Capacity, Collaboration, and Commonality: A Framework for Understanding Team Learning

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Abstract

This article develops a theory of learning in team contexts and tests the degree to which personal and situational variables impact knowledge creation within interactive task groups. Using the critical conditions of capacity, collaboration, and commonality as explanatory concepts, we examine the effects of cognitive ability, agreeableness, workload distribution, and structure on team learning. Results from 109 teams working on an interdependent command and control simulator suggest that teams learn the most when composed of people who are high in cognitive ability and learn the least when composed of people who are high in agreeableness. Teams with a distributed workload learned more than teams that overloaded individual members, and teams utilizing a paired structure learned more than teams structured either functionally or divisionally. The theoretical and practical implications of the aforementioned results are discussed, as well as possible limitations and directions for future research.

Introduction and Background

Although researchers have examined learning at a number of different levels within organizations, the processes underlying how organizations learn are still not fully understood. As a result, it has been suggested that future research needs to focus on the more micro underpinnings of organizational learning (Argote, 1993). Perhaps the best place to start is at the team level, since most of the learning within an organization takes place in groups or teams (Brown & Duguid, 1991). This shift from the individual to team learning is due to distinct changes in organizational structure over recent years. Employees are now designated tasks to complete as a team, often with a designated leader (e.g., Ilgen, 1994).

Given these developments, it is critical to understand how teams learn. The purpose of this study is to develop a theory of learning in team contexts, and to examine the effects of personal and situational variables on knowledge creation within interactive task groups. Prior to introducing specific hypotheses, learning is defined at the team level. Then three conditions are introduced as essential precursors of team learning: capacity, collaboration, and commonality. After defining each condition, we discuss and then test the degree to which personal and situational antecedents relate to team learning using capacity, collaboration, and commonality as explanatory concepts.

Team Learning: Definition and Conceptualization

We adopt the perspective that learning reflects changes in both knowledge and behavior. This is illustrated well by Weiss (1990: 172), who proposes that "learning is a relatively permanent change in knowledge or skill produced by experience." Weiss originally intended his definition to be specific to the individual learner. However, when those individuals are placed in an interdependent team setting, learning can occur through the interaction of the team members. This social aspect of knowledge acquisition has recently received attention from scholars interested in socially shared cognition and information processing systems (e.g., Hinsz, Tindale, & Vollrath, 1997). Both streams of research view cognition as a combination of the social context and the interaction between the group members (Hollingshead, 1998). Within the group, cognition is shared through a system of encoding, storing, and retrieving information which has been termed transactive memory (e.g., Wegner, 1987, 1995). Transactive memory is derived from research on directory-sharing computer networks and consists of three key processes: (a) *directory updating*, where group members learn what other group members already know, (b) *information allocation*, where new information is passed along to the group member with the requisite expertise in order to expedite its storage, and (c) *retrieval coordination*, where a plan is set up within the group for retrieving needed information based on the expertise of each group member (Wegner, 1995).

Transactive memory adds a social aspect to learning that does not present itself at the individual level, thereby altering the conceptualization of the learning construct at the team level. Therefore, we define team learning as *a relatively permanent change in the team's level of knowledge and skill produced by team members' collective ability to encode, store, and retrieve information over time.*

Critical Conditions for Team Learning: Capacity, Collaboration, and Commonality

Any theory of team learning needs to address critical issues necessary for people working in collectives to both learn things individually and to learn directly and vicariously from others. For this to take place, we propose that at least three conditions must exist at the team level: capacity, collaboration, and commonality.

Capacity. Individuals bring to teams a collection of skills, abilities, and personal styles that provide human capital. For example, cognitive characteristics can help the team function more effectively (e.g., Argote, 1993; Barrick, Stewart, Neubert, & Mount, 1998). By capacity, we mean the sum total of the individuals' knowledge, skills, and abilities they bring to the team.

We propose that these characteristics can also impact team learning, since individuals who are part of a group must process information within their own minds as well as among the minds of the group members (Ickes & Gonzales, 1994). In a transactive memory system, some level of individual mental capacity is necessary for the entire group to progress through the three stages of encoding, storage, and retrieval.

