Organizational Behavior and Human Decision Processes 108 (2009) 131–142

Contents lists available at ScienceDirect

Organizational Behavior and Human Decision Processes

journal homepage: www.elsevier.com/locate/obhdp

Cutthroat cooperation: The effects of team role decisions on adaptation to alternative reward structures ☆

Bianca Beersma [a,*], John R. Hollenbeck [b], Donald E. Conlon [b], Stephen E. Humphrey [c], Henry Moon [d], Daniel R. Ilgen [b,e]

[a] University of Amsterdam, Department of Work and Organizational Psychology, Roetersstraat 15, 1018 WB Amsterdam, The Netherlands
[b] Michigan State University, Department of Management, MI, USA
[c] Pennsylvania State University, PA, USA
[d] London Business School, London, UK
[e] Michigan State University, Department of Psychology, MI, USA

ARTICLE INFO

Article history:
Received 4 April 2007
Accepted 9 July 2008
Available online 19 September 2008

Accepted by John Schaubroeck

Keywords:
Teams
Reward structure changes
Role discussion
Conflict
Coordination
Performance

ABSTRACT

Structural Adaptation Theory proposes that it is more difficult for teams to change from competitive to cooperative reward conditions than it is for them to change in the opposite direction, and this has been labeled the cutthroat cooperation effect [Johnson, M. D., Hollenbeck, J. R., Ilgen, D. R., Humphrey, S. E., Meyer, C. J., & Jundt, D. K. (2006). Cutthroat cooperation: Asymmetrical adaptation of team reward structures. *Academy of Management Journal, 49*, 103–120]. The current study investigated whether team role discussion can neutralize this effect and promote successful adaptation from competitive to cooperative reward structures. Consistent with our predictions, in a study that involved 75 four-person teams performing a complex task under cooperative reward conditions, we found that teams with a history of competitive rewards performed worse than teams with a history of cooperative rewards in a control condition. However, this effect was neutralized when teams allocated their roles in a team role discussion. This neutralization effect was driven by behavioral coordination and unmet expectations regarding conflict.

Introduction

In the last two decades, many organizations have restructured their workforce around work teams (Hackman, 1998; Ilgen, 1999), defined as "small groups of interdependent individuals who share responsibility for specific outcomes" (Sundstrom, DeMeuse, & Futrell, 1990, p. 120). In the literature on teams, consensus is emerging that teams are not static entities that perform in single-cycle contexts, but instead, are complex, adaptive, and dynamic systems that perform across time (McGrath, Arrow, & Berdahl, 2000). Teams often operate in turbulent environments, where they are confronted with dynamic tasks and work situations, and adaptation is crucial (Burke, Stagl, Salas, Pierce, & Kendall, 2006; LePine, 2003, 2005).

Structural changes are one example of changes requiring team adaptation. The current trend in organizations is toward using more flexible, team-based structures marked by increased interdependence. For example, companies such as GE, Yahoo, Ford Motor Company, Dow Chemical and Goodyear Tire and Rubber have scaled back or abandoned "rank and yank" evaluation and reward systems that make fine-grained within unit differentiations, and replaced these with systems that focus on broader, team-based outcomes (Bates, 2003; Boyle, 2001; Lowery, 2003; McGregor, 2006; Meisler, 2003). Indeed, the use of team-based incentives is on the rise, and longitudinal surveys of Fortune 1000 firms indicate that in the year 2000, close to 80% of these firms employed some form of team-based pay, up from 59% in 1990, and less than 20% in 1980 (Garvey, 2002). For example, Unisys, Lockheed Martin, Marriott, General Motors, 3M and Carrier Corporation have moved from individual-based pay raises to team-level bonuses in order to promote coordination of efforts and shared focus on team goals (Gross, 1995).

