Small Group Research

http://sgr.sagepub.com/

Examining Team Planning Through an Episodic Lens : Effects of Deliberate, Contingency, and Reactive Planning on Team Effectiveness

Leslie A. DeChurch and Craig D. Haas

Small Group Research 2008 39: 542 originally published online 20 June 2008
DOI: 10.1177/1046496408320048

Small Group Research
Volume 39 Number 5
October 2008 542-568

10.1177/1046496408320048
http://sgr.sagepub.com
hosted at
http://online.sagepub.com

Examining Team Planning Through an Episodic Lens

Effects of Deliberate, Contingency, and Reactive Planning on Team Effectiveness

Leslie A. DeChurch
University of Central Florida
Craig D. Haas
Hogan Assessment Systems Inc.

Three types of team planning processes differing in terms of timing and adaptation capacity are investigated. Deliberate planning and contingency planning occur during team transition phases; deliberate planning specifies a primary course of action whereas contingency planning specifies backup plans. Reactive adjustment is planning that occurs during the action phase when teams adapt plans to account for evolving task conditions. The current study uses data from a scavenger hunt game involving a total of 38 teams randomly assigned to preplanning or control conditions. While instructing teams to plan increased deliberate planning, it does not increase the adaptation-enabling processes of contingency planning and reactive adjustment. Team effectiveness is determined most strongly by reactive adjustment, then by contingency planning, and least so by deliberate planning.

Keywords: *deliberate planning; contingency planning; reactive strategy adjustment; team effectiveness*

Various groups operating in the city of New Orleans and state of Louisiana had extensive disaster response plans in advance of hurricane Katrina's landfall. Their plans were not nearly adequate enough to

Authors' Note: An earlier version of this article was presented at the Annual Meeting of the Society for Industrial and Organizational Psychology, Chicago, IL, April 2004. The authors thank Nathan Hiller and Christian Resick for their helpful comments on an earlier version of this article, and Alexander Alonso, Paul Gregory, and Laura Batista for their assistance with data collection. Correspondence concerning this article should be addressed to Leslie A. DeChurch, Department of Psychology, P.O. Box 161390, Orlando, FL 32816-1390; e-mail: ldechurc@mail.ucf.edu.

handle a levee breach, which would ultimately flood the city. Task Force Ranger's plan to capture key insurgents in the 1993 Battle of Mogadishu quickly proved that it was based on faulty assumptions; for example, that rocket-propelled grenades (RPGs) could not be configured to shoot down helicopters. Planning is an essential process whenever a collection of individuals is required to coordinate effort to accomplish tasks more complex and challenging than could be individually tackled. Yet the processes that underlie successful planning in teams are not well understood. The current investigation explores three types of team planning process differing in terms of timing (i.e., when in a team task episode they are used) and adaptability (i.e., the extent to which the plan enables the team to adapt to new information and changing circumstances), in an effort to better understand how team planning processes impact team coordination and task performance.

This research addresses calls for more in-depth exploration of team processes, particularly with regard to the phases of team performance episodes within which those processes occur (LePine, Piccolo, Jackson, Mathieu, & Saul, in press; Marks, Mathieu, & Zaccaro, 2001; Weingart, 1997). The current study explores the effects of three distinct types of team planning process posited by Marks et al. (2001) as uniquely important aspects of team planning, but whose effects have yet to be examined.

Prior investigations of planning have found that teams generally do not plan on their own (Hackman, Brousseau, & Weiss, 1976; Weingart, 1992), and that when they do plan, performance is affected by the overall quality of the plan (Smith, Locke, & Barry, 1990), the timing of the planning such that in-process planning is more predictive of performance than is up-front planning (Weingart, 1992), and what teams plan about (Weingart, 1992; Weingart & Weldon, 1991; Weldon, Jehn, & Pradhan, 1991). Most prior work on team planning has examined planning as an explanatory mechanism of the group goal effect (e.g., Smith et al., 1990; Weingart, 1992; Weingart & Weldon, 1991). However, as small group and team researchers work to more fully understand how teams operate, team processes have taken on a central role. Processes offer specific verbal and behavioral explanations for observed input–output relations thereby enhancing our understanding of what prompts effective team performance.

With regard to planning, Marks et al.'s (2001) team process taxonomy distinguishes three types of strategy formulation and planning: *deliberate*, *contingency*, and *reactive* planning. The taxonomy distinguishes up-front deliberate planning from planning that, either a priori or ad hoc, recognizes the deficiency in a plan and adapts accordingly. As teams are often utilized for their adaptive capacity (Kozlowski & Ilgen, 2007), this distinction in planning processes is timely and meaningful in enabling a more fine-grained understanding of the types of planning teams need to engage in to be successful. The current study takes a first look at these three types of planning process, measured when they are theoretically proposed to be executed, and links them to coordination and performance. In doing so, we test Marks et al.'s prediction that these are three distinct types of planning, each predictive of team effectiveness.

Team Planning Process

In teams, the term *process* refers to the specific mechanisms through which a team transforms its inputs into outcomes (Marks et al., 2001). Planning is a quintessential teamwork process, as it describes the manner in which a team organizes its work. Team planning process involves cognitive and verbal elements (Hayes-Roth & Hayes-Roth, 1979; Nutt, 1984) whereby team members jointly conceptualize and understand the various components of their task, its purpose and meaning to the team, and how best to proceed with accomplishing the task (Locke, Durham, Poon, & Weldon, 1997; Stout, Cannon-Bowers, Salas, & Milanovich, 1999).

Two aspects of the episodic view of team processes proffered by Marks et al. (2001) are particularly insightful to understanding team planning process. First, the episodic view employs the notion of a performance episode to define the role of both time and task demands. Team performance episodes are "distinguishable periods of time over which performance accrues and feedback becomes available" (Marks et al., 2001, p. 359). Performance episodes consist of two recurring phases: transition and action. Transition phases are periods of downtime where team members can reflect upon past events and prospect future events. Action phases are periods of task engagement. Thus, it is useful to examine when in a team's task cycle planning processes are needed.

This temporal theme builds on similar distinctions drawn in prior investigations of team planning. For example, Weingart (1992) differentiated planning that occurred prior to working on the task (i.e., preplanning) from planning that occurred during task accomplishment (i.e., in-process planning). Similarly, Gevers, van Eerde, and Rutte (2001) compared planning that occurred during the orientation and task execution phases. These studies support the idea that team planning occurs both in advance of and during task accomplishment, though an open question is what particular types of planning activities, or processes, do teams utilize during each phase?