Collaboration. The second critical condition necessary for team learning is effective collaboration, which refers to the sharing of information, critical discussion, and insight within the team. As stated above, teams must process information both individually and collectively (Ickes & Gonzales, 1994). Once the team members start to interact, they use transactive memory to share and critique information among the team members (Wegner, 1987, 1995). Some degree of information sharing must occur in order for the team to operate successfully (Hinsz, Tindale, & Vollrath, 1997).

Commonality. Commonality is defined by a common frame of reference or language within the team, such that each team member can understand and replicate the learning of others within the team. Team members treat information differently if they do not have a common frame of reference (e.g., Tindale, Sheffey, & Scott, 1993). This could potentially be disastrous for the team if the process of encoding, storage, and retrieval is interrupted, particularly when learning what other team members already know (Hinsz, Tindale, & Vollrath, 1997).

Personal and Situational Characteristics

If capacity, collaboration, and commonality make up an effective system for learning at the team level, then we should be able to develop predictors regarding the various personal and situational characteristics that might directly effect team-level learning.

Personal Characteristics. This study examined two personal variables: one that deals with capacity (i.e., general cognitive ability) and a second that deals with effective collaboration (i.e., agreeableness).

Cognitive ability predicts a number of individual level outcomes, including training performance (Ree & Earles, 1991) and job performance (Ree, Earles, & Teachout, 1994). Aside from performance related outcomes, individuals high in cognitive ability also evidence the largest changes in job knowledge (Hunter, 1983), supporting the belief that cognitive ability predicts learning (Jensen, 1986). This link between cognitive ability and performance has also been shown at the team level (Barrick et al., 1998). However, none of these studies directly examined whether cognitive ability has a beneficial effect on knowledge change at the team level. Therefore, based on the research described above (e.g., Jensen, 1986; Ree, Carretta, & Teachout, 1995), our expectation was that individuals high in cognitive ability possess greater capacity for the encoding, storage, and retrieval of information in a team setting. More specifically, we hypothesized that:

Hypothesis 1. Teams with higher levels of general cognitive ability will evidence higher levels of team learning.

The second personal characteristic, agreeableness, is important because of its implications for effective collaboration. Agreeableness reflects the degree to which a person is friendly, trusting, tolerant, compliant and modest (e.g.,Goldberg, 1993). It would appear to be particularly important in teams. Team learning requires that team members critically analyze information that is presented to them, and high levels of agreeableness may actually be detrimental to effective collaboration and objective measures of team learning. In fact, the notion that pre-mature consensus has a negative effect on group problem solving and decision making accuracy has been well-supported (Aldag & Fuller, 1993).

Rather than requiring an over-emphasis on cohesiveness, consensus-seeking, and agreement, effective collaboration within teams trying to learn or solve problems requires a full and critical discussion of the available data and ideas (Tjosvold & Deemer, 1980). Tjosvold and his colleagues (e.g., 1980) have labeled this phenomena “constructive controversy.” Agreeable team members, who by definition are compliant and deferent, may more readily accept the opinion of their team members uncritically in order to avoid argument. Without the benefits of critical discussion, teams may not be able to effectively share and critique information and ideas (e.g., Hall & Williams, 1970; Maier & Hoffman, 1964). Thus, our second hypothesis with respect to personal characteristics was that:

Hypothesis 2. Teams with higher levels of agreeableness will evidence lower levels of team learning.

Situational Characteristics. Although there are a number of situational that could have important implications for team functioning, perhaps the most critical from a transactive memory perspective is workload distribution. Workload distribution may be related to learning because it affects both capacity and collaboration. Regarding capacity, individuals can only encode, store and retrieve a certain amount of information (e.g., Kanfer, Ackerman, Murtha, Dugdale, & Nelson, 1994). If one team member is performing the majority of the team’s tasks, the team is only using a small percentage of its cognitive resources and likely will only be able to accomplish a portion of its duties. In addition, because he or she must concentrate exclusively on the task at hand, collaboration within the team will also likely suffer. Sharing knowledge and information with the rest of the team becomes difficult when one is bombarded with information that must be encoded and stored individually before it can be disseminated to the rest of the team. Therefore, we hypothesized that:

Hypothesis 3. Teams with an evenly distributed workload will learn more than teams with an unevenly distributed workload.