Recent research has started to explore the questions of how teams adapt to changes like those described above over time, and how certain variables affect their performance and adaptability (cf. Ilgen, Hollenbeck, Johnson, & Jundt, 2005; Johnson et al.,

☆ Grant N00014-99-1-0983 from the Cognitive and Neural Sciences Division of the Office of Naval Research and Grant 451.04.100 of the Dutch National Science Foundation (NWO) financially supported this research in part. Although support for this work is gratefully acknowledged, the ideas expressed herein are those of the authors and are not necessarily endorsed by the funding agencies. This research was conducted while the first author studied at Michigan State University on a Fulbright Graduate Student Scholarship, and we thank The Netherlands America Commission for Educational Exchange gratefully for their support. The authors also would like to thank Astrid Homan for her valuable comments on a previous version of this manuscript.

* Corresponding author. Fax: +31 20 639 0531.
E-mail address: bbeersma@fmg.uva.nl (B. Beersma).

0749-5978/$ - see front matter © 2008 Elsevier Inc. All rights reserved.
doi:10.1016/j.obhdp.2008.07.002

2006). One theory that has been developed to understand how teams react to changes is Structural Adaptation Theory (SAT, Johnson et al., 2006). SAT suggests that like physical systems, social systems can be differentiated by their degree of complexity and that more energy is required to maintain the structure of complex systems relative to simpler ones. Moreover, in line with the second law of thermodynamics, SAT proposes that there is a natural tendency for complex and organized systems to break down over time into structures that are increasingly simple and chaotic. If this is the case, in the absence of any formal, external intervention, more complex systems that are highly ordered—in the sense of being hierarchical, specialized and collective—may inherently drift toward more disordered and chaotic systems that are decentralized, undifferentiated, and individualistic.

This is precisely what Johnson et al. (2006) observed when they examined SAT with respect to how teams react to changes in reward structures. Under stable conditions, they found that teams working under a cooperative reward structure coordinated their efforts better and performed more accurately than teams working under a competitive structure, just as had been demonstrated in earlier research (Beersma et al., 2003). However, Johnson et al. (2006) found that when teams had to adapt to new reward structures, their history affected their interaction patterns and performance. Specifically, whereas teams that changed from a cooperative to a competitive reward structure behaved like they had always been competitive, and thus adapted successfully to the new situation, this was not the case for teams that switched from competitive to cooperative rewards (which Johnson et al. labeled "cutthroat cooperation" teams). These teams failed to act like teams that had always been cooperative, and continued to engage in their habitual interaction patterns, leading to suboptimal coordination and poor performance.

The Johnson et al. (2006) study thus showed that static predictions about which processes and outcomes are associated with various reward structures do not generalize to dynamic contexts where reward structures change. Instead, "history matters" and "direction matters" when it comes to predicting team adaptation. This is an important discovery for theories of adaptation because most theories tend to be "direction free" (i.e., teams are adaptable or not adaptable), but these results also have important practical implications. SAT and the results associated with the "cutthroat cooperation effect" demonstrate that organizations may need to do more than just change rewards in contexts where the goal is to change group dynamics. One important question is therefore which organizational procedures can facilitate reward structure changes. In the current paper, we examine whether or not adapting the role allocation procedure that is employed when teams make the transition from a competitive to cooperative reward system can facilitate reward structure change.[1] Specifically, we propose that having team members allocate their own roles in their upcoming new tasks in a team discussion (versus being assigned roles by a supervisor) can help reduce conflict and further behavioral coordination and performance in teams with a history of competitive rewards, but that the opposite will be true for teams that have a history of cooperative rewards.

Role allocation in teams

Team members' roles can be viewed as subsets of the behaviors exhibited within the team processes; they manifest individual level contributions to these team processes (Mumford, 2002, see also: Bales, 1950; Belbin, 1993; Benne & Sheats, 1948; Fisher, Hunter, & Macrosson, 1998; Mudrack & Farrell,1994, 1995; Senior, 1997). An important decision that needs to be made when adapting to a structural change is how team members will reallocate tasks and take on new and different roles (Edmondson, Bohmer, & Pisano, 2001; Gersick & Hackman, 1990).

One way to reallocate roles when a team goes through a structural change would be to have the team's supervisor autocratically impose new roles. As such, teams transitioning from a competitive to a cooperative reward structure are not helped in any way to deal with the change. Therefore, it is likely that in this situation, their habitual pattern of interaction, characterized by a lack of coordination and inaccurate performance, continues into the future. Thus, under circumstances where role reallocation is implemented autocratically, this is likely to result in cutthroat cooperation, as was indeed observed by Johnson et al. (2006).