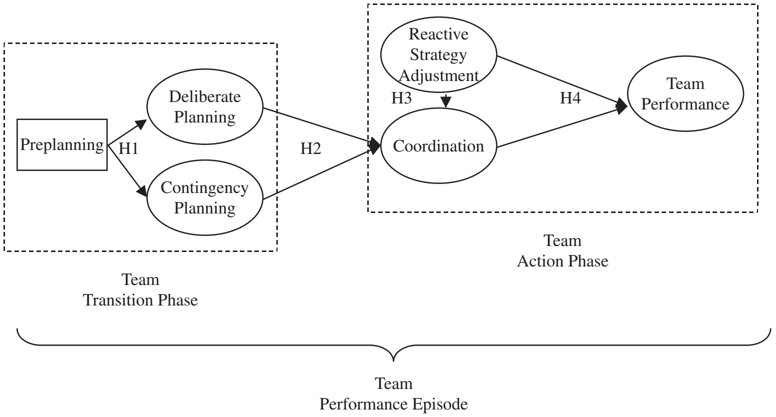
The second notable aspect of Marks and colleagues' (2001) episodic view is the specification of the particular types of processes most needed during each team phase. Marks et al. identified three types of planning process: deliberate, contingency, and reactive. Deliberate planning occurs when team members develop and communicate a primary course of action. Contingency planning specifies in advance a backup plan that the team will follow if needed. Reactive strategy adjustment occurs when teams modify their initial plans because of feedback or changes in the performance environment. Marks et al. submitted that deliberate and contingency planning are utilized during team transition phases whereas reactive strategy adjustment occurs during the action phase, invoking a transitory subepisode when the team recognizes the need to change primary plans based on evolving task circumstances.

This suggests a new distinction in the team planning arena: adaptation capacity. These three types of planning process not only differ in terms of their temporal suitability to team task episodes but also in their utility in enabling team adaptation. Unlike deliberate planning, which specifies a primary course of action, contingency and reactive planning require teams to anticipate and recognize the inadequacy of their formal plans. Contingency planning is similar to deliberate planning in that both are enacted up front. However, past work examining preplanning has not distinguished preplanning aimed at setting up a plan of action from preplanning aimed at enabling the team to adjust appropriately if and when the primary plan fails.

The current study extends the team planning literature in two key ways. First, we experimentally manipulate preplanning (analogous to the overall amount of team planning) to examine its effects on the types of team planning processes used (i.e., deliberate, contingency, and reactive) and team performance. Second, we delve deeper into the quality component of team planning by distinguishing three types of team planning processes to examine their effects on team coordination and performance. Figure 1 presents an overview of the key relations examined in this study.

According to Hackman and Morris (1975) and Weingart (1992), preplanning is strategic activity that occurs before and independent of actual task performance. As preplanning is inclusive of all planning activity that commences during a team's transition phase, we expect it to relate to the quality of both deliberate and contingency planning processes, which are enacted during team transition phases. Preplanning activity occurs prior to teams working on their task and ought to translate into both the specification of initial, up-front plans (deliberate planning), and a priori specification of what the team will do should the primary plan fail (contingency

Figure 1
Summary of Proposed Relationships Among Team Planning Processes, Coordination, and Performance



planning). On the other hand, reactive planning occurs later, during the team action phase; thus, we would not expect reactive planning to be directly affected by preplanning.

> *Hypothesis 1:* Teams who engage in more preplanning will utilize more deliberate planning (H1a) and contingency planning (H1b) planning processes than teams who engage in less preplanning.

According to the recurring phase model (Marks et al., 2001), team transition process enables team action process. Thus, actions like goal setting and planning that occur during transition periods indirectly improve team performance by way of action process. Action processes include team coordination, which specifies the synchronization of interdependent team actions. Effective planning during team transition phases should enable teams to more smoothly coordinate their actions. By specifying exactly how the task will be done and who will do what, deliberate planning is expected to enable more effective coordination process during team action phases. Likewise, making backup plans in advance that designate what team members will do if their primary plan fails, should also enable superior team coordination.

Initial support for this idea come from Janicik and Bartel (2003), who found planning actions that occur early on in a team's development affect the norms the team develops about time, which in turn affect its coordination process and performance. In a similar vein, Mathieu and Schulze (2006) found formal planning early on helped to shape effective interpersonal process later in the team's task cycle.

Thus, based on the recurring phase model and prior work demonstrating a link between teams' initial and subsequent process, we expect transition planning processes (i.e., deliberate and contingency planning) will relate positively to team action process (i.e., coordination).

Hypothesis 2: Deliberate (H2a) and contingency (H2b) planning processes will positively predict team coordination process.

The third type of planning, reactive strategy adjustment, is a transition process that occurs during team action phases. Reactive planning describes a team's ability to plan *on the fly* and adapt their task strategies to changing circumstances. Although an initial plan and backup plan certainly ought to enable some degree of effective coordination process, we expect teams who reactively adapt their plans as they go to coordinate even more effectively.

Although prior research has not examined reactive strategy adjustment, per se, examinations of similar constructs support this logic. First, prior work has compared advance planning to in-process planning and found in-process planning that occurs during task execution to be more predictive of team performance than advance planning (Gevers et al., 2001; Weingart, 1992). Second, research on a similar team adaptive process and role structure adaptation, found the ability of teams to make reactive and nonscripted adjustments to their system of member roles was highly predictive of their performance (LePine, 2003). Therefore, reactive planning should add incrementally to the prediction of team coordination after accounting for the effects of deliberate and contingency planning.

Hypothesis 3: Reactive strategy adjustment will explain incremental variance in team coordination process beyond that explained by deliberate and contingency planning processes.

Consistent with prior studies of team coordination process and performance (Hackman & Morris, 1975; Marks & Panzer, 2004; Marks, Sabella, Burke, & Zaccaro, 1999), the smooth integration of team member actions (i.e., coordination) ought to predict overall team success. In addition, we predict the ability of teams to reactively adapt their plans during the action phase will further contribute to the explanation of team performance. Both Weingart (1992) and Gevers et al. (2001) found in-process planning that occurred during task execution was an important determinant of team performance. Thus, past research has shown both coordination and in-process planning to be important predictors of performance. Based on Marks et al.'s argument that coordination and reactive strategy adjustment represent distinct types of team process, we expect them to explain unique variance in team performance.

Hypothesis 4: Reactive planning process will explain incremental variance in team performance beyond that explained by team coordination.

Method

Participants

Participants included 132 undergraduate psychology students at a large Southeastern university. In return for their participation, participants received course credit and had the opportunity to win prizes for placing in the top nine teams overall. All participants were from the undergraduate psychology subject pool and were arranged into teams solely for the purpose of completing this study (i.e., no teams were preexisting). The study was conducted over three days and an equal number of each experimental condition was run on each day. Participants were randomly assigned to teams of three or four members, and teams were randomly assigned to either the treatment (preplanning) or control (no preplanning) condition in a between-subjects design. In all, 38 teams participated in the study.