The second situational characteristic that was expected to influence team learning was the structure of the team. Like workload, structure deals with the division of labor. However, while workload is an externally driven characteristic, structure is internally driven and focuses on how roles are defined within the team. Configurations that employ narrowly defined roles have traditionally been labeled "functional structures" whereas configurations that rely on broad roles have been labeled "divisional structures" (e.g., Burns & Stalker, 1961; Pennings, 1992). The implications of different types of structures for capacity, collaboration, and commonality are complex. Defining roles narrowly, as is accomplished in functional structures, may promote team level learning because it reduces the required capacity for individual team members who only have to encode, store, and retrieve a small amount of information. However, it may create commonality problems. That is, the person occupying the specialist role may have difficulty collaborating effectively with other team members specializing on different aspects of the task because groups tend to not discuss information that is unique or held by a single person (e.g., Stasser & Stewart, 1992). In addition, Laughlin and Ellis (1986) have demonstrated that "truth wins" models inaccurately describe how groups learn and solve problems. That is, the fact that one member possesses the correct solution is rarely enough for the group as a whole to come up with right answer. Defining roles more broadly, as is accomplished in divisional structures, creates conditions where team members have greater commonality and may set the stage for effective collaboration relative to what might occur in more narrowly defined functional structures. However, the breadth of these roles may create problems in terms of capacity, since each team member is asked to process all the information. This may even spill over into poor collaboration, because the team members may not have time to effectively discuss the situation.

Some type of compromise structure needs to be created, and, once again, the literature on collective induction is highly relevant in terms of stipulating the exact nature of that structure. Specifically, although "truth wins" models have been shown to poorly capture the outcomes associated with problem solving groups, "truth supported wins" models seem to capture the process quite well (Laughlin & Ellis, 1986). Given these findings, structures that create "role partners" (two individuals who share expertise and information processing responsibilities), which we refer to as pair-based structures, may allow for the best mix of capacity, commonality and collaboration in team learning contexts. As a result, we hypothesized that:

Hypothesis 4. Teams utilizing pair based structures will learn more than those structured functionally or divisionally.

Method

Research Participants

Participants included 436 students from an introductory management course at a large Midwestern University who were arrayed into 109 four-person teams. In exchange for their participation, each earned class credit and 40% earned cash prizes (up to $40 per session) based upon the team's performance.

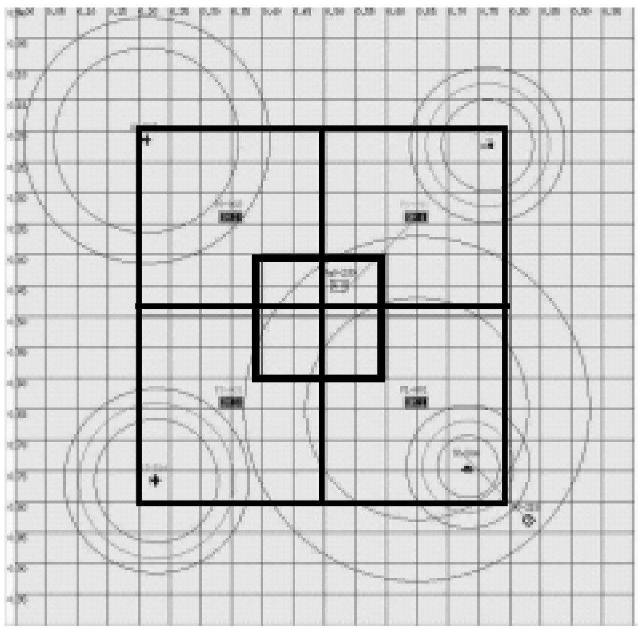
Task

Participants engaged in a modified version of the Distributed Dynamic Decision-making (DDD) Simulation (see Miller, Young, Kleinman, & Serfaty, 1998). Participants controlled various military vehicles such as helicopters, jets, tanks, and radar planes within a geographic region represented by a 20 by 20 grid on the screen.

