The Impact of Hybrid Team Structures on Performance and Adaptation:

Beyond Mechanistic and Organic Prototypes

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ABSTRACT

Building on the idea of asymmetric adaptability, this study focused on structural and compositional ways to arrange teams in order to maximize both initial performance *and* structural adaptability. Based on 64 teams that completed a command and control simulation, our results suggest that hybrid teams (teams structured using non-redundant, complimentary elements of both departmentation and centralization) were able to perform well initially *and* successfully shift structures, while teams structured in traditionally mechanistic and organic manners were not. Furthermore, high mean levels of emotional stability and extraversion helped to ease the difficult transition from organic to mechanistic team structures.

The nature of jobs and organizational life is changing. Jobs are no longer static and the external environments that organizations have to deal with are becoming turbulent and unpredictable (Ilgen & Pulakos, 1999). Because of this, organizations need flexibility and the ability to perform well in different environments and situations. At the same time, competitive pressures faced by organizations are also mounting, which puts efficiency requirements at the center of most discussions of organizational design. Finally, many organizations are shifting toward the use of team-based structures for completing myriad different tasks that demand both efficiency and flexibility.

One important decision that organizations must making regarding the use of teams is how the teams should be structured. Structure describes how large numbers of people are separated into smaller groups, as well as how group member roles are differentiated and coordinated (Pennings, 1992). Different types of task environments require teams with different levels of flexibility, adaptability, and efficiency, among other things. If organizations fail to properly align the way their teams are structured with the task environments they are facing or their pesonnel, sub-optimal performance is likely to occur.

Structural Contingency Theory (SCT; Burns & Stalker, 1961) is built around the notion that there is no one best way to structure organizations. Indeed, SCT theorists (Burns & Stalker, 1961; Lawrence & Lorsch, 1967; Pennings, 1992) advocate an "if/then" approach to structuring organizations based on the current task environment that the organization is faced with. Support for these assertions has been found at both the organizational level (Drazin & Van de Ven, 1985) and the work team level (Hollenbeck et al. 2002) and suggests that organizations/teams need to be structured differently when faced with environments that vary in terms of predictability.

Wagner (2000) identified two critical dimensions of organizational or team structure; departmentation and centralization. Departmentation refers to the division of labor and reflects the degree to which work units are grouped based on functional similarity or on geographic and/or product market differentiation. Two major types of departmentation schemes are functional and divisional. In a functional departmentation scheme, people are grouped based on the similarity of the work they perform. So, each person in a group may have a certain specialization and would be in charge of all of the activity pertaining to that specialization for the entire group. On the other hand, people operating in a divisional departmentation scheme are grouped either by the geographic region they serve or by the type of product produced. Functional departmentation schemes lead to very narrow, specialized roles, which in turn lead to low levels of personal discretion and a high need for coordination with others. Divisional departmentation schemes, however, create general, broad roles and allow for increased personal discretion and reduced needs to coordinate with other team members (Burns & Stalker, 1961).

Hollenbeck et al. (2002) examined departmentation from at structural contingency perspective. Consistent with their predictions, no single departmenation scheme was best across both predictable and random task environments. Their results suggested that functional departmentation schemes worked best in a predictable environment while divisional schemes worked best in a random environment. Divisional departmentation schemes had the resources necessary to respond to unforeseeable local threats they faced in a random environment, while teams in functional departmentation schemes were much more efficient and well-coordinated in dealing with the reoccurring, more foreseeable threats they faced in a predictable environment.

The second dimension of structure discussed by Wagner (2000) is centralization. Centralization also deals with the division of labor but refers to how authority for making decisions is distributed among team members. In a centralized structure, a single group leader has a high amount of decision authority and either directly tells team members what they should do or waits for team members to request permission to take certain actions. In a decentralized structure there is little hierarchical control so team members have high levels of autonomy and are free to act on their own. While decentralized teams may still have a leader, this leader's role is to support the individual team members, not to tell them what to do. High levels of centralization lead to dependence on the leader, and low levels of autonomy and responsibility for individual team members, while the exact opposite would occur in a highly decentralized team.