We performed a *t* test on the mean time to completion to compare the 3-member and 4-member teams. On average, the 3-person teams completed the task in 132 min ($SD = 30.67$), and the 4-person teams took 141 min ($SD = 23.47$). This difference was not statistically significant ($t[36] = -0.94$, *ns*); thus, it was not necessary to include *team size* as a covariate.

We randomly assigned individuals to teams to equalize familiarity across conditions. We also examined the level of prior familiarity of team members by asking them at the beginning of the study to indicate how well they knew each of their teammates. Response options were 1 = *We have never met before*, 2 = *hardly at all*, 3 = *She or he is a casual acquaintance*, 4 = *She or he is a friend*, and 5 = *She or he is a close friend*. Each participant responded to this item separately for each team member. An overall index of familiarity was then calculated. Across teams in the study, the average familiarity was 1.38 (SD = 0.67), indicating that most teams' members familiarity was best described as falling between response options 1 (*We have never met before*) and 2 (*hardly at all*). Team familiarity scores ranged from 1 to 4. Familiarity was distributed equally across the two experimental conditions, $t(26.85) = 1.27$, *ns*. Furthermore, team familiarity was not significantly related to overall performance on the task ($r = -.19$, *ns*), and so it was not included in the main analyses.

Experimental task. The task performed by teams was an on-campus scavenger hunt. The scavenger hunt task was chosen for several reasons. First, it requires a mix of interdependence requirements (Mitchell & Silver, 1990), and part of the planning involves the type of coordination that will be used. Although many prior studies of team planning have used either decision making or simple construction tasks with inherently fixed task demands, the scavenger hunt can be done using a combination of pooled, sequential, and reciprocal task strategies. Second, the scavenger hunt naturally mirrors the transition and action cycles central to the recurring phase model and provides a clear start and end to one team's performance episode. This ensures an adequate opportunity for teams to utilize all three types of planning processes. Finally, the scavenger hunt clues were designed to require a variety of physical, mental, and interpersonal abilities of team members thus rendering a laboratory-type task with some degree of generalizability to organizational teams (i.e., especially action and project teams).

The scavenger hunt required teams to solve a total of 10 clues. Each of the 10 clues required a combination of problem solving and physical activity. The team first had to read the clue and decipher what the task entailed, and then some subset of the team had to report to a certain location on campus to gather information and solve the clue. Experimenters were stationed at each of the campus locations to document that each team sent at least one member to complete the task. This prevented teams from simply obtaining an answer from another team. The tasks assigned at each location differed in their requirements of team members. Some tasks required physical endurance (e.g., counting a large number of parking spaces) whereas others required creative problem solving (e.g., locating a structure with a Latin inscription and translating the inscription correctly). All clues required the use of information first, and then, the completion of a task. For example, one clue read: "Translate the following instructions and carry them out:

"Bringen Sie Schule Zeitung Zuruch." Students had to first determine that this was a phrase written in German, translate it, and then follow the instructions (i.e., by bringing back a copy of the school newspaper).

Most of the tasks could be solved in a variety of ways, using multiple combinations of team member effort. For example, one clue read: "Who lives in the University House? Who else could have lived there if only it had been built in 1967?" Some teams went to the library computer lab to use the Internet to look up the information. Others went to the campus information desk to ask the student on duty. Some went to the student union to obtain a student handbook and look up the required information, and still others went to the president's office, as one or more team members knew that the former presidents' names and terms in office were listed on a wall plaque.

In addition to using different external resources to complete this task, teams also differed markedly in how they utilized their internal personnel resources. Some teams assigned this task to one member and let him or her determine how to complete it, while others first brainstormed as a team what the fastest method for completing the task was, and then assigned it to one or two team members. Other teams assigned subgroups to work on certain tasks, and still others completed every task as a complete team (i.e., they did not split up). Structured interviews were conducted at the conclusion of the study asking one member of each team to describe their team's task strategy. Most of the teams reported that they alternated between completing tasks with the entire team and subdividing tasks among group members.

Preplanning manipulation. Teams were randomly assigned to either assigned preplanning or control conditions. We chose to manipulate preplanning for two reasons. First, by doing so we could see which planning processes are affected by simply setting aside time for teams to plan. Second, as prior research shows teams naturally opt out of planning (Hackman et al., 1976; Weingart, 1992) we wanted to ensure sufficient variability in the amount of planning in order to examine the potential merits of planning.

In the assigned preplanning condition, teams were given a list of clues, a campus map, and a pad of notebook paper, and then asked to read the following instructions: "You will now have 15 min to plan how you are going to go about completing the scavenger hunt." No overt instructions on the content or process of planning were provided. Teams then planned for 15 min, after which they were handed a one-page measure to complete and were instructed as follows: "As soon as all of your team members have completed the measures, you can begin the scavenger hunt." In the control condition, teams were given the same materials (e.g., clues, map, and paper). They were not instructed to plan for 15 min. They received the one-page measure and were simply told, “As soon as all of your team members have completed the measures, you can begin the scavenger hunt.”

A single-item manipulation check was administered at the conclusion of the study. We asked participants to indicate the number of minutes their team had spent planning prior to beginning the scavenger hunt. Teams in the preplanning condition reported planning longer ($\chi = 10.03$ min) than teams in the control condition ($\chi = 5.72$ min). This difference was statistically significant, $t(36) = -4.26$, $p \leq .001$. We also documented the amount of time teams actually spent planning before they left to begin solving clues. For the experimental teams, this was exactly 15 min; all experimental teams departed immediately after the 15-min planning period. For control teams, the average time to departure was 4.26 min ($SD = 3.25$). Teams in the control group tended to slightly overestimate the time spent planning whereas teams in the experimental condition underestimated the time spent planning.

Procedure. Participants arrived for the study in a large auditorium where an experimenter provided a brief introduction to the study and obtained informed consent from all participants. Next, participants completed a series of background measures. Name tags were labeled with team and member identification numbers and handed out to participants as they completed these measures. After all participants completed all measures, teams were formed using the identification codes, and half of the teams went to one room to begin while the other half went to another room directly across the hall. In one room, the teams were provided with the instructions for the preplanning condition, and in the other room, they were read the nonspecific control condition instructions; both were read at the same time to ensure that all teams were actively engaged in the scavenger hunt simultaneously.

One of the clues required the entire team to arrive at a certain location 1 hr after the scavenger hunt began, at the approximate halfway point (determined in a pilot study). Teams were informed prior to beginning the hunt that this clue had to be solved within a 10-min time frame and that failure to arrive during the designated time interval would result in a large time penalty. All teams arrived within the designated time interval. Upon arrival, teams were instructed to go to a classroom where they were met by an experimenter and completed a brief survey that included the reactive strategy adjustment and coordination process items.

After completing the survey, teams resumed the hunt. We recorded the total time each team spent at the midway location, including time spent completing measures and time spent talking with group members. On average, teams spent 8.76 min (SD = 5.03) at the midway location. Times ranged from 2 to 15 min. We found no difference in the time spent at the midway location based on our preplanning manipulation, $t(36) = 1.51$, *ns*.