The DDD Grid. The grid was partitioned into four geographic quadrants of equal area (NW, NE, SW, SE), and each area was assigned to one team member. In the center of the screen, a 4 by 4 square was marked off a highly restricted airspace. Surrounding the center square was another restrictive airspace denoted by a 12 by 12 square. The area outside of the larger square was considered to be neutral airspace (see Figure 1).

The objective of the simulation was to identify unfriendly vehicles operating on the screen and to keep unfriendly vehicles out of the green and red restricted areas, while making sure not to engage any friendly vehicles operating anywhere on the screen. If an unfriendly vehicle made its way into the restricted airspace, the team had to disable it as soon as possible. The team lost points for every second that an enemy target resided in the restricted airspace and for disabling a friendly vehicle.

Figure 1
The DDD Grid, Including Bases, Vehicles, and Tracks



Bases and Vehicles. Each team member had two rings around their base, which had implications for what they could see on the screen. The outer ring was referred to as the detection ring. Any vehicle outside the detection ring could not be seen with that individual's base. Once the track entered the detection ring, it appeared on the team member's screen. However, it could not be identified (friend or foe) until it reached the inner ring, which was called the identification ring. If a team member wanted to monitor airspace outside the detection ring of his or her base, they could check with a teammate or launch a vehicle and move it over to that area (see Figure 1).

Four vehicles were assigned to each base, which included a combination of tanks, jets, helicopters, and radar planes (see Figure 1). However, each vehicle had different capabilities in terms of four dimensions: range of vision, speed of movement, duration of operability, and weapons capacity. Regarding range of vision, the radar plane's detection ring evidenced the largest radius, followed by the jet, the helicopter, and finally the tank. Tanks were also the slowest vehicles on the screen, surpassed in order by the helicopter, radar plane, and jet. However, the tank could operate for eight minutes at a time, while the radar plane was limited to six minutes, the helicopter to four minutes, and the jet to two minutes. Regarding weapons capacity, the tank had a power of five, followed by the helicopter with a power of three, the jet with a power of one, and the radar plane with zero power.

Tracks. Vehicles entering the grid were called tracks and were either identified by codes that indicated whether they were air or ground vehicles, friendly or unfriendly, and, if unfriendly, how powerful they were (1=low to 5=high).

Learning Tracks. During the actual game the team encountered four types of unknown tracks labeled UX, U+, U-, and U#. The team members were told that each one corresponded to an air track, and that each had a power of 0, 1, 3 or 5. During the simulation, teams had to learn the meaning of each symbols as quickly as possible through trial and error learning. For instance, if one team member lost points by engaging a U+ in the restricted airspace, they learned that the U+ was friendly. However, in order to create a shared representation, this crucial information had to be discussed within the team. Without communication, the other team members were forced to waste time and points figuring out that the U+ is friendly on their own. More importantly, if one team member incorrectly diagnosed the power of the U+, he or she continued to engage the friendly unknown unless another team member offered contradictory information.

Other tracks required more complex trial and error learning. For example, if one team member engaged an unfriendly U with a JT (power = 1) and it failed to destroy the track, that team member learned that the U must either be an A3 or an A5. If a second team member engaged the same track with a HE and it was destroyed, that person learned that the track must be either an A1 or an A3. If the team learning process were operating properly, the first team member would have shared the newfound information with the rest of the team. When the second team member learned that it was either an A1 or an A3, he or she could retrieve the knowledge shared by the first team member or allocate the information to the first team member. Either way, through communication the team could have learned that the U target was an A3.