Alternatively, management could opt to have team members discuss their new roles among themselves. This approach fits the trend of using self-management procedures to manage teams, which has shown a tremendous increase in recent years (Manz & Sims, 1987). Granting team members more discretion in the role building process has been shown to provide a number of structural benefits to organizations, such as adapting to important but idiosyncratic local contingencies and conditions (Ilgen & Hollenbeck, 1991). In addition to the structural benefits, team self-management of role decisions also creates a form of "voice" or process control (Lind & Tyler, 1988). The justice literature has documented the positive effects of this process control in terms of enhancing satisfaction and commitment (c.f., Colquitt, Conlon, Wesson, Porter, & Ng, 2001; Lind & Tyler, 1988). Based on this, one might conclude that having members allocate roles themselves might facilitate the change process.

However, in a team context, process control may not have the same positive effects as have been found for individuals, and as emphasized in SAT, changes in directions of a higher order of complexity such as the change from a competitive to a cooperative structure reduce autonomy for some individuals and create interdependence requirements that were formally absent. One team member's exercise of process control can easily lead to the support of outcomes that are not in other members' best interests or may threaten others' status within the team. In this case, process control or voice might not always lead to a personally better outcome because of the influence of other members' voice. Instead of leading to improved coordination and performance, intra-team role discussions could therefore lead to disagreements and process losses.

The question is therefore whether having team members decide about their roles themselves would help or hinder teams to adapt to a change from a competitive to a cooperative reward structure. On the one hand, SAT would suggest that role discussion would only increase conflict (defined as perceived incompatibilities, or perceptions by parties that they hold discrepant views or have interpersonal incompatibilities, Jehn, 1995), and impair behavioral coordination (defined as the process of orchestrating the sequence and timing of interdependent actions, Marks, Mathieu, & Zaccaro, 2001). On the other hand, theories of self-managing teams would suggest that role discussion could be the starting point for increased future coordination (Rubin, Pruitt, & Kim, 1994), and therefore help teams with a history of competitive rewards make the change to a cooperative structure.

In order to understand whether role discussion would help or hinder teams undergoing reward structure changes and thus to attenuate the cutthroat cooperation effect, it is crucial to take a closer look at what the discussion process entails for teams with different histories in terms of reward structure. When team members

[1] In the current study, we only examined the change from competitive to cooperative reward structures, not the change from cooperative to competitive structures. We chose not to investigate this condition, because earlier research (Johnson et al., 2006) has shown that the transition from cooperation to competition is not problematic for teams, whereas the competition–cooperation transition is.

have to allocate roles among themselves, this involves a joint problem solving process that is characterized by mixed-motive interdependence (Schelling, 1960). On the one hand, members are motivated to cooperate to ensure that they reach consensus on who should do what. On the other hand, the motivation to compete also plays a role because each member strives to obtain an agreement that is optimally beneficial for him- or herself, particularly in situations where teams have to distribute roles that are not equally desirable (De Dreu, Weingart, & Kwon, 2000). For example, a team of researchers may have to decide who should run a research study and who gets to go to a conference to present it; and an intramural soccer team may have to identify who is going to start the game and who is going to be a substitute. Thus, there are inherent competitive and cooperative aspects to all team role discussions (De Dreu et al., 2000; Tjosvold, 1998).

Since all perception is relative, the degree to which role discussions are perceived as cooperative or competitive will depend upon the previous level of cooperativeness and competitiveness in the team. Although it has not been applied to team processes and performance in previous research, this idea is not new. The theoretical notion derived from Prospect Theory (Kahneman & Tversky, 1979) that experiences are evaluated with respect to changes from a reference position rather than by their objective properties is well known to researchers in the field of social judgment and decision making, and has received a great deal of empirical support in this field (see, e.g. Heath, Larrick, & Wu, 1999; Kahneman & Miller, 1986; Lopes, 1987; Tesser, 1999). Likewise, Control Theory (Kernan & Lord, 1991; Lord & Hanges, 1987) postulates that individuals compare outcomes to referents, and this comparison process leads to positive or negative discrepancies. Rather than the absolute outcome levels, these discrepancies, in turn, influence affective and behavioral reactions (Conlon & Ross, 1993; Kernan & Lord, 1991; Rice, McFarlin, & Bennett, 1989).