The costs and benefits of operating in a centralized or decentralized structure mirror, to a certain extent, the costs and benefits of operating in a functional or divisional structure. Centralized structures are thought to ensure coordination and create efficiency due to the fact that the strong element of leader control. Like functional structures, however, centralized structures are not appropriate for dealing with situations or environments that are not reoccurring and repeatable. Decentralized structures ensure quickness and learning due to the fact that there is no hierarchy of authority that individual team members must go through in order to make decisions. Since each member is ultimately responsible for their own actions, they are also responsible for learning from their mistakes and applying that knowledge in the future. One can see how these benefits are similar to those offered by a divisional departmentation scheme.

Siggelkow and Levinthal (2003) suggest that organizations with centralized structures do better in decomposable landscapes (all interactions are captured within separate divisions) while decentralized organizations are better in non-decomposable landscapes (interactions span across divisions). This finding mirrors that of Hollenbeck at al. (2002) and provides further evidence that both environment and structure should be taken into account when designing teams or organizations for successful performance.

Asymmetric Adaptability

Structural Contingency Theory provides an adequate framework for thinking about the alignment between structure and environment in a static sense, but it makes no detailed provisions for the fact that teams or organizations may need to change structures “on the fly” in response to environmental changes. Environmental instability and change are becoming commonplace and the days of static jobs are coming to an end (Ilgen & Pulakos, 1999). Because of this, both organizations and teams are going to need to be able to rapidly adapt and change their structures so that they are always aligned with their external environment (Allred, Snow, & Miles, 1996; Townsend, DeMarie, & Hendrickson, 1998). If they fail to properly do this, performance will suffer. While the logic behind Structural Contingency Theory would seem to suggest that simply changing structures back and forth would be adequate for meeting changing environmental demands, this may not be the case.

A stream of research is unfolding that examines this type of dynamic structural change in teams. This research was spurred on by the notion that changing back and forth between different types of structures may not be as easy as one might think. In fact, structural reconfigurability may be directional in nature. Moon, Hollenbeck, Humphrey, Ilgen, West, Ellis, & Porter (in press) coined the term *asymmetric adaptability* to refer to this notion of directional reconfigurability and examined the differences in performance between teams who switched from functional to divisional structures (F → D), and vice versa (D → F). Their results provided evidence supporting the notion of asymmetric adaptability, and showed that teams were able to make the F → D switch much more successfully than the D → F switch.

Moon et al. (in press) suggested that the F → D switch was easier than the D → F switch due to entrainment of group norms for communication and coordination. Entrainment theory (Ancona & Chong, 1996) suggests that once a set of norms or habitual activities becomes routine, they also become self-reinforcing within the given social system. Because of this, they persist over time even when their original functional value is no longer of primary importance. Moon et al.'s (in press) findings support this notion of entrained norms. In their sample, coordination processes mediated the relationship between the F → D shift and higher performance. Teams structured functionally developed high levels of coordination and cooperation at Time 1 and this persisted at Time 2. Although high levels of communication and coordination were not necessary for performance at Time 2 (in the Divisional Structure) these activities did not harm performance. On the other hand, divisionally structured established norms for concentration and independence at time one, and did not entrain coordination and communication norms. When these teams switched into functional structures, their norms for low communication and coordination persisted, but because the specialized roles associated with functional structures demanded coordination, this led to poor performance at Time 2.

Ellis, Hollenbeck, Ilgen, & Humphrey (2002) also tested the notion of asymmetric adaptability but examined centralization rather than departmentation. Structural contingency theory predicts that centralized structures are superior when it comes to decision-making accuracy, but that decentralized structures are better when it comes to the decision making speed. Ellis et al. conformed this basic static prediction, but also documented asymmetric adaptability when teams were required to change structures. Their results suggested that teams are more successful in switching from centralized to decentralized structures (C → Dc) than from decentralized to centralized structures (Dc → C). More specifically, teams that made the C → Dc switch saw no loss of accuracy, but increased their speed at Time 2. On the other hand, teams that made the Dc → C switch were slower at Time 2, but did not exhibit any gains in accuracy that one might expect when switching to a centralized structure. Again, the teams norms for concentration and independence at Time 1 carried over to time two and became maladaptive due to the fact that the team needed to work more interdependently in order to perform well in a centralized structure.