Procedures

Prior to reporting to the experimental setting, all participants completed cognitive ability and personality measures administered as part of an introductory management class. Each team member was randomly assigned to a four-person team. Training took approximately 90 minutes. The first 30 minutes were devoted to declarative knowledge regarding all the various details relevant to playing the DDD. The second 60 minutes focused on the simulation, with the trainer instructing the team members on the details of the task, the operation of the mouse, etc. After practicing for 60 minutes, the team members went through the 60 minute experimental session.

Measures

Experience. Experience was manipulated by breaking the 60 minute simulation into two 30-minute sessions (i.e., Time 1 and Time 2). Experience was thus a within-subjects variable.

Team Learning. The measure of team learning was based on the unknown tracks that were presented during the final sixty minutes of the three-hour session. By learning what those tracks were in the actual game (e.g., A0, A1, etc.), and then remembering what they were for the duration of the game, team members evidenced a permanent change in knowledge and skill. Learning can be operationally measured by counting the number of desired behaviors and then subtracting the number of undesired behaviors or errors (Kraiger, Ford, & Salas, 1993). The DDD captured both desired and undesired behaviors including the number of correct attacks on the enemy unknown tracks, the number of attacks using incorrect power, and the number of attacks on the friendly unknown tracks. Attacking correctly meant that the team member matched the power of the target with the power of the vehicle used in the engagement. This situation indicated that the team member had the requisite knowledge and skill to deal with that specific target and the team member received 2 learning points. However, there were situations where team members successfully attacked U tracks without being efficient. For instance, the U-, which had a power of 1, could be engaged with the helicopter, tank, and jet. If a team member attacked it with the helicopter or tank, it was unclear whether he or she learned the exact power of the track, but it was clear that he or she learned that the track was unfriendly. Therefore, the team member only earned 1 learning point. When team members either attacked the friendly U target or attacked an unknown without enough power, it was clear that the team had not learned the identity of the unknown track and the team lost 2 learning points.

Learning was assessed at the individual level and aggregated to the team level by averaging across team members. Intraclass correlation coefficients 1 and 2 were .55 and .83 respectively, indicating that aggregation was appropriate (see Klein et al., 2000).

Cognitive Ability. Form IV of the Wonderlic Personnel Test, which is one of the most widely used measures of *g* in both applied and research contexts (Wonderlic and Associates, 1983), was administered to each research participant prior to the experiment. To aggregate cognitive ability to the team level, we used Steiner's (1972) taxonomy. Out of Steiner's (1972) three categories, the additive model best represents the team task used in this study. Therefore, the average of the team's four Wonderlic scores was most relevant operationalization of cognitive ability at the team level.

Agreeableness. Agreeableness was measured using the Revised NEO Personality Inventory (NEO-PI-R). The reliability and validity of this test has been demonstrated by a variety of researchers (e.g., Costa & McCrae, 1992). For this study, the coefficient alpha estimate of reliability was .86 for Agreeableness. Because the task was additive, the average of the team's four agreeableness scores represented the construct at the team level.

Workload Distribution. Distribution of labor was manipulated within teams and counterbalanced across the two time periods to control for any order effects. In the uneven condition, DM2 encountered the majority of unknown tracks (around 60%) in his or her quadrant. In the evenly distributed workload condition, each DM encountered the same number of unknown tracks (25%) as the other team members.

Structure. Team structure was manipulated as a between-subjects variable with teams randomly assigned to paired, functional, or divisional team structures. In the functional structure, each team member had control over one type of vehicle in order to create specialized functional competencies. In the divisional structure, all four team members were responsible for one of each type of vehicle. Finally, in the pair-based structure, role partners were created so two team members had two tanks and two radar planes, while the other two team members had two helicopters and two jets.

Results

Data Analysis and Statistical Power

Repeated measures regression was used to analyze the data (Cohen & Cohen, 1983). The first step in repeated measures regression is to partition the overall variance in the dependent variable into within- and between-team portions. By partitioning the variance, irrelevant sources of variance are removed from the denominator of the F ratio when making inference tests (e.g., removing within-teams variance when examining between-teams effects).