Applying these notions to the case of role discussions in teams undergoing reward structure changes, teams that previously worked under a competitive reward structure have a competitive situation as their reference point. Because competition is all they have known, at the start of a role discussion, members of these teams are likely to expect their team members to engage in uncooperative behavior. Therefore, the mixed cooperative and competitive aspects of the role discussion process will seem, on average, less competitive than what they experienced in the past. Team role discussion provides team members with the opportunity to voice their opinions, as well as to learn the opinions of others, and has been shown to help former competitors begin to learn how to jointly solve problems (Rubin et al., 1994). Thus, role discussion can be a first opportunity for formerly competitive team members to work together cooperatively and therefore may de-escalate conflict. The coordination of efforts initiated by team role discussion processes may promote future cooperative behavior and coordinated efforts. Therefore, we argue that for teams that previously worked in a competitive reward structure and who have to make the transition to a cooperative reward structure, role discussion decreases perceived conflict, and enhances coordination and performance.

In contrast, the mixed cooperative and competitive aspects of role discussion should reflect an escalation of competition and conflict for team members who had previously only experienced cooperative relationships. For teams with a history of cooperative rewards, the mixed cooperative and competitive aspects of the team role discussion process should generally seem more competitive relative to their past experience. When teams with a cooperative reward structure history engage in role discussion, assignments that were previously unquestioned are now open to debate. During this debate, questions can be raised about the qualifications of certain people for certain roles. The conversation may focus on past mistakes or future potential, leading to perceptions of conflict and causing certain members to feel criticized or undervalued. These feelings have been shown to decrease willingness to collaborate in the future (Weaver & Brickman, 1974). This should, in turn, hinder future coordination of efforts and performance. Thus, we argue that for teams that previously worked under a cooperative reward structure and who remain to work under such a structure, role discussion increases perceived conflict, and decreases coordination and performance. Based on the above, we propose

Hypothesis 1. *The effect of a team's history in terms of reward structure on future team performance is moderated by role allocation procedures, such that role discussion will be positively related to subsequent performance for teams with a competitive reward structure history, but negatively related to performance for teams with a cooperative reward structure history.*

Implicit in the above reasoning we proposed that the effects of role discussion on team performance are mediated by perceptions of conflict and by team coordination processes. We predict team role discussion to have a de-escalating effect for teams with a history of competitive rewards, whereas we predict it to have an escalating effect for teams with a history of cooperative rewards, and that these de-escalating and escalating processes will become apparent in the level of conflict perceived by previously competitive and teams with a history of cooperative rewards. In turn, conflict will affect team performance. Hence

Hypothesis 2. *Role discussion leads to a relative decrease in conflict for teams with a competitive reward structure history, but to a relative increase for teams with a cooperative reward structure history (H2a), and this mediates the interactive effect of history and team role discussion on performance (H2b).*

Besides affecting conflict, we also expect the de-escalating and escalating processes described in the above affect team coordination. According to Marks et al. (2001, p. 368), team coordination involves "information exchange and mutual adjustment of action in order to align the pace and sequencing of team member contributions..." Coordination thus reflects the ability of the team to support and facilitate each other's task accomplishment via workload sharing and information sharing. This workload sharing and information sharing are vital task behaviors teams need in order to perform well. Based on the above reasoning, we propose

Hypothesis 3. *Role discussion leads to a relative increase in coordination for teams with a competitive reward structure history, but to a relative decrease for teams with a cooperative reward structure history (H3a), and this mediates the interactive effect of history and team role discussion on performance (H3b).*

