .22 and .30, respectively. These results suggest that team-efficacy and potency are significantly positively related to objective team performance. After correction for unreliability, the estimate of ρ equaled .29, and sampling error accounted for approximately 26% of the variance in effect sizes.

The moderator analysis investigating the effects of level of analysis demonstrated a clear difference between individual and team-level findings. For the individual-level analysis, the uncorrected and corrected mean correlations were .18 and .20, respectively. The 95% confidence interval ranged from .11 to .25, and the sampling error accounted for 17% of the observed variance in the individual-level effect sizes. For the team-level analysis, the uncorrected and corrected mean correlations were .35 and .39. The 95% confidence interval ranged from .31 to .39, and sampling error accounted for approximately 43% of the observed variance.

Note that the confidence intervals for the individual and team effect sizes have no overlap and that the effect sizes at the team level (.39) are nearly double those obtained at the individual level of analysis (.20). At the team level, efficacy and potency are related to over 15% of the variance in performance. In contrast, at the individual level, efficacy and potency are related to only 4% of the variance in performance. The results of the Hedges and Olkin (1985) procedure indicated that level of analysis had a substantial and significant effect on the team-efficacy, potency, and performance relationships, B = .19, $t(94) = 8.8$, $p < .01$. These analyses were repeated separately for team-efficacy and potency and all results provide strong support for Hypothesis 3.

The next analysis separately evaluated the relationships between team-efficacy or potency and performance at the team level. For team-efficacy, the uncorrected and corrected mean correlations were .36 and .41, respectively. The 95% confidence interval ranged from .30 to .41. For potency, the uncorrected and corrected mean correlations were .33 and .37, respectively. The 95% confidence interval ranged from .27 to .39. All results are significantly different from zero, and provide strong support for Hypotheses 1 and 2.

The next set of analyses investigated the relationship between team-efficacy, potency, and performance, with interdependence as a moderator, controlling for level of analysis. We controlled for the effect of level in three different ways. First, we conducted an analysis of the effects of interdependence with all possible studies, entering both level of analysis and interdependence into the general linear model. This has the effect of statistically controlling for the level of analysis. Second, we selected only team-level studies and performed analyses investigating the effect of interdependence. Finally, even though we were interested in team-level theory and outcomes, we reran the same analyses with individual-level studies and with individual- and team-level studies combined to determine whether the use of team-level effect sizes influenced results. In all analyses we concluded that interdependence significantly moderated the relationship between team-efficacy and performance but not potency and performance. Thus, findings involving the moderating effect of interdependence are consistent across levels. We report the findings involving the team-level studies below.

Because interdependence was a continuous variable, we used a general linear model to test for moderation (Hedges & Olkin, 1985). Results indicated that interdependence had a significant effect on the team-efficacy–performance relationship, B = .07, $t(40) = 4.41$, $p < .01$. The regression equation predicted an effect size of .09 for teams at the lowest level of interdependence and .47 for teams at the highest level of interdependence. In contrast, interdependence had virtually no effect on the potency–performance relationship, $B = -.01$, $t(27) = -0.81$, $p > .40$.

To illustrate these findings in our table, we performed a median split on interdependence and separated the effect sizes into low and high interdependence. For low interdependence, the uncorrected and corrected mean correlations were .32 and .36. The 95% confidence interval ranged from .26 to .38, and sampling error accounted for approximately 40% of the observed variance. For high interdependence, the uncorrected and corrected mean correlations were .38 and .43, respectively. The 95% confidence interval ranged from .33 to .44, and sampling error alone accounted for approximately 52% of the observed variance. Note that the confidence intervals for low and high interdependence have relatively little overlap.

When the median split analysis was separately performed for team-efficacy and potency, distinct patterns emerged. The average effect size for team-efficacy was .29 at low interdependence and .40 at high interdependence. The 95% confidence interval for low interdependence ranged from .20 to .38, whereas the 95% confidence interval for high interdependence ranged from .34 to .47, indicating virtually no overlap between the intervals for team-efficacy. This provides strong evidence that interdependence moderates the relationship between team-efficacy and performance. In contrast, the average effect sizes for potency varied much less. Obtained effect sizes for potency were .34 and .31 for low versus high interdependence, respectively. The 95% confidence interval for low interdependence ranged from .26 to .41, and the 95% confidence interval for high interdependence ranged from .21 to .41, indicating substantial overlap between the intervals.