Mechanistic and Organic Structures

Although the two dimensions of structure, departmentation and centralization, are often described as independent dimensions, Burns & Stalker (1961) noted that organizations that tend to structure functionally, also tend to centralize decision-making. These decisions are complimentary, in the sense that both help achieve the same outcomes of accuracy and efficiency, but discount speed and flexibility in the process. Alternatively, organizations that choose divisional structures tend to also decentralize, placing the emphasis on speed and flexibility, while de-emphasizing accuracy and efficiency. Organizations that combine centralized and functional structures are referred to as mechanistic structures, whereas the term organic structure refers to organizations that combine decentralization with divisional departmentation (Burns & Stalker, 1961)

Mechanistic structures combine elements of both centralized and functional structures, thus creating high levels of centralized control coupled with well-defined member roles. Organic structures combines elements of both decentralized and divisional structures. People operating in organic structures have high levels of autonomy due to their geographic grouping and have less formal hierarchy of control that oversees their actions. Purely mechanistic and organic structures, then, are likely redundant in terms of the costs and benefits they present to organizations or teams who utilize them.

In terms of asymmetric adaptability, based on the work done by Moon et al. (in press) and Ellis et al. (working manuscript), one would expect that teams changing from mechanistic structures to organic structures (M → O) would outperform teams changing from organic to mechanistic structures (O → M). Indeed, one purpose of this study is to corroborate this assertion.

H1: Teams switching structure from M → O will adapt more successfully than teams switching structures from O → M.

Past research has documented that divisional to functional shifts, and centralized to decentralized shifts, are more difficult to execute relative to shifts in the other direction. Because organic structures combine divisional departmentation with decentralized decision-making authority, shifting from organic to mechanistic structures should also be more difficult than changing in the opposite direction. This might make it seem reasonable for teams to always start out in mechanistic structures; however, mechanistic structures may be problematic in environments that are not purely predictable.

This presents an interesting paradox. Initially structuring teams in an organic manner should lead to high performance in unpredictable environments, however, these teams will not be able to transition to a mechanistic structure very well if their external environment stabilizes and then places demands for efficiency on the organization. On the other hand, initially structuring teams in a mechanistic manner allows for a smooth transition to an organic structure when environmental turbulence occurs, but initial performance will likely suffer because the hierarchical, controlled nature of the mechanistic structure does not allow people to deal with problems on their own.

How then, can one resolve this paradox? The major focus of this study is to address this question. We suggest two different ways that teams that are required to change structures can perform well initially *and* successfully adapt to a new structure to deal with novel, rapidly changing environments. The first way involves structuring teams in a manner that capitalizes on the positive elements of both departmentation and centralization by making complementary and different, as opposed, to reinforcing and redundant decisions with respect to departmentation and centralization. We also suggest that internal fit (fit between team members and team structure) can help ameliorate the negative consequences of the O → M shift, such that teams with certain member composition can perform well initially in an organic structure and also perform well when they are required to switch to a mechanistic structure.

Hybrid Structures

As mentioned earlier, traditional mechanistic and organic structures combine redundant elements of both departmentation and centralization. Because of this, they assume similar costs and benefits on both dimensions of structure. We would like to propose an alternative type of structure, which we will refer to as a hybrid structures. *Hybrid structures* combine non-redundant elements of departmentation and centralization. For example, a team could be divisional in departmentation and centralized, or a team could be functional in departmentation and decentralized. We propose that these types of structures should afford teams the benefits that both dimensions of structure have to offer.

A functional/decentralized team should be able to share the benefits of increased coordination and cooperation (because of their functional nature) and the motivational benefits of increased responsibility and autonomy, due to the fact that there is no formal leader that oversees and controls their actions. On the other hand, a divisional/centralized team should benefit from increased coordination and cooperation (because of the leader) but still have fairly high levels of decision authority and autonomy because they have the resources necessary to respond to most local threats without having to go through the leader.

We propose that teams structured in a hybrid manner should be able to initially perform well in most environments. Furthermore, because of their non-redundant nature, they should be able to successfully adapt when they are required to switch on both elements of structure (i.e. changing from divisional/centralized to functional/decentralized, or vice versa). The major idea is that these teams should outperform mechanistic teams at Time 1 (the lowest performing teams) and still adapt successfully to structural change (unlike O → M teams).