Methods

Research participants and task

Participants were 300 business students at a Mid-Western university in the U.S.A., arrayed into 75 four-person work teams. Sixty percent of our sample was male, and approximately 90% was Caucasian. Participants engaged in a dynamic and networked computer simulation, MSU-DDD (Miller, Young, Kleinman, & Serfaty, 1998). Because this task has been described in detail in other sources (see, for instance: Beersma et al., 2003; Hollenbeck et al., 2002), we provide only a brief description below. The current study was part of a research program investigating the impact of reward structures on team performance. Teams performed two tasks. In the first task, all teams worked within a divisional structure (broad and generic roles). The second task required them to work within a

functional structure (narrow and specialized roles) with a reward structure that emphasized team-level performance and made no distinctions in performance within the team. Hence, all teams, regardless of condition, had to adapt to a new structure that placed more emphasis on working together. The key difference was that half of the teams were working under the same reward structure in Task 2 as in Task 1 (cooperative), whereas half of the teams were working under an individual-based reward structure where they competed against members of their own team for the highest individual score (competitive) in Task 1, but moved to a cooperative structure in Task 2. Beersma et al. (2003) described the role structure and reward structure of these teams at Time 1, as well as results for Task 1. As the current paper concerns the influence of *changes* in reward structure on performance, and how this influence is moderated by team role discussion, we focus on Task 2 here.

The team's mission was to monitor air and ground space, keeping unfriendly forces from moving into restricted areas, while allowing friendly forces to move about freely. Radar representations of these forces were known as "tracks". In monitoring the geographic space, each team member's base of operation had radar capacities that covered only a portion of the total space. Any track outside a team member's radar range was invisible to this member. If team members wanted to determine the nature of a track outside their radar range, they could ask their team members to share that information or they could launch a vehicle and move it near the track. Each team member had control of four vehicles, which could be launched and moved to different areas of the screen. In total, the team had four AWACS planes, four tanks, four helicopters, and four jets. Each of these vehicles varied in its capacities on several dimensions. Teams were both confronted with "standard tracks" (which were known *a priori* to have specific characteristics which were taught in the training prior to the task) and "novel tracks" that were not encountered during the training (for a full description of vehicle and track characteristics, see Beersma et al., 2003, or Johnson et al., 2006).

Teams engaged in the DDD-task twice, and, although Tasks 1 and 2 were the same in terms of team responsibilities (e.g., keeping the restricted area free of enemy tracks), the task structure changed for all teams from Task 1 to Task 2. Whereas in Task 1 the enemy tracks came into the area from all directions, in Task 2 the enemy's actions were particularly focused on the northwestern quadrant. Previous research has shown that in this type of environment, a functional task structure in which every team member operates one type of sub-platforms is most conducive to effective performance (Hollenbeck et al., 2002). Before Task 2, team members were told that the enemy had changed its strategy and they therefore had to switch to a functional structure. The decision about which team member would operate which vehicles was determined by our manipulation of team role discussion. After the role decision, teams engaged in a 5-min strategy session and then proceeded to Task 2.

Manipulations and measures

History

Teams were randomly assigned to either a "cooperative–cooperative" or a "competitive–cooperative" (in Johnson et al.'s terms: "Cutthroat cooperation") reward structure condition. Under the *cooperative* structure, participants were informed that the top performing *teams* would receive a reward of $40, which would be split evenly among the team members regardless of how well they performed as individuals. Under the *competitive* structure, participants were informed that the top performing *individuals* would receive a reward of $10, regardless of how well the team performed as a whole. All teams worked under a cooperative structure for Task 2, but their experience in Task 1 was manipulated so that half the teams had a cooperative history and half the teams had a competitive history. That is, all teams in this Study at Time 2 worked within a functional structure with a reward structure that emphasized team-level performance and made no distinctions in performance within the team. At Time 1, all teams worked within a divisional structure, and hence all teams had to adapt to a new structure that placed more emphasis on working together.[2] The key difference in their history was that half of the teams at Time 1 were working with the same reward structure at Time 2 as they did at Time 1 (cooperative), whereas half of the teams were working under an individual-based reward structure where they competed against members of their own team for the highest individual score (competitive).