Teams then returned to the original starting point as soon as they had correctly performed all of the scavenger hunt tasks (i.e., clues). If the hunt was not completed correctly, teams were sent back out to continue working. The time of completion was recorded when all team members arrived with all of the tasks completed correctly. Team members then filled out a final survey, including measures of deliberate and contingency planning, reactive strategy adjustment, coordination, and the preplanning manipulation check.

Deliberate and contingency planning are processes used during the transition phase and, by definition, occur prior to beginning the task. Because the transition phase was relatively short (at most 15 min), we felt one measurement was sufficient to capture the use of these processes. Reactive strategy adjustment and coordination, on the other hand, occur during the action phase and as such likely evolve over time. We measured both reactive strategy adjustment and coordination at two points in time. The first measurement was taken approximately halfway through the hunt at the midway location, and the second measurement was taken immediately upon completing the hunt.

Measures. Deliberate, contingency, and reactive planning were measured using three items each. Items were developed based on the process definitions provided by Marks et al. (2001). The items were written and refined by a group of team process researchers very familiar with the Marks et al. process definitions, who had experience in developing observer ratings of these processes for prior investigations. The items were written to clearly reflect the conceptual definitions presented by Marks and colleagues, and followed the same process as those developed by Mathieu and Schulze (2006). The Mathieu and Schulze scale could not be used for this study, as it only includes one item for strategy formulation and planning, and the item does not distinguish deliberate, contingency, and reactive planning.

As an example of how items were written to map onto the process definitions, Marks et al. (2001) defined deliberate planning as “the formulation and transmission of a principal course of action for mission accomplishment” (p. 365). Thus, items read, “To what extent did your team develop a clear plan prior to beginning the scavenger hunt” (Item 1), “decide who would do what during the scavenger hunt" (Item 2), and "clarify expectations about team member roles" (Item 3)? The group of researchers collectively wrote the items to capture multiple aspects of the process definitions and to retain as much of the language present in the original definitions as possible in the items.

The items were first reviewed by a separate group of graduate students who provided feedback on overall clarity. This resulted in some minor wording changes. For example, contingency planning Item 1, "Use 'if-then' logic in developing your plans" was expanded to "Use 'if-then' logic in developing your plans (i.e., If this happens then we'll do that.)." Finally, the items (along with all other scavenger hunt materials) were pilot tested to ensure clarity and examine internal consistency in a pilot sample of 9 teams (35 individuals). No changes were made to the scales as a result of the pilot testing.

The complete list of items is presented in Table 1. The items were preceded by the prompt, "To what extent did your team . . . ," and responses were made on 5-point Likert-type scales ranging from 1 = *not at all* to 5 = *to a great extent*. The following psychometric data are based on the full sample of 38 teams (excluding the 9-team pilot sample). Internal consistency reliabilities for the deliberate and contingency planning scales were .83 and .82, respectively. Cronbach's alpha for reactive strategy adjustment was .71 at Time 1, and .66 at Time 2.

Coordination process was also measured using a 3-item scale, developed in the same manner as the planning process scales. Items were worded using Marks et al.'s (2001) definition of coordination: "the process of orchestrating the sequence and timing of interdependent actions" (pp. 367-368). Thus, our items read: "To what extent did your team smoothly synchronize joint actions" (Item 1), "combine individual efforts toward your team's goals" (Item 2), and "effectively coordinate member actions" (Item 3)? Cronbach's alpha for this scale was .80 at Time 1 and .71 at Time 2.

Because all the four process dimensions were assessed using newly developed scales, an exploratory factor analysis was conducted to examine the structure of the scales (see Table 1). The Time-2 data were used for the factor analysis because they contained all the four scales measured within the same survey at the same point in time. We used the common factor model with an oblique rotation (because we expected moderate correlations among the factors); factors with associated eigenvalues greater than 1 were extracted. A 4-factor solution emerged and was easily interpretable as the four process dimensions. Items generally loaded strongly on intended factors and weakly on the other factors. Loadings ranged from .50 to .94 on

Table 1
Exploratory Factor Analysis of Team Process Items (*N* = 132)

Item	Factor 1: Deliberate Planning	Factor 2: Contingency Planning	Factor 3: Reactive Planning	Factor 4: Coordination
To what extent did your team carry out the following?				
1. Develop a clear plan prior to beginning the scavenger hunt?	*.65*	.26	–.09	.00
2. Decide who would do what during the scavenger hunt?	*.94*	–.15	.01	–.03
3. Clarify expectations about team member roles?	*.75*	.05	.01	.07
4. Use "if-then" logic in developing your plans (i.e., If this happens then we'll do that)?	.06	*.66*	–.02	.04
5. Specify alternative courses of action that would take effect if your initial plan didn't work?	–.06	*.85*	–.08	.03
6. Communicate backup plans in advance?	.05	*.86*	–.01	–.12
7. Effectively make needed adjustments to your initial plan?	–.12	.16	*.62*	.25
8. Plan "on the fly" as you were working on the scavenger hunt?	–.03	–.14	*.70*	–.12
9. Redistribute tasks among team members as needed?	.32	.06	*.50*	–.05
10. Smoothly synchronize joint actions?	–.20	.06	–.04	*.83*
11. Combine individual efforts toward your team's goals?	.09	–.07	.01	*.78*
12. Effectively coordinate member actions?	.21	–.07	–.11	*.74*

Note: Values are oblimen-rotated factor loadings. Loadings above .40 appear in italics.

the intended factor whereas loadings on unintended factors ranged from 0 to .32. Factor intercorrelations ranged from .34 to .54. Together, the four factors explained 73.27% of the total item variance.

Aggregation. The items used to assess deliberate, contingency, and reactive planning and coordination process were all completed by individuals with the target residing at the team level. Items were worded at the level of the team and conceptually represent collective team-level states. Each of these measures was aggregated by computing the mean within each team. Empirical support for this aggregation procedure was obtained by computing rwg(j), an index of within-group agreement (James, Demaree, & Wolf, 1984). Median rwg(j)'s for deliberate and contingency planning were .86 and .66, respectively. The median rwg(j) for reactive strategy adjustment was .80 at Time 1 and .86 at Time 2. The median rwg(j) for coordination process was .83 at Time 1 and .86 at Time 2. These values indicate generally high levels of agreement within teams, so the resulting aggregated variables were used in all further analyses.