H2a: Hybrid teams will outperform mechanistic teams at Time 1.

H2b: Hybrid teams will adapt to structural change better than O → M teams at time 2.

Team Composition

A number of different types of individual differences may play important roles in determining how well members of a team, and thus the team as whole, perform in different types of environments or structures. These individual differences are often classified into two separate groups, traits and abilities (Costa & McCrae 1992; Nunnally, 1978). One type of trait variable that is often examined at both the team (e.g. Beersma, Hollenbeck, Humphrey, Moon, Conlon, & Ilgen, 2003) and the individual level within teams (e.g. Hollenbeck et al., 2002; Porter, Hollenbeck, Ilgen, Ellis, West & Moon, 2003) is personality.

The Five-Factor Model (FFM) or "Big-5" is a framework commonly used to examine the role of personality in task-performance situations. Indeed, the FFM is thought to be a wellgrounded and robust conceptual framework and system of measurement for conducting personality research (McCrae & Costa, 1997). Of the five major personality factors this model suggests, we believe that two of them are important to teams who need to execute the difficult O → M structural shift.

The first personality factor we focus on is commonly referred to as emotional stability. People who exhibit high levels of emotional stability are able to avoid the potentially maladaptive effects of stress, anxiety, and depression when faced with novel or changing situations in which they are required to adapt to (Judge & Ilies, 2002; Hollenbeck et al. 2002). Indeed, Hollenbeck et al. (2002) found that divisionally structured team members who were high in emotional stability performed better in misfit environments than did those who were low in emotional stability, because they were better able to deal with the anxiety and stress caused by operating in a structure that did not fit their given environment. Porter et al. (2003) also examined the role in emotional stability in teams and found that team members who were high in emotional stability, as opposed to those low in emotional stability, were more apt to provide support or "back up" teammates who were in need.

We propose that teams who are high on emotional stability as a whole should be able to much more successfully make the difficult O → M shift because their members are better equipped to deal with the stress and tension caused by this change. Furthermore, the kinds of backup and support behaviors provided by high emotional stability team members should strongly influence performance when teams shift from O → M.

H3: Teams with high levels of emotional stability will outperform teams with low levels of emotional stability at time 2 when they are required to shift from an organic structure to a mechanistic structure (O → M).

Extraversion is the second personality factor that we believe is important for teams attempting to execute an O → M structural shift. Extraversion reflects the degree that individuals are talkative, assertive, outgoing, and ascendant in social interactions or situations (Judge & Illies, 2002; Porter et al. 2003). Applied to a team setting, highly extraverted people are quite likely to inform teammates of problems they are facing and insist on receiving help if necessary. Indeed, Porter et al. (2003) found that highly extraverted team members were more likely to receive needed help from their teammates than were people who were more reserved. This makes sense in that teammates cannot help each other out if they do not know that problems exist. Beersma et al. (2003) also examined the role of extraversion in a team setting and discovered that teams with extraverted members performed well under situations that rewarded high levels of coordination. As noted earlier, a major problem with teams switching from O → M is that they establish norms for independence and local focus, and then struggle to break free of these norms when they change structures. We suggest, however, that teams composed of highly extroverted members will be more likely to communicate with each other, thus easing the O → M transition.

H4: Teams with high mean levels of extraversion will outperform teams with low levels of extraversion at time 2 when they are required to shift from an organic structure to a mechanistic structure (O → M).

METHOD

Research Participants and Task

Research participants were 264 upper-level students who were divided into 66 four-person work teams. In return for their participation, each earned class credit, and all were eligible for cash prizes based upon their team's performance. All participants engaged in a dynamic, networked computer simulation and completed two thirty-minute trials. The task was a modified version of the more generic Distributed Dynamic Decision-making (DDD) Simulation developed for the Department of Defense (Miller, Young, Kleinman, & Serfaty, 1998) for research and training purposes in the area of military operations (see Hollenbeck et al., 2002 for a more complete description of the task). Data for two teams (8 individuals) was not analyzed due to the teams' failure to complete all of the necessary elements of the experiment. Thus, we retained and analyzed the data for 64 teams (256 individuals).