To check the adequacy of our manipulation of reward structure, we used a four-item scale measuring competition and a three-item scale measuring cooperation ("1" = "disagree strongly" and "5" = "agree strongly"). A sample item used to measure competition was: "While I was playing the DDD game, I was competing with the others on my team." A sample item used to measure cooperation was: "While I was playing the DDD game, it was important to achieve as many points as possible as a team." We asked participants to complete these scales two times; once after the team had finished Task 1 and once after the team had finished Task 2.

Successful manipulations would imply that those participants who worked under a cooperative reward structure during Task 1 would have a higher score on the scale for cooperation and a lower score on the scale for competition (measured after Task 1) than those who worked under a competitive reward structure during Task 1. However, since all teams worked under a cooperative reward structure during Task 2, no differences in cooperation or competition between teams that had worked under a cooperative reward structure during Task 1 and teams that had worked under a competitive reward structure during Task 1 should occur on the measurement that referred to Task 2.

The items used to check the manipulation of reward structure formed reliable scales. For the four items used to check for a competitive orientation, Cronbach's alpha was .93 when the measurement concerned Task 1, and .81 when the measurement concerned Task 2. For the three items used to check for a cooperative orientation, Cronbach's alpha was .93 when the measurement concerned Task 1, and .70 when the measurement concerned Task 2.

Team role discussion

After Task 1, teams were informed that they would be switching from a divisional to a functional structure due to a change in the enemy's strategy. As a consequence, vehicles would be distributed differently across team members in Task 2 relative to how they had been distributed in Task 1. Specifically, each team member would be in control of four vehicles of the *same type*. Thus, one team member would control all four jets, one member would control all four AWACS, one member would control all four helicopters, and one member would control all four tanks. Some roles were perceived as more desirable than others because of limitations associated with the functionality of the vehicles assigned to certain

[2] Roles for Task 1 were broader than for Task 2, and although they did not strictly require interdependence, people could leave their own region and attack tracks in other people's quadrants. Within the cooperative reward structure condition, this was generally considered "helping behavior," and members within the team usually appreciated this action because it increased their chances of winning the team-based financial bonus. In the competitive reward structure condition this exact same behavior was generally considered "poaching (or stealing) behavior," and team members usually resented it because it decreased their chances of winning the individual-based financial bonus. Thus, the history for one group was cooperative, and the history for the other was competitive at Time 1, but at Time 2 everyone worked under the exact same cooperative reward system.

roles (e.g., the inability to attack with the AWACS and the low power and short operational duration of the jets).[3]

We manipulated the way in which roles (the command over the four types of vehicles) were allocated by randomly assigning teams to either a *team role discussion condition* or to a *no team role discussion (control) condition*. It is important to note that, independent of conditions, all teams would end up with a functional structure with one member in command of the AWACS, one in command of the helicopters, one in command of the tanks, and one in command of the jets.

In the team role discussion condition, teams had 10 min to discuss to which member they would assign which type of vehicles. In the control condition, the experimenter determined how roles were allocated. The essence of this condition was that the role decision was *not* based on an intra-team discussion. Of course, there are many ways to operationalize this control condition. We chose to randomly assign the roles to the team members in half of the teams in this condition. For the other half, the experimenter had the team member with the highest performance score in Task 1 pick a type of vehicles first, followed by the second best performer, and so on. These two processes share in common the critical property that the team did not have to reach consensus and no role was "up for grabs" based upon the outcome of a public team debate.

Because differences within the control condition were not of central interest to this study, we did not treat it as a separate independent variable, but rather counterbalanced teams on this variable. This allowed us to explore if different ways of operationalizing the "no team role discussion" condition affected the results. We checked whether the different methods for allocating vehicles in the control condition resulted in significant differences in performance, and found that they did not, $t\ (22) = -.50$, *ns*. We therefore combined them to form a single control condition.[4]

To check the accuracy of our manipulation of role decision procedure, we used two five-point scales (1 "disagree strongly" to 5 "agree strongly"). These items were: "The decision about how to allocate the sub-platforms in your team was made by the team members" and "The decision about how to allocate the sub-platforms in your team was made by the experimenter". The second item was reverse-coded. The items formed a reliable scale (Cronbach's alpha = .96).