Results

Table 2 reports descriptive statistics and correlations among the key study variables. Correlations among the three dimensions of planning process generally support the tripartite typology advanced by Marks et al. (2001). Correlations ranged from .38 to .51, suggesting the dimensions share at most 26% of their variance in common. The two dimensions of transition phase planning process (i.e., deliberate and contingency planning) were significantly positively correlated ($r = .38$, $p < .05$). Both deliberate and contingency planning were also related to Time 1 reactive strategy adjustment. Teams who more extensively developed up-front plans (i.e., deliberate planning) also reported being better able to smoothly plan as they go (i.e., reactively adjust; $r = .49$, $p < .01$) early on in the action phase. However, deliberate planning was not related to reactive strategy adjustment measured at Time 2 ($r = .11$, *ns*). Teams engaging in more contingency planning before beginning the hunt reported more extensive reactive strategy adjustment both early on ($r = .51$, $p < .01$) and at the end of the action phase ($r = .38$, $p < .05$).

Next, we examined the effects of assigned preplanning on planning processes, coordination, and team performance. Table 3 reports the means

Table 2
Descriptive Statistics and Correlations Among Key Study Variables Reported at the Team Level of Analysis (n = 38)

	M	*SD*	1	2	3	4	5	6	7	8
1. Preplanning manipulation	—	—	—	—	—	—	—	—	—	—
2. Deliberate planning	3.28	0.89	.38**	(.83)	—	—	—	—	—	—
3. Contingency planning	3.56	0.55	.24	.38**	(.82)	—	—	—	—	—
4. Reactive strategy adjustment (Time 1)	3.08	0.63	.07	.49***	.51***	(.71)	—	—	—	—
5. Reactive strategy adjustment (Time 2)	3.84	0.46	.03	.11	.38**	.21	(.66)	—	—	—
6. Coordination (Time 1)	3.87	0.55	.24	.32**	.50***	.44***	.37**	(.80)	—	—
7. Coordination (Time 2)	3.99	0.41	.21	.29*	.38**	.26	.70***	.49***	(.70)	—
8. Team performance (minutes)	136.47	28.2	–.35**	–.15	–.25	–.20	–.44***	–.18	–.36**	—

Note: Diagonal reports coefficient alphas calculated at individual level of analysis (N = 132).
*p < .10; **p < .05; ***p < .01.

Table 3
Team Process and Performance Scores by Preplanning Condition

Measure/Condition	*n*	*M*	*SD*
Deliberate planning			
Control	20	2.95*	1.02
Preplanning	18	3.63*	0.59
Contingency planning			
Control	20	3.43	0.63
Preplanning	18	3.71	0.43
Reactive strategy adjustment (Time 1)			
Control	20	3.04	0.73
Preplanning	18	3.13	0.53
Reactive strategy adjustment (Time 2)			
Control	20	3.83	0.50
Preplanning	18	3.85	0.43
Coordination (Time 1)			
Control	20	3.75	0.66
Preplanning	18	4.00	0.39
Coordination (Time 2)			
Control	20	3.91	0.49
Preplanning	18	4.08	0.28
Team performance			
Control	20	146.04*	22.22
Preplanning	18	124.01*	29.84

*Indicates means are significantly different at p < .05.

by preplanning condition. Hypothesis 1 predicted differences in the quality of transition planning process (i.e., deliberate and contingency planning) based on the preplanning manipulation. Mean differences on each planning dimension were examined using *t* tests. Results support Hypothesis 1a (deliberate planning) but not Hypothesis 1b (contingency planning). Teams in the preplanning condition engaged in more extensive deliberate planning process, $t(36) = -2.48$, $p < .05$, than teams in the control condition, but they did not engage in more extensive contingency planning, $t(36) = -1.59$, *ns*, than controls. Thus, instructing teams to spend time planning prior to beginning the hunt (preplanning condition) prompted more deliberate planning but did not affect the amount of contingency planning.

Though not predicted, for completeness we also tested for differences in reactive strategy adjustment, coordination, and performance as a function of the preplanning manipulation. As Table 3 shows, no significant differences were found in reactive strategy adjustment or coordination. Prompting teams to take time out to plan before working on the hunt was unrelated to their ability to reactively adjust plans or to coordinate member actions during the hunt. However, there were significant differences in team performance as a function of preplanning. Notably, teams in the preplanning condition who were required to spend 15 min planning prior to beginning work on the task, completed the scavenger hunt faster than the teams who were not instructed to plan for 15 min (mean time to completion = 126 min vs. 146 min), $t(36) = 2.60$, $p < .05$. The duration of the planning manipulation was 15 min and so, quite ironically, the teams instructed to take 15 min at the beginning to plan out their task activities completed the task, on average, 35 min faster than the teams not instructed to plan.

The second hypothesis predicted significant positive relationships between deliberate and contingency planning processes and team coordination process. As reported in Table 2, significant correlations support both hypotheses, that is, H2a and H2b. The correlation between deliberate planning and team coordination measured at Time 1 was .32 ($p < .05$). Deliberate planning correlated .29 ($p < .10$) with team coordination measured at Time 2. Thus, deliberate planning and coordination were significantly positively related; the relationship was stronger at Time 1 than at Time 2. Similarly, contingency planning correlated .50 ($p < .001$) with team coordination measured at Time 1, and .38 ($p < .05$) with team coordination measured at Time 2. Just as with deliberate planning, contingency planning was positively related to team coordination at both times, though the relationship was stronger early on in task completion (mid-action phase) than it was at the end of the action phase. These findings support a prediction of the Marks et al.'s (2001) recurring phase model; namely, that team transition processes (i.e., deliberate and contingency planning) predict action phase processes (i.e., reactive strategy adjustment and coordination).

Hypothesis 3 examines the relative contribution of the three planning dimensions to team coordination process. Specifically, Hypothesis 3 proposed reactive strategy adjustment would add incrementally to the prediction of coordination beyond the effects of deliberate and contingency planning. Hierarchical regression was used to test this hypothesis (see Table 4) where coordination was regressed on deliberate and contingency planning in Step 1, and then reactive planning was added into the equation in Step 2. Separate equations were calculated for coordination measured at Times 1 and 2. The results differed at the two time periods. At Time 1, Hypothesis 2 was not supported. Examining the betas at Step 2 shows contingency planning was the strongest predictor of coordination (Time 1), and reactive planning was not a significant predictor of coordination (Time 1). However, the pattern of relationships changed at Time 2. Using coordination measured at the end of the action phase, reactive strategy adjustment was the most potent predictor of team coordination (β reactive adjustment = .66, $p < .01$), and explained significant incremental variance in coordination beyond that explained by deliberate and contingency planning ($\Delta R^2 = .37$, $p < .01$). Thus, the relationship specified in Hypothesis 3 seems to differ over time. Hypothesis 3 was not supported when coordination was assessed early on in the action phase, but it was supported when coordination was measured at the end of the action phase. Essentially, these results suggest contingency planning was most important in predicting team coordination early on in the action phase whereas reactive strategy adjustment was most important later on in the action phase.