A graphic depiction of the interface research participants interacted with on this task is shown in Figure 1. This grid was partitioned in several ways. First, in terms of the person's physical location in the simulated geography, the grid was partitioned into four geographic quadrants of equal area (NW, NE, SW, SE), and each area was assigned to one of the team members (i.e., decision makers or DMs). The geographic region was also divided into three regions that varied in terms of the extent to which the areas needed to be protected from penetration by unfriendly forces. The regions were labeled neutral, restricted (a 12 by 12 grid in the center of the screen), and highly restricted (a 4 by 4 grid in the middle of the screen). The team's mission was to keep unfriendly forces from moving into the restricted and highly restricted areas, while at the same time, allowing friendly forces to move in and out of the same areas freely.

In terms of monitoring the geographic space, each DM's base had a detection ring and an identification ring. The detection ring allowed the individual to see the track on the game screen, the identification ring allowed the individual to determine the nature of the track. Any track outside the DR was invisible to the DMs, and therefore they had to rely on their teammates to monitor regions of the space that were outside their own quadrant.

Each DM also had control of various types of vehicles that could be launched, and then moved to any area on the screen, including those monitored by other team-members. These vehicles were semi-intelligent agents that could automatically perform certain functions (follow designated tracks, return to base to refuel, etc.), and hence the DM was a manager of these semi-intelligent agents. There were four different types of vehicles; (a) AWACS planes, (b) tanks, (c) helicopters, and (d) jets. Each of these vehicles varied in its capacities on four different dimensions; (a) range of vision, (b) speed of movement, (c) duration of operability, and (d) weapons capacity. The various vehicles constituted a complex set of assets that ranged widely in their capacities. Each DM controlled four such vehicles that could all be operated concurrently.

Tracks were radar representations of forces moving through the geographic space monitored by the team. There were 12 unique types of tracks that varied in terms of being (a) friendly vs. unfriendly, (b) air-based vs. ground-based, (c) easy or difficult to disable, and (d) known or unknown upon identification. All tracks originated from the edge of the screen and proceeded inward. Once the track came within the IR of either the base or a vehicle, the DM had the opportunity to identify the track. At this time the individual had to decide how to best handle the track in the most expeditious manner as the team would lose one point for every second the track resided in the restricted zone and two points for every second the track was in the highly restricted zone (see Hollenbeck et al. 2002 for a full description of the capabilities of all the tracks and vehicles).

The task environment for this study was designed to simulate that which many teams operating in organizations may face. Random tracks came in from each direction throughout the simulation, but there were also pre-programmed "waves" of targets that bombarded the DM2 quadrant periodically throughout. Thus, the environment was neither totally random nor totally predictable.

Manipulations and Measures

Departmentation: Departmentation was manipulated such that one half of the teams started in a functional departmentation scheme, while the other half started in a divisional departmentation scheme. Each team then switched departmentation schemes at time 2. In the *functional* departmentation scheme, vehicles were grouped by task specialty and assigned to DMs in order to create narrow, distinctive functional competencies wherein each DM managed four vehicles, *all of the same type*, taking on the role of tank command, helicopter command, jet command, or AWACS command. In this narrow role, the person could manage one single type of task (e.g., the AWACS commander could only identify tracks and not engage them, the jet command could only engage A1 or G1 tracks but not any others) and hence this role had relatively *low task scope*.

In the *divisional* departmentation scheme, vehicles were grouped geographically and assigned to DMs in order to create broader roles. Like the functional structure, each DM in the divisional structure managed four vehicles, but in this case, the four vehicles were *all of a different type*. The DM then took basic responsibility for a specific geographic region (e.g., the NW quadrant). Because of the complex array of strengths and weaknesses for each of the four vehicles, operating the four different platforms created a job with relatively *high task scope*.

Centralization: Centralization was also manipulated in this study such that one half of the teams started in a centralized scheme, while the other half started in a decentralized scheme. Each team then switched centralization schemes at time 2. In a *centralized* scheme, the person sitting at DM1 was designated as the "leader" and was given additional powers/responsibilities.

The leader was able to see each target as soon as it entered the geographic space, regardless of where their personal detection ring(s) were located. Furthermore, the leader could identify any target that was located inside of anybody on the team's identification ring.