These findings are not susceptible to influence by the categorization used in the median split analysis or the proportions classified as low versus high interdependence. The median split analysis shown in the table is for expository purposes. The most appropriate test of a continuous moderator such as the interdependence variable is the Hedges and Olkin (1985) approach. The median split findings are consistent with the results obtained with general linear modeling. However, the general linear modeling estimate of the team-efficacy effect size ranged from a low of .09 to a high of .47, indicating that the effects were even stronger than those portrayed in the table. In contrast, no analysis showed a significant effect of interdependence for the potency–performance relationship. Interdependence significantly moderated the relationship between team-efficacy and performance, supporting Hypothesis 4. As ex-

pected, interdependence was not found to moderate the relationship between potency and performance.

Discussion

Summary of Findings

Our meta-analytic findings extend our understanding of how team-efficacy and potency are related to performance. Results indicate that team-efficacy and potency are related positively to performance (estimated true $\rho = .41$ and $\rho = .37$, respectively). These values are similar to, but stronger than, the relationship between cohesion and performance (estimated true $\rho = .32$; Gully et al., 1995). However, we found that level of analysis is a crucial moderating variable of observed relationships. We also found that interdependence moderated the relationship between team-efficacy and performance but not between potency and performance.

Level of analysis. Ostroff and Harrison (1999) noted that average effect sizes are uninterpretable if they are confounded across levels. The moderator analysis indicated that observed relationships were substantially weaker in individual-level studies (estimated true $\rho = .20$) than in team-level studies (estimated true $\rho = .39$). An important finding was that the 95% confidence intervals for these two sets of studies had no overlap. The observed team-level effect size is comparable to the observed relationship between individual self-efficacy and individual performance (estimated $\rho = .38$; Stajkovic & Luthans, 1998). These findings are also consistent with those obtained by Gully et al. (1995) who found that the relationship between cohesion and performance was significantly lower at the individual level (estimated true $\rho = .23$) than at the group level (estimated true $\rho = .32$). Our findings support the assertions of various authors that researchers must consider levels of analysis when making inferences and generalizations in collective contexts (Chan, 1998; K. J. Klein et al., 1994; Morgeson & Hofmann, 1999; Ostroff & Harrison, 1999; Rousseau, 1985). The team is the appropriate level of analysis and generalization for studies testing theories focused on collective processes and outcomes.

Interdependence. Interdependence moderated the relationship between team-efficacy and performance but not the relationship between potency and performance. This finding was obtained with both the full data set and with effect sizes at the team level only. Specifically, the relationship between team-efficacy and performance was larger when interdependence was high than when it was low. In contrast, the relationship between potency and performance was similar for both high and low interdependence.

The consistency of our findings with research in other domains (Gully et al., 1995) lends credibility to the results. Credibility is enhanced because similar patterns were observed with the use of different constructs that are presumed to operate in similar ways. Also, similar effects for levels of analysis and interdependence were observed with different studies, constructs, coding systems, and meta-analytic techniques. This reduces the likelihood that judgment calls (Wanous et al., 1989) played an important role in determining the final conclusions.

Implications for Theory

The burgeoning growth of empirical studies on collective efficacy and potency is rapidly pushing our knowledge to new heights. The current study provides evidence that team-efficacy and potency function differently across task contexts. Potency is clearly distinguishable from efficacy on the basis of task specificity. Because team-efficacy is task-specific, one would expect its relationship with performance to be influenced strongly by characteristics of the task environment. In contrast, because potency is task-general, one would expect its relationship to be influenced less by such characteristics. This is exactly what was found. Future research should evaluate whether similar effects hold across other task characteristics and contexts.