Descriptive Statistics and the Role of Experience

Table 1 shows the descriptive statistics for the between-team variables, and Table 2 shows the results of regressing team learning on five independent variables. Forty-five percentof the total variance in learning was due to within-team variation, whereas 55% was due to between-team variation. The within-team variables were entered first and the between-team variables entered second. Because of the orthogonality of the manipulated conditions, and the lack of a relationship between cognitive ability and agreeableness, order of variable entry had no effect on the results.

Table 1
Means, Standard Deviations, and Intercorrelations Among the Between-Team Variables

Variable	Mean	SD	1	2	3	4	5
1. Team Learning	28.80	17.63	--				
2. Cognitive Ability	24.94	2.89	.26*	--			
3. Agreeableness	3.30	.19	-.18*	-.04	--		
4. Divisional	.31	.46	-.08	-.12*	.01	--	
5. Functional	.36	.48	-.12*	.06	-.04	-.51*	--

Note: N=99. Divisional is the dummy coded variable comparing the divisional structure with the functional and paired structures. Functional is the dummy coded variable comparing the functional structure with the divisional and paired structures. Significance values are based on one-tailed tests. * $p < .05$.

Table 2
Effects of the Between- and Within-Team Variables on Team Learning

		Team Learning			
Hierarchical Step	Independent Variable	Total R^2	Incremental R^2	Incremental Variance Accounted Within[a]	Incremental Variance Accounted Between[b]
1	Experience	.10*	.10*	.22*	
2	Labor Distribution	.14*	.04*	.09*	
3	Cognitive Ability	.20*	.07*		.13*
4	Agreeableness	.23*	.03*		.05*
5	Structure	.28*	.04*		.07*

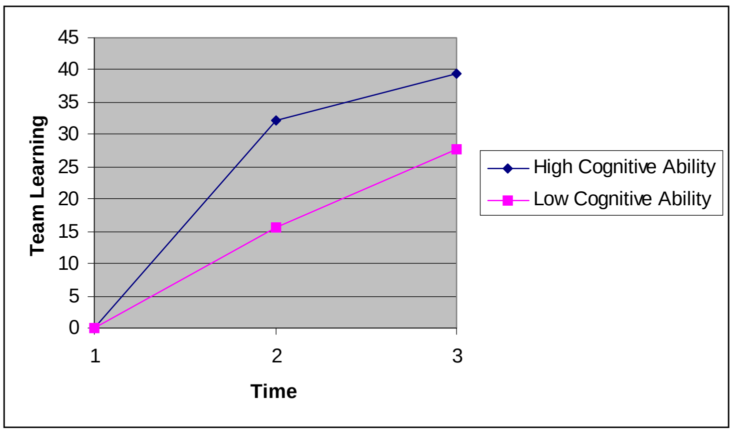
Note: [a]N=198 (2 observations per 99 teams) (df = 198 – 99 – k – 1). [b]N=99 (1 observation per 99 teams) (df = 99 – k – 1). * $p < .05$.

Prior to addressing the hypotheses, we checked the validity of our definition of team learning by examining the effects of experience on knowledge and skill acquisition. To test this, we used task experience as the first predictor, entered before all the hypothesized independent variables. The regression analysis indicated that experience accounted for 10% of the total variance in team learning. However, since experience is a within-team variable and 45% of the total variance in team learning could be attributed to within-team variance, it explained a statistically significant 22% of the within-team variance (see Table 2). So, as expected, the knowledge and skill level within teams increased over time, suggesting some degree of construct validity for our measure of team learning.