Referring to figure 1, one can see that this allowed the leader to identify nearly every target that entered the restricted area as well as any target that was located near a team member's vehicle(s). Thus, one primary role of the leader revolved around providing the other team members with information and helping them coordinate their defense. Finally, the leader was able to transfer the ownership of vehicles among team members. For example, the leader could commandeer any vehicle (s)he wanted for her/himself, or the leader could redistribute vehicles among other team members. This gave the leader a high degree a control over what assets and resources each individual team member was allowed to possess and use at any given point in time.

In a *decentralized* scheme, no formal leader was assigned. Thus, the person located at DM1 was not afforded any extra responsibilities or powers and thus performed the task as a normal team member. This allowed for a high degree of individual autonomy and responsibility for one's own quadrant and a nonexistent degree of hierarchical control.

To clarify the design of the study, departmentation and centralization were fully-crossed at Time 1, thus creating 4 different structural schemes: Divisional/decentralized (aka organic), functional/centralized (aka mechanistic), divisional/centralized (hybrid), and functional/ decentralized (hybrid). We combined the two different types of hybrid structures into one category because we did not have any differential predictions regarding how they would perform. Each team then changed across both elements of structure at Time 2, creating 3 different types of shifts: Organic to mechanistic (O → M), mechanistic to organic (M → O), and hybrid-to-hybrid. Data from the two hybrid conditions were collapsed for analyses such that one hybrid-to-hybrid condition was represented. This resulted in three conditions that were dummy coded such that the O $\rightarrow$ M condition was the comparison group, dummy code 1 identified the hybrid conditions, and dummy coded 2 identified the M $\rightarrow$ O condition.

Emotional stability and extraversion: Emotional stability (α = .80) and extraversion (α = .77) were both measured with 12 items taken from the short form of the revised NEO Personality Inventory (NEO-PI-R-short; Costa & McCrae, 1992).

Team Performance: Team performance in this study was measured using a composite variable that indexed speed, accuracy, and the total number of attacks. The DDD simulation captures a number of different performance variables, five of which were combined to assess team performance. The speed component was a combination of attack speed and identification speed. Attack speed measures the elapsed time between when an enemy track enters the restricted area and when it is engaged by a team member. Identification speed refers to the elapsed time between when a track enters the geographic playing area and when a team member first identifies it. Accuracy was indexed by a combination of friendly fire kills and "come up shorts". Friendly fire kills were simply the number of friendly targets that were engaged in a hostile manner. "Come up short" was a count of the number of times an enemy target was engaged but the engaging vehicle did not have enough power to successfully disable it (e.g. a jet engaged a G5 track). Total number of attacks was simply an index of how many tracks were engaged. The team performance variable was a composite of the standardized values for each of these indicators. All indicators were coded such that higher standardized values represented more desirable performance.

RESULTS

Table 1 shows the means, standard deviations, and intercorrelations for all of the variables of interest in this study. Hypothesis 1 stated that teams switching structure from M → O would adapt more successfully than teams switching from O → M. The first two steps of Table 2 show the results of a hierarchical regression designed to test this hypothesis. After controlling for Time 1 performance in step 1, one can see that the beta-weight for dummy code two, which indexes the difference between the O → M group and the M → O group is positive and significant ($b = 2.55$, $p < .01$), suggesting that the M → O group adapted more successfully to their structural change at Time 2 than did the O → M group. This supports hypothesis 1 and corroborates reported by Moon et al. (2003) and Ellis et al. (2002).

Hypothesis 2a suggested that hybrid teams would outperform purely mechanistic teams at Time 1. An independent-samples t-test was conducted to test this hypothesis and showed that hybrid teams did indeed outperform mechanistic teams at time 1, $t(47) = 3.01$, $p < .01$. Thus, hypothesis 2a was supported. Hypothesis 2b suggested that hybrid teams would be able to adapt to structural change better than O → M teams. The first two steps of Table 2 show the results of a hierarchical regression designed to test this hypothesis. After controlling for time 1 performance in step 1, one can see that the beta-weight for dummy code one, which indexes the difference between the O → M group and the hybrid groups is positive and significant ($b = 1.93$, $p < .01$), suggesting that the hybrid groups adapted more successfully to their structural change at time 2 than did the O → M group. When the results from these two hypotheses are considered simultaneously, one can see that our assertions regarding the potential usefulness of hybrid team structures are supported. Not only did teams structured in a hybrid manner perform well at time 1, they also successfully adapted to changes on both dimensions of structure at time 2.