Hypothesis 4 proposed reactive strategy adjustment would explain incremental variance in team performance beyond that explained by coordination process. Table 4 reports hierarchical regression results used to test this hypothesis. In Step 1, performance was regressed on coordination process (Time 2) and a dummy-coded vector capturing variability due to the preplanning manipulation. Because the *preplanning manipulation* had a strong impact on team performance but not on reactive strategy adjustment or coordination, we included it as control variable to more precisely isolate relations between coordination, reactive strategy adjustment, and team performance. Reactive strategy adjustment (Time 2) was added to the equation in Step 2. Hypothesis 4 was supported. Whereas preplanning and coordination explained 24% of the variance in team performance, reactive strategy adjustment explained an additional 10% of team performance variance.

Table 4
Results of Hierarchical Regression Analysis on Team Coordination and Performance (*n* = 38)

Variable	β	R^2	ΔR^2
DV = Team coordination (Time 1)			
Step 1	—	.27***	—
Deliberate planning	.15	—	—
Contingency planning	.45***	—	—
Step 2	—	.30***	.03
Deliberate planning	.07	—	—
Contingency planning	.37**	—	—
Reactive planning (Time 1)	.21	—	—
DV = Team coordination (Time 2)			
Step 1	—	.17***	—
Deliberate planning	.17	—	—
Contingency planning	.31*	—	—
Step 2	—	.54***	.37***
Deliberate planning	.20	—	—
Contingency planning	.05	—	—
Reactive planning (Time 2)	.66***	—	—
DV = Team performance			
Step 1	—	.24**	—
Preplanning	–.34**	—	—
Coordination (Time 2)	–.29*	—	—
Step 2	—	.34**	.10**
Preplanning	–.39**	—	—
Coordination (Time 2)	.05	—	—
Reactive planning (Time 2)	–.46**	—	—

Note: β = standardized regression coefficient.
$^*p < .10$. $^{**}p < .05$. $^{***}p < .01$.

This finding suggests although coordination and reactive strategy adjustment are both action processes, they are distinct teamwork processes. Furthermore, in the current sample of teams, although reactive strategy adjustment explained performance variance on top of that explained by team coordination, team coordination was not a significant predictor of team performance (β = .05, *ns*) once reactive strategy adjustment was entered into the equation.

In sum, our manipulation of team preplanning resulted in differences in team deliberate planning but not in contingency planning or reactive strategy adjustment. As expected, deliberate and contingency planning were significantly related to coordination process, though more strongly early on in the action phase than at the end of the action phase. Reactive planning added incrementally to the explanation of coordination when coordination was assessed at the end of the action phase (Time 2). When coordination was assessed early on (Time 1), only contingency planning was a significant predictor. Finally, in predicting team performance, reactive strategy adjustment explained unique performance variance beyond that explained by coordination process.

Discussion

The primary aim of the current study was to distinguish different types of team planning processes utilized during each of the two team task performance episodes: transition and action phases, and to examine the effects of each type of planning on team coordination and performance. To link our findings of team planning processes with previous team planning research, we invoked an assigned planning manipulation (i.e., preplanning). We then measured planning processes and indexed team performance as the time taken to successfully complete a scavenger hunt.

Instructing teams to plan (i.e., preplanning manipulation) improved their deliberate planning process but not their contingency or reactive planning. This suggests prior work examining preplanning and plan quantity has primarily explored the deliberate dimension of team planning but not the contingency or reactive aspects of planning. The lack of relations with contingency and reactive planning suggests these are distinct subdimensions of team planning whose relations with other team effectiveness indices have yet to be explored.

This finding is particularly important as the contingency and reactive aspects of planning showed the strongest relations to coordination and ultimately to performance. These aspects of planning differ from deliberate planning in that they enable teams to adapt to change. Contingency plans do so by anticipating what might go wrong, and specifying alternative courses of action that will take effect. Reactive adjustments do so real time while the team is working on the task and experiencing the gap between their existing plan and the demands of the task.

The current study found that deliberate and contingency planning were positively related to team coordination process. In other words, teams who developed plans and/or backup plans during the transition period prior to beginning the hunt reported smoother synchronization of member actions during the hunt. Interestingly, these relationships were stronger at Time 1 than at Time 2. Thus, deliberate and contingency planning helped team members coordinate early on, though the effects seemed to weaken over time. The third type of team planning process, reactive strategy adjustment was predictive of both team coordination and performance. Most notably, our results suggest advance planning is not nearly as valuable as reactive strategy adjustment. We found a strong relationship between the extent to which teams utilized on-the-fly planning and were able to change their plans in response to the rhythms of the task and the speed with which they completed the task.

This finding builds on prior work supporting a strong link between in-process planning and team performance (Weingart, 1992). Although Weingart measured both pre- and in-process planning, because there was so little preplanning observed, a meaningful comparison between the utility of the two types of planning could not be made. By manipulating preplanning, we ensured variability in the extent to which teams utilized advance planning. Consistent with Weingart, we found in-process or reactive planning was highly predictive of team performance. In addition, we found reactive strategy adjustment was a stronger predictor of team coordination and performance than was deliberate or contingency planning. This consistency of findings is particularly notable because the two tasks were markedly different. Weingart's teams could readily observe one another, placing a premium on in-process planning. The teams studied here typically alternated between working as an intact team and then as individual members. This meant team members often could not directly communicate with one another, arguably placing a premium on up-front advance planning (deliberate and contingency) to guide team task effort.

The current study makes several important contributions to the literature on team process. First, findings support the tripartite structure of team planning process advanced by Marks et al. (2001). Marks and colleagues proposed a taxonomy of teamwork processes organized by team task performance episodes (i.e., transition and action phases). Notably, they argue the processes critical to each episode differ. With regard to planning, three types of planning process were defined: two needed during transition periods, prior to task accomplishment, and one needed during task accomplishment. Although some prior research on team planning has distinguished preplanning from in-process planning (Weingart, 1992), research has not yet explored the three types of planning proposed by Marks et al. We observed substantial variability across teams in their use of these planning processes, and the three planning processes were only modestly related to one another.

Furthermore, of the two types of planning that occur during the transition phase, the current findings suggest that contingency planning is more strongly related to subsequent action processes than is deliberate planning. Contingency planning is not only the lesser investigated of the two processes but also the more predictive of team effectiveness. These two processes differ conceptually in the extent to which they recognize the need for enabling teams to adapt to unpredictable aspects of the operating environment. Our finding that these two processes, differing in their facilitation of team adaptation, also show a differential pattern of antecedent (i.e., preplanning manipulation) and outcome relations, suggests this is a meaningful distinction in team planning process. Examining antecedents of team contingency planning represents a fruitful area for future research on team planning, especially for understanding teams operating in dynamic performance environments.