The finding that level of analysis accounts for variation in effect sizes highlights the fundamental need to acknowledge these issues in team research. Work from the levels perspective has identified the need to match the level of statistical analysis with the level of theory (i.e., level of generalization) to draw appropriate inferences (Moritz & Watson, 1998). In other words, if one wishes to talk about teams, one should use team-level measures or appropriate aggregation procedures of individual-level measures (Rousseau, 1985). In contrast, if one wishes to talk about individuals, one can measure individual perceptions and relate them to individual motivations, cognitions, behaviors, and performances. It is possible to conceive of a study in which individual team-efficacies or potencies are measured and related to individual outcomes with team-level characteristics as antecedents or moderators of observed relationships. Individual perceptions are theoretically and statistically distinguishable from team perceptions.

The results assessing interdependence as a moderator suggest that the strength of the team-efficacy–performance relationship is strongly affected by the team context. When the task and context encourage coordination, communication, and cooperation among members, team-efficacy is related more strongly to performance than when interdependence is low. However, the same cannot be said of potency. Interdependence is only one of many possible contextual factors that may influence the relationships between efficacy, potency, and performance. For example, team resources, organizational barriers, leadership support, team empowerment, and team life span may moderate relationships with performance (Tesluk & Mathieu, 1999). Future theory regarding potency and efficacy should include interdependence and other contextual variables.

There are many possible antecedents of team-efficacy and potency. Many of the same factors that impact self-efficacy, including previous performance, vicarious experiences, verbal persuasion, and emotional arousal, are likely to influence team-level competency perceptions (Bandura, 1982; Guzzo et al., 1993; Lindsley et al., 1995). However, because collective contexts evolve in a dynamic and interactive fashion, additional factors will be relevant. For example, individuals who have differing beliefs about the capability of a key team member may interact differently initially, thereby changing the development of efficacy and potency over time. Initial perceptions of team capability may create a self-fulfilling cycle, positive or negative, that is difficult to break (Lindsley et al., 1995). Team leadership seems to be a key variable that influences the development and evolution of efficacy and potency because key members or leaders of a team often strongly influence the efficacy perceptions of others (Kozlowski, Gully, Salas, & Cannon-Bowers, 1996; Zaccaro et al., 1995).

Team-efficacy and potency may also be particularly important in applied decision-making and negotiation contexts. Research has

shown that conflict management is a critical team process that plays a pivotal role in team outcomes (Jehn, 1995). Amason (1996) suggested that executive teams that were able to minimize affective or emotionally based conflict while engaging in moderate levels of cognitive or task-based conflict would be able to capitalize on the diversity of resources brought together in the team, leading to more accurate situational diagnosis and more effective strategic decision-making. It is possible that acquisition of conflict management skills will influence the development of team-efficacy and potency. Alternatively, it is possible that efficacy and potency may moderate the relationship between conflict and team performance.

We posit that team-efficacy and potency are perceptions that can have an influential impact on team conflict and strategic decision-making. Research has shown that perceived team threats are associated with reductions and restrictions in information processing (Gladstein & Reilly, 1985; Staw, Sandelands, & Dutton, 1981). We believe that efficacy and potency may determine whether an ambiguous situation is framed as a threat versus an opportunity, and these frames will influence the ability of a team to effectively regulate affective conflict and share and process information. Unfortunately, to our knowledge, no studies have linked efficacy or potency to perceived threats or opportunities in top management teams.

Limitations and Future Research Directions

As in any study, there are limitations to the current study. It should be noted that this study has not attempted, nor is it able, to identify the direction of the presumed causal relationship between efficacy, potency, and performance. Implicit is the notion that team-efficacy and potency cause performance because it is difficult to believe that teams will engage in an activity if they feel it is impossible for members to accomplish anything. However, performance is equally likely to influence subsequent efficacy and potency.

There are two approaches that can be used to disentangle issues regarding causal directionality. First, one can use studies with lagged relationships. However, Williams and Podsakoff (1989) pointed out that there are many limitations to using cross-lagged relationships for inferring causality. A second approach is to manipulate efficacy and potency experimentally with the use of false-feedback or other similar techniques and then measure levels of efficacy or potency. This allows one to disentangle perceived team-efficacy and potency from actual levels of performance. If manipulated efficacy and potency are shown to have significant influences on team functioning and performance, then one can more confidently conclude the direction of causality. Future research should continue to examine the possibility of dynamic and reciprocal relationships between efficacy, potency, and performance through the use of longitudinal and experimental designs.