The next two hypotheses dealt with the issues of group composition and internal fit. More specifically, hypothesis 3 suggested that when making the O → M shift, teams with high mean levels of emotional stability will outperform teams with lower levels of emotional stability at time two. Table 2 presents the results of a hierarchical regression designed to test this hypothesis. Although we did not specifically predict a main effect for emotional stability across conditions, this main effect (as indexed in step 3 of the regression, $b = 1.6$, $p < .05$ 1-tailed) explained 5% of the incremental variance in time 2 team performance above time 1 performance and structure, suggesting that for this sample it is nearly always better to have team members with high levels of emotional stability when changing from one structure to another. Step 4 of the regression tested the interaction proposed by hypothesis 3 and showed that the interaction between structure and emotional stability explained an additional 5% ($p < .05$, 1-tailed) of the variance in time 2 performance over and above time 1 performance, structure, and the main effect of emotional stability. A plot of this interaction revealed that the positive impact of emotionally stable team members is most pronounced when teams are executing the O → M shift. Thus, hypothesis 3 was supported.

Hypothesis 4 suggested that when making the O → M shift, teams with high mean levels of extraversion will outperform teams with lower levels of extraversion at time two. Table 3 shows the results of a hierarchical regression analysis designed to test this hypothesis. While no main effect of extraversion above and beyond time 1 performance and structure was found, consistent with our theory and prediction the interaction between structure and extraversion did explain unique variance in performance at time 2. More specifically, the interaction accounted for 7% ($p < .05$, 1-tailed) of the incremental variance in performance at time 2. The nature of this interaction, when plotted revealed that teams with high mean levels of extraversion suffered less from making the O → M shift than did teams with low mean levels of extraversion. Thus, hypothesis 4 was supported.

DISCUSSION

Structural Contingency Theory (Burns & Stalker, 1961) suggests that organizations should consider the environment when trying to decide on an appropriate structure. Indeed, it has been shown at both the organizational level (Drazin & Van de Ven, 1985) and the work team level (Hollenbeck et al. 2002) that different structures are better suited to different environments. Structural Contingency Theory, however, does not make predictions for changing structures in the face of environmental change other than to suggest that the structure should compliment the environment.

Recent researchers (Ellis et al., working manuscript; Moon et al., 2003) have introduced the notion of structural asymmetry and suggest that work teams cannot simply change back and forth between different types of structures according to the prescriptions of Structural Contingency Theory. These researchers provide evidence that structural reconfigurability may be directional in nature such that it is easier to move from point A to point B than vice versa.

The primary purpose of this study was to examine both structural and compositional issues related to work teams changing structures. Specifically, we examined structural reconfigurability in relation to two existing types of structures (organic and mechanistic) and suggested a new type of structure (hybrid) that may combine the benefits of both. Furthermore, we suggested two individual differences that may help ameliorate the effects of switching from an organic to a mechanistic structure.

Our first hypothesis was a replication of previous work done on asymmetric adaptability and suggested that teams switching from mechanistic to an organic structure would outperform teams switching from an organic to a mechanistic structure. Our findings support this hypothesis and helped to bolster the notion of asymmetric adaptability as originally put forth by Moon et al. (2003). These findings shed light on an interesting paradox, however. Teams that started out in an organic structure performed well initially, but could not successfully adapt when their structure changed. On the other hand, teams that started out in a mechanistic structure initially performed poorly, but they were able to successfully adapt to structural change.

We suggested two different types of ways in which this paradox could be resolved. The first deals with alternative types of team structures that we refer to as hybrid structures. Hybrid structures combine non-redundant elements of both departmentation and centralization in order to elicit the benefits of both. Our second hypothesis was broken down into two parts and suggested that teams operating in hybrid structures would not only outperform teams with mechanistic structures at time 1, but they would also be able to adapt more successfully to structural change than would the O → M teams. Our results supported both of these hypotheses.