Like those of Janicik and Bartel (2003), these findings further underscore the multidimensional nature of team planning. Future research on team planning would be well served to distinguish between these three types of planning processes. For example, research on team planning as a mediator of the group goal effect may benefit from examining how goals differentially affect or induce each type of planning process. This opens up interesting avenues for future research examining questions like which type of planning most accounts for the group goal effect? If group goals differentially impact the three types of planning processes, it would be helpful to understand how team goals can be structured to maximize the adaptation-enabling contingency and reactive processes examined here.

A related contribution is the explicit focus on the timing of team processes. We measured planning that was completed prior to beginning the scavenger hunt (i.e., deliberate and contingency) and that which occurred throughout the scavenger hunt (i.e., reactive strategy adjustment). In addition, we measured reactive strategy adjustment and coordination at two time periods, and found interesting differences. First, results support the idea that planning processes enacted during transition and action phases have different effects on team coordination and performance. Transition phase (advance) planning was more important to early coordination than to coordination measured later on. Action phase planning (i.e., reactive strategy adjustment) was strongly related to coordination throughout the action phase. Notably, Time 1 coordination was most strongly predicted by the quality of teams' contingency planning, whereas Time 2 coordination was most strongly predicted by the quality of teams' reactive strategy adjustment.

Another difference between planning processes used during the transition and action phases was that transition planning (i.e., deliberate and contingency planning) impacted action process (i.e., coordination) whereas action planning (i.e., reactive strategy adjustment) directly impacted performance. Thus, we observed positive effects of deliberate and contingency planning in terms of improved coordination but not team performance. Conversely, reactive strategy adjustment occurs during the action phase itself and as such showed a strong direct link with team performance. These findings lend empirical support to the recurring phase model's prediction that transition processes impact action processes, which in turn impact team performance (Marks et al., 2001).

In addition to testing a central proposition of the Marks et al. (2001) model, the current study contributes to team process research by developing and providing initial psychometric evidence to support the use of self-report scales to measure three team planning processes and team coordination. Future research may employ these and similar scales as a viable method for tapping *team process* variables. Using self-report measures of team process may be particularly helpful in field settings where observer ratings of process are extremely difficult to obtain.

The current study also contributes to team effectiveness research by studying teamwork processes in a new task environment. The scavenger hunt task afforded a great deal of control without compromising realism. The competitive nature of the hunt ensured participants were highly engaged in the task and cared about their team's performance. We were also able to maintain a great deal of structure and consistency. All teams performed an identical task under the same conditions. The complexity of the task also provided an excellent opportunity to study the effects of planning processes. For example, in Weingart's (1992) study of team planning, team members worked on a tinker-toy construction task and could readily observe one another's actions and directly communicate throughout task completion. This characteristic largely undermined the utility of preplanning. In the scavenger hunt task, team members spent at least part of the time working on separate parts of the task and could neither directly observe one another's progress nor communicate. Thus, all forms of planning could serve an important role.

The scavenger hunt task mirrors certain aspects of common applied workplace team tasks. In particular, the scavenger hunt task requires members to quickly come together for a common purpose. In this way, teams are comparable to project teams, who "carry out defined, specialized, time-limited projects and disband after finishing" (Sundstrom, McIntyre, Halfhill, & Richards, 2000, p. 46) and to action teams who "conduct complex, time-limited performance events” (Sundstrom et al., 2000, p. 47). Both project and action team tasks require that teams utilize their members’ differing informational sets to solve problems, gather and collectively process new information, and coordinate smoothly with one another to perform their task as efficiently as possible. The scavenger hunt used in the current study placed a premium on collective information processing (Hinsz, Tindale, & Vollrath, 1997); teams had to combine their existing knowledge and creatively devise ways to obtain new information to succeed.

Limitations

Although the current study renders several meaningful contributions to our knowledge of team process, there are also a number of important limitations worthy of mention. First, when we used Marks et al.’s (2001) recurring phase model as a lens to study the impact of planning processes occurring in different phases of the team task episode, we did so within a single performance episode. The Marks et al. model posited that teams cycle through recurring cycles of transition and action cycles. Thus, reactive strategy adjustment in one action phase may improve subsequent deliberate and contingency planning in the following transition phases, as the team reflects on and learns from its prior successes and failures. Future research is needed that, like Mathieu and Schulze (2006), models multiple recurring phases to more fully explore the temporal dynamics of team process.

A second limitation is the use of a sample of undergraduate psychology students. Although we observed that participants were highly engaged in the task, clearly there may be differences in the way college students and working adults benefit from team planning processes. The current findings can be viewed as providing a glimpse into the effects planning can have on team performance (Mook, 1983), but these findings need to be replicated in more applied team settings.

Finally, we consider the use of self-report measures of team process to be both a strength and a limitation. We were unable to use observational ratings because of the large number of teams working on the task simultaneously dispersed across a large campus. Testing the teams together enhanced the realism and engagement of the task, yet it also prevented us from directly observing and being able to rate team process. Ideally, we would have triangulated across observer ratings and self-report ratings. We did ensure all team process measurements were made prior to informing teams of their performance and measured action processes at two time periods.

Future Research Directions

Results of the current study point to a number of exciting avenues for future research. First, we found reactive strategy adjustment was a potent predictor of both team coordination and team performance. Reactive strategy adjustment added uniquely to the prediction of coordination (measured at the end of the action phase), above and beyond the effects of transition phase planning. In effect, not only was having a priori plans important to effective team coordination but being able to modify those plans in response to changing task conditions also enabled greater coordination. Team reactive strategy adjustment also explained unique variance in team performance beyond that of coordination process. Reactive strategy adjustment was not impacted by simply instructing teams to plan at the onset of the task. The question in need of future research is, how do we foster and/or evoke this type of team process?

Team composition and training are two interesting possibilities. LePine (2003) found teams comprised of members with higher levels of cognitive ability, achievement, openness, and lower levels of dependability showed greater role structure adaptation after an unexpected change in the task environment than teams comprised of individuals lower on these traits. Perhaps, these same compositional variables also enable more effective reactive strategy adjustment. For training teams in the adaptive planning processes, contingency and reactive adjustment would be another viable option in need of future study.

Another interesting issue for future study is the consistency of these process–performance relationships across team task types. Our results find that transition processes impact action process, whereas action processes impact performance. The nature of the team task may dictate the relative importance of each type of planning. For example, in highly predictable task environments where team members have substantial experience and expertise, deliberate and contingency planning may be directly related to team performance, as opposed to impacting only action processes like coordination. On the other hand, in more dynamic and unpredictable task environments, not only might reactive strategy adjustment play the largest role in predicting performance but also excessive reliance on up-front deliberate planning may invoke too much rigidity and hinder adaptability.

The current study also revealed an unexpected finding with regard to contingency planning. Contrary to our prediction, the preplanning manipulation did not impact contingency planning. Setting aside time to plan improved the quality of teams' deliberate process, but it did not prompt teams to consider potential backup plans. Given our observation that contingency planning was a key predictor of coordination early on in the action phase, future work that explores the contingency dimension of planning in more detail is needed; for instance, under what conditions are contingency plans useful, and how do teams develop effective contingency plans?