Another issue of concern to all models of team effectiveness is time and team longevity (Shea & Guzzo, 1987a). Our analysis of team longevity showed that it did not influence our substantive conclusions. However, this does not mean that team longevity is not important. As noted, a number of issues precluded its inclusion as a substantive variable in our study. Despite this limitation, it appears that perceptions of team-efficacy and potency may become more homogenous over time (Jung & Sosik, 1999; Zaccaro et al., 1994). Initially perceptions may reflect individual efficacy, but as members interact, they may become increasingly homogenous regarding their perceptions about the team. These findings support theoretical models that suggest that teams transition in their development across levels over time (Kozlowski et al., 1999). If it is true that sharedness of efficacy and potency change as a function of time, then their relationships with performance are also likely to evolve. More longitudinal research is required to determine the patterns of relationships between efficacy, potency, and performance, and future studies should be clear about team longevity when reporting results.

Future research should continue to investigate the similarities and distinctions between potency and team-efficacy. We located seven studies with ten effect sizes that correlated team-efficacy and potency. This was not a large enough sample for a separate meta-analysis, but we were able to determine that potency and team-efficacy correlated an average of .67. As expected, this indicates a strong overlap, but it is worth noting that the two variables share less than half of their variance. The distinction between potency and team-efficacy is similar to the distinction between general self-efficacy and task-specific self-efficacy (Chen, Gully, & Eden, 2001). Interdependence was shown to be one factor that determines conditions under which one construct predicts beyond the other. However, this area deserves further exploration. For example, potency may be more predictive of performance across a variety of different tasks or it may be useful for predicting more general types of performance. In contrast, team-efficacy may be less predictive across tasks or for general performance. To our knowledge, no study has investigated potency, efficacy, and performance for the same teams performing in a wide variety of domains. Future research should continue to evaluate how team-efficacy, potency, and performance differentially relate to each other under a variety of performance conditions.

Although goal, task, and outcome interdependence are related, experimental studies similar to that conducted by Saavedra et al. (1993) can be used to disentangle their relationships with potency and team-efficacy. Also, future work should investigate whether interdependence affects team-efficacy and potency. Although controlling for team size did not alter our conclusions, team size is likely to be an important factor as we consider the impact of different types of interdependence.

We suggested that motivational variables such as persistence and effort are likely mediators of the relationship between efficacy, potency, and performance. It would also be interesting to determine the conditions under which inflated perceptions of team capability function as mediators. Future research should continue to investigate key mediators and moderators of team-efficacy, potency, and performance relationships.

Finally, there remains the issue of how researchers should collect team perceptions. Although we found that use of consensus ratings did not affect conclusions, researchers should continue to do work along the lines of Gibson et al. (2000) and Kirkman, Tesluk, and Rosen (2001). We need to know more about when, why, or how consensus and aggregated ratings provide similar or different results. Also, we need to know if independent observers can function as effective informants of team-efficacy and potency. Similarly, we need to know the conditions under which aggregated self-efficacies yield relationships with performance that are dif-

ferent from aggregated team-efficacies or aggregated potencies. The opportunities for building on our current knowledge seem boundless.

Summary

Researchers have often noted our limited understanding of factors that determine team effectiveness (Gladstein, 1984; Hackman & Morris, 1983; Shea & Guzzo, 1987a). The present study provides some useful answers to our ever expanding questions regarding critical determinants of team effectiveness. It is clear that efficacy, potency, and related constructs are relevant to the viability and performance of teams in a variety of contexts, but the relationships are complex. Relationships between team-efficacy, potency, and performance are strongest at the team level, the usual focal level of interest. Future research should treat team-efficacy and potency as team-level constructs and analyze them accordingly unless the theory is explicitly focused on individual processes and outcomes. Additionally, team-efficacy and potency are related, yet they function differentially across task contexts. In particular, interdependence is a key moderating variable of the relationship between team-efficacy and performance but not of the relationship between potency and performance. These findings strengthen our understanding of team effectiveness, and we can further develop and refine our theories regarding team performance as these issues are explored. We believe that continued research in these areas will increase our understanding and lead to useful interventions yielding highly effective teams.

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