Tests of Hypotheses

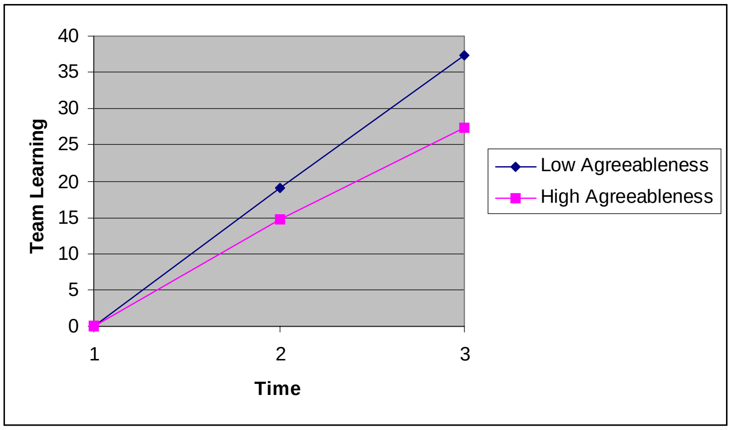
Hypothesis 1. Regarding our first substantive hypothesis, cognitive ability accounted for 7% of the total variance in team learning. Because 55% of the total variance was attributable to between-team variance, this meant that a statistically significant 13% of the between-team variance could be explained by the team's level of cognitive ability (see Table 2). The nature of these effects is revealed in Figure 2. The analyses of plotted mean differences indicated that, in general, team learning increased over time, but as was predicted in Hypothesis 2, this increase was much more pronounced for teams that were high in cognitive ability.

Figure 2
The Effect of High and Low Cognitive Ability on Team Learning Across Time



Hypothesis 2. As depicted in Table 2, the regression analysis of our second hypothesis found that agreeableness explained 3% of the total variance in team learning. Similar to cognitive ability, agreeableness is a between-team variable and the between-team variables accounted for 55% of the total variance in team learning. Thus, this means that a statistically significant 5% of the between-team variance could be attributed to the team's level of agreeableness. A follow-up analysis of plotted mean differences showed that team learning increased over time (see Figure 3), however, as was predicted in Hypothesis 2, teams high in agreeableness evidenced less improvement in team learning relative to teams low in agreeableness.

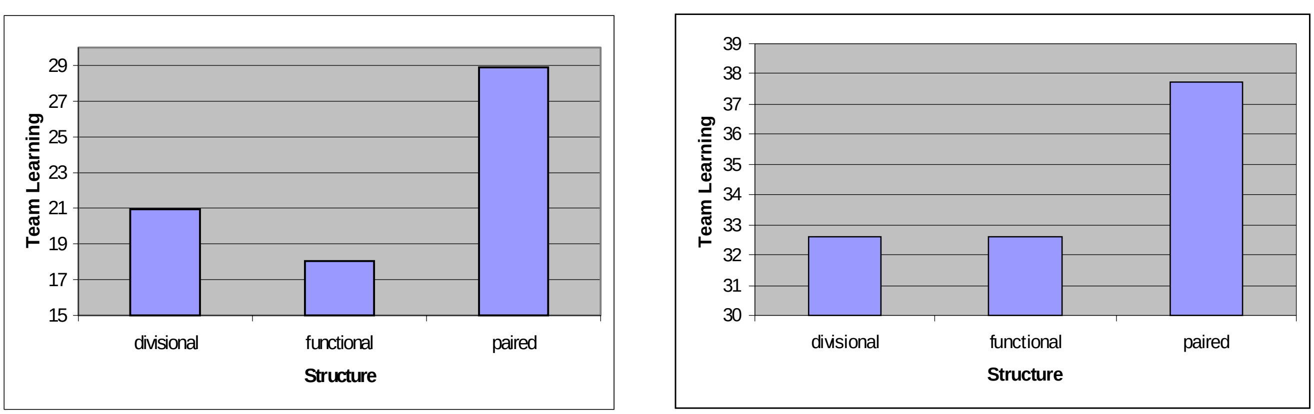
Figure 3
The Effect of High and Low Agreeableness on Team Learning Across Time



Hypothesis 3. Our second within-team variable, distribution of workload, was counterbalanced across the two time periods and explained 4% of the total variance in team learning, which represents 9% of the within-team variation (see Table 2). Since the incremental within-team variance accounted for by workload distribution was statistically significant, Hypothesis 3 was supported. More specifically, teams with labor distributed evenly among all the team members learned more than teams with labor unevenly distributed.