Though not hypothesized, we found a strong direct relationship between the preplanning manipulation and team performance that does not appear to be mediated by any of team process variables examined in this study (as evidenced by the lack of relations between *preplanning* and *teamwork process* variables). Whereas preplanning promoted effective deliberate planning process, deliberate planning was at best only distally linked to performance (i.e., via coordination and reactive planning). Thus, there does appear to have been some advantage to teams who spent a longer time in the transition phase but not necessarily by way of improved planning processes. The recurring phase model specifies two additional transition processes: goal setting and mission analysis. Perhaps, teams in the preplanning condition engaged in more effective goal setting and mission analysis, enabling their superior performance. Because we did not measure either process, we were unable to test that idea in the current study. This remains an open question for future research.

The current study provides a first look at these important subdimensions of team planning process. Results of this initial study suggest the repeated observation that teams typically do not plan on their own (Hackman et al., 1976; Weingart, 1992) may in fact be functional to the extent that teams avoid developing rigid up-front plans (i.e., deliberate planning). Conversely, this may be harmful to performance when it also involves the failure to develop backup or contingency plans in advance. Planning that occurred in tandem with the task, as opposed to that which occurred prior to beginning it, showed stronger links with both coordination and performance. This suggests that those working in and managing teams ought to target their team development efforts at fostering teams' enactment of reactive strategy adjustment.

References

Gevers, J. M. P., van Eerde, W., & Rutte, C. G. (2001). Time pressure, potency, and progress in project groups. *European Journal of Work and Organizational Psychology, 10*, 205-221.

Hackman, R. J., Brousseau, K. R., & Weiss, J. A. (1976). The interaction of task design and group performance strategies in determining group effectiveness. *Organizational Behavior and Human Performance, 16*, 350-365.

Hackman, J. R., & Morris, C. G. (1975). Group tasks, group interaction process, and group performance effectiveness: A review and proposed integration. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (vol. 8, pp. 45-99). New York: Academic Press.

Hayes-Roth, B., & Hayes-Roth, F. (1979). A cognitive model of planning. *Cognitive Science, 3*, 275-310.

Hinsz, V. B., Tindale, R. S., & Vollrath, D. A. (1997). The emerging conceptualization of groups as information processes. *Psychological Bulletin, 121*, 43-64.

James, L. R., Demaree, R. G., & Wolf, G. (1984). Estimating within-group interrater reliability with and without response bias. *Journal of Applied Psychology, 69*, 85-98.

Janicik, G. A., & Bartel, C. A. (2003). Talking about time: Effects of temporal planning and time awareness norms on group coordination and performance. *Group Dynamics: Theory, Research, & Practice, 7*, 122-134.

Kozlowski, S. W. J., & Ilgen, D. R. (2007). Enhancing the effectiveness of work groups and teams. *Psychological Science in the Public Interest, 7*, 77-124.

LePine, J. A. (2003). Team adaptation and postchange performance: Effects of team composition in terms of members' cognitive ability and personality. *Journal of Applied Psychology, 88*, 27-39.

LePine, J. A., Piccolo, R. F., Jackson, C. L., Mathieu, J. E., & Saul, J. R. (in press). A meta-analysis of teamwork processes: Tests of a multidimensional model and relationships. *Personnel Psychology*.

Locke, E. A., Durham, C. C., Poon, J. M. L., & Weldon, E. (1997). Goal setting, planning, and performance on work tasks for individuals and groups. In S. L. Friedman & E. K. Scholnick (Eds.), *The developmental psychology of planning: Why, how, and when do we plan?* (pp. 239-262). Mahwah, NJ: Erlbaum.

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

Marks, M. A., & Panzer, F. J. (2004). Monitoring training: An examination of the effects of training monitoring skills on team performance. *Human Performance, 17*, 25-41.

Marks, M. A., Sabella, M. J., Burke, C. S., & Zaccaro, S. J. (1999). The impact of cross-training on team effectiveness. *Journal of Applied Psychology, 87*, 3-13.

Mathieu, J. E., & Schulze, W. (2006). The influence of team knowledge and formal plans on episodic team process-performance relationships. *Academy of Management Journal, 49*, 605-619.

Mitchell, T. R., & Silver, S. S. (1990). Individual and group goals when workers are interdependent: Effects on task strategies and performance. *Journal of Applied Psychology, 75*, 185-193.

Mook, D. G. (1983). In defense of external invalidity. *American Psychologist, 38*, 379-387.

Nutt, P. C. (1984). Planning process archetypes and their effectiveness. *Decision Sciences, 15*, 221-239.

Smith, K. G., Locke, E. A., & Barry, D. (1990). Goal setting, planning, and organizational performance: An experimental simulation. *Organizational Behavior and Human Decision Processes, 46*, 118-134.

Stout, R. J., Cannon-Bowers, J. A., Salas, E., & Milanovich, D. M. (1999). Planning, shared mental models, and coordinated performance: An empirical link is established. *Human Factors, 41*, 61-71.

Sundstrom, E., McIntyre, M., Halfhill, T., & Richards, H. (2000). Work groups: From the Hawthorne Studies to work teams of the 1990s and beyond. *Group Dynamics: Theory, Research, & Practice, 4*, 44-67.

Weingart, L. R. (1992). Impact of group goals, task component complexity, effort, and planning on group performance. *Journal of Applied Psychology, 77*, 682-693.

Weingart, L. R. (1997). How did they do that? The ways and means of studying group process. *Research in Organizational Behavior, 19*, 189-240.

Weingart, L. R., & Weldon, E. (1991). Processes that mediate the relationship between a group goal and group member performance. *Human Performance, 41*, 33-54.

Weldon, E., Jehn, K. A., & Pradhan, P. (1991). Processes that mediate the relationship between a group goal and improved group performance. *Journal of Personality and Social Psychology, 16*, 555-569.

Leslie A. DeChurch is an assistant professor of industrial and organizational psychology at the University of Central Florida. Her research interests include team effectiveness, multiteam systems, leadership, and conflict management. Her research has appeared in the *Journal of Applied Psychology*, *Leadership Quarterly*, *Journal of Applied Social Psychology*, *Group Dynamics: Theory, Research, & Practice*, and the *International Journal of Conflict Management*.

Craig D. Haas is a consultant at Hogan Assessment Systems Inc. He works with five of the *Fortune* 100 companies and several other firms to help them to validate and utilize personality assessments for large-scale personnel selection, leadership development, and talent management initiatives. His research interests include personality theory and assessment, leadership, team effectiveness, and conflict management. His research work has appeared in *Group Dynamics: Theory, Research, & Practice*.