We also suggested two different compositional factors that could possibly ameliorate the detrimental effects of teams switching from organic to mechanistic structures. Our third hypothesis suggested that when teams were composed of members with high levels of emotional stability, they would be able to more successfully make the O → M transition than would teams composed of members with low levels of emotional stability. Our results supported this assertion. It is likely the case that teams with high levels of emotional stability were able to more successfully fend off the high levels of stress and anxiety associated with making the difficult O → M transition. Also, as Porter et al. (2003) suggest, the members of these teams may have provided more support and "back-up" to each other, thus aiding successful transition.

Hypothesis 4 also dealt with compositional issues in teams making the O → M shift, but focused on extraversion. This hypothesis suggested that teams that were composed of members high in extraversion would outperform low extraversion teams. Our results suggest that this was the case. Presumably, team members that were highly extroverted were more likely to communicate and coordinate with other team members. As noted by Porter et al. (2003), this would allow the entire team to be more aware of any problems that exist, thus affording them opportunities to help out if they could.

The implications of the findings of this study may be important for many organizations that are relying on teams to deal with task environments that are not necessarily set in stone. From a structural standpoint, organizations should analyze the costs and benefits of each type of team structure and how well teams will be able to adapt to structural changes based on where they start out at, not necessarily where they are going. Based on our findings, we suggest that organizations begin to explore the use of hybrid structures when they are structuring teams that may need to rapidly reconfigure in the face of changing demands.

Furthermore, organizations need to be aware that the type of people that they staff their teams with may have important implications for just how well the teams are going to be able to adapt to structural change. Our research focused primarily on compositional issues regarding teams that begin in an organic structure and are required to shift to a mechanistic structure. We focus on this type of change for two reasons. First, this seems to be the most difficult structural change to make, thus any recommendations for how to make it easier should be well received. Secondly, teams that start off in organic structures, in a somewhat turbulent environment like the one in this study, were more likely to perform well initially than were teams that were structured in a mechanistic manner. It is likely that organizations want teams to perform well right from the start and would be more likely to choose an initial organic structure because of this. Organizations who structure teams using this logic should be aware of the importance of staffing their teams with members who are high on emotional stability and fairly extroverted if they need their teams to successfully adapt to changing environments.

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TABLE 1

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATIONS

			Correlations				
Variable	*M*	*SD*	1	2	3	4	5
1. Extraversion	3.71	.27					
2. Emotional Stability	2.42	.33	.46**				
3. Performance (time 1)	0	2.62	.20	.07			
4. Performance (time 2)	0	2.38	.04	.29*	.43**		
5. Dummy code 1	-	-	.10	.13	.29*	.25*	
6. Dummy code 2	-	-	.11	.07	-.34**	.06	-.57**

* p < .05, ** p < .01

Dummy code 1.- 0 = O --> M, 1 = hybrid

Dummy code 2.- 0 = O --> M, 1 = M-->O

TABLE 2

HIERARCHICAL REGRESSION OF TIME 2 TEAM PERFORMANCE ON EMOTIONAL STABILITY, STRUCTURE, AND TIME 1 PERFORMANCE.

Step	Time 2 Performance		
	b	R^2 Total	ΔR^2
1. Time 1 Performance	.39	.19	.19**
2. Structure		.35	.16**
Dummy code 1	1.93**		
Dummy code 2	2.55**		
3. Emotional Stability	1.60*	.40	.05*
4. Structure x Emotional Stability		.45	.05*

* p < .05, ** p < .01 (*1-tailed*)
Dummy code 1.- 0 = O --> M, 1 = hybrid
Dummy code 2.- 0 = O --> M, 1 = M-->O

TABLE 3

HIERARCHICAL REGRESSION OF TIME 2 TEAM PERFORMANCE ON EXTRAVERSION, STRUCTURE, AND TIME 1 PERFORMANCE.

	Time 2 Performance		
Step	*b*	R^2 Total	ΔR^2
1. Time 1 Performance	.39	.19	.19**
2. Structure		.35	.16**
Dummy code 1	1.93**		
Dummy code 2	2.55**		
3. Extraversion	-.42	.35	.00
4. Structure x Extraversion		.43	.07*

* $p < .05$, ** $p < .01$ (*1-tailed)*
Dummy code 1.- 0 = O --> M, 1 = hybrid
Dummy code 2.- 0 = O --> M, 1 = M-->O

FIGURE 1

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