Hypothesis 4. We tested Hypothesis 4 by creating two dummy-coded variables. The results of the regression analysis indicated that the two dummy variables representing structure accounted for a 4% of the total variance in team learning. Structure remained constant for each team, which meant that it was a between-team variable. Because the between-team variables accounted for 55% of the total variance in team learning, structure explained 7% of the between-team variance. The nature of these effects is depicted in Figure 4a and Figure 4b. Both graphs show that teams in the paired structure learned more than teams in the functional or divisional structures, at both Time 1 and Time 2. These results support our original hypothesis, since teams utilizing paired structures learned more than those structured functionally or divisionally.

Figure 4a and 4b
The Effects of Structure on Team Learning at Time 1 and Time 2



Discussion

This study attempted to develop a theory of team learning by utilizing research on transactive memory systems to introduce three conditions critical to team learning: capacity, collaboration, and commonality. Then, using these three conditions as explanatory concepts, we investigated whether cognitive ability, agreeableness, workload distribution, and structure affected the acquisition of knowledge and skill within interactive task groups.

Personal Characteristics

As expected, *g* positively affected team learning. Although cognitive ability has been shown to influence individual and team level outcomes in previous research (e.g., Barrick et al., 1998), the second personal characteristic examined in this study, agreeableness, has not. Previous research at the individual level has failed to show a link between agreeableness and job performance (e.g., Barrick & Mount, 1991). In our study, when objective measures of team learning served as the criterion, teams composed of members who were low in agreeableness outperformed teams characterized high on this trait. Indeed, the results for this variable may appear in some ways counter-intuitive. However, the negative effect of team agreeableness on team learning supports the idea that constructive controversy can help groups solve problems through a full and critical discussion of different data and ideas (Tjosvold & Deemer, 1980).

Situational Characteristics

The results regarding the distribution of workload indicated that overloading individual team members with tasks negatively affected learning at the team level. This supports the theory that individuals only have a certain amount of capacity to process information (e.g., Kanfer et al., 1994). By giving one team member the majority of the work, the team significantly reduces its cognitive capabilities.

Moving to the second situational characteristic examined in this study, we found that structure also has an impact on learning at the team level. Teams working within a paired structure learned more than those who were structured divisionally or functionally. These results offer support for the theory that teams confronted with induction tasks, as was the case in this study, are described more accurately by a “truth supported wins” model rather than a “truth wins” model (Laughlin & Ellis, 1986). That is, at least two team members were required to have access to the same information in order for the team to learn.

Practical Implications

At least two practical implications arise from the results presented in this study. First, we have shown that, if the organization is interested in increasing team learning, it would be beneficial to staff teams with individuals high in cognitive ability. For obvious reasons, one might be tempted to staff teams with members who were all highly agreeable. However, our results suggest that if team learning is the primary goal, excessive agreeableness is not a virtue because it may preclude critical analysis and foster pre-mature consensus.

Second, if organizations wish to strengthen the relationship between personal characteristics within the team and team learning, they should make sure that the environment facilitates the process. In particular, workload within the team should be distributed among all the team members, and the team should be structured such that two team members have equal access to the same information. Although this does not ensure that team learning will be maximized, it could help to eliminate barriers impeding the progress of the team.

Limitations and Suggestions for Future Research

Although we found that teams composed of agreeable team members were less adept at critically analyzing information during the task, we would not suggest that organizations could benefit from staffing teams with disagreeable individuals. One solution to this problem is to have one team member play the “Devil’s advocate.” In other words, one team member would be assigned the task of being disagreeable. Although this theory seems plausible, future research needs to determine whether playing the “Devil’s advocate” positively affects team learning while retaining the team’s cohesiveness.

Another interesting finding in this study related to the optimum structure for team learning. We found that pair-based structures worked best, but we only used four-person teams. Although four person teams do exist, organizations usually do not restrict teams to four employees. When teams grow to eight or sixteen employees, it would be interesting to see whether the results of this study still hold. That is, with sixteen-person teams, should organizations structure them in eight pairs of two, or should they use four pairs of four, etc.? Future research should determine how the size of the team influences the relationship between structure and team learning.

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