Performance

As Johnson et al. (2006) demonstrated that transitioning from a competitive to a cooperative reward structure is especially detrimental to team accuracy, in the current study we were interested in the accuracy with which teams performed during Task 2. Accuracy reflects the extent to which the team is successful in avoiding decision-making errors. Our measure of accuracy encompassed two types of decision-making errors, which were automatically recorded in the simulation. First, "friendly fire" errors occurred when anyone accidentally engaged a friendly track. Second, "rules of engagement" errors occurred when anyone engaged a track outside the restricted zone. The scale was reversed such that high scores reflected high levels of accuracy.[5]

Conflict

In the literature on team conflict, two types of conflict have been distinguished based on their content (Guetzkow & Gyr, 1954; Jehn, 1995). According to Jehn (1995) *task conflict* refers to "disagreements among group members about the content of the tasks performed, including differences in viewpoints, ideas, and opinions," whereas *relationship conflict* refers to "interpersonal incompatibilities among group members, which typically includes tension, animosity, and annoyance among members within a group" (Jehn, 1995, p. 258). In the current context, teams that had to allocate roles by team role discussion mainly addressed *who* would take what role, and not on *how* roles would be defined, as the content of the roles was fixed by the technology (AWACS vs. jets vs. tanks vs. helicopters). These discussions are likely to impact relationship conflict, not necessarily task conflict because task requirements were defined by the role once it is assumed. We therefore focused on relationship conflict in the current study and used Jehn's relationship conflict scale that consists of four five-point scales (1 "not at all" to 5 "very much") to measure relationship conflict during the teams' strategy session (Jehn, 1995). Sample items are "To what extent where there personality clashes in your team?" and "How much emotional conflict was there in your team?" (Cronbach's alpha = .86).

Coordination

In this study, there were three direct indicators of behavioral coordination. At the individual team member level, we recorded the degree to which team members' attacks came up short (i.e., lacked sufficient power) or were wasteful (i.e., used more power than was needed). Both of these behaviors reflect lack of coordination because they result from a failure of the team member who had the best vehicle for engaging the track to move into the region where it was needed. Because our theory prescribes coordination as the "total process of orchestrating the sequence and timing of interdependent actions" (Marks et al., 2001, p. 368) we aggregated these individual level data to the team level by computing a team score for each team.

[3] The helicopter command is the most preferred role: Helicopters are fast, their attack power is good, they have good vision, and can stay away from the base for a relatively long time. Tanks are somewhat less preferred; a tank has only limited vision and is slow. However, it has a high weapon capacity. The jet command is generally preferred even less, because they have limited power and can stay away from the base for a very short time only. Finally, commanding the AWACS planes is the least desirable role. As AWACS cannot attack targets, commanding the AWACS is more a support role than an essential role. In order to empirically check for differences in preferences for the different team roles, we asked participants in our study to indicate to what extent they would like to perform each of the four roles on a five-points scale, ranging from 1 (not at all) to 5 (very much). As we expected, the data show that the helicopter command was the most preferred role ($M = 4.23$, $SD = .43$), followed by the tank command ($M = 3.22$, $SD = .54$), the jet command ($M = 3.14$, $SD = .53$), and the AWACS command ($M = 2.63$, $SD = .78$). Paired samples *t*-tests demonstrated preferences for the helicopters to be stronger than for the tanks, the jets, and the AWACS. Preferences for the tank and the jet were not significantly different, and the AWACS command was preferred significantly less than all other roles. Thus, there are three clear categories of roles: A highly preferred one (helicopter command), an intermediate one (tank or jet command) and a least preferred one (AWACS command).

[4] This resulted in the following distribution of teams over conditions: Cooperative history, no team role discussion: $n = 10$ (five teams were assigned roles randomly, five picked roles in the order determined by Task 1 performance), Competitive history, no team role discussion: $n = 14$ (seven teams were assigned roles randomly, seven picked roles in the order determined by Task 1 performance), Cooperative history, team role discussion: $n = 20$, Competitive history, team role discussion: $n = 31$. When one uses multiple regression to analyze this type of categorical data, unequal sample sizes do not affect the results. Specifically, Cohen and Cohen (1983) state that when data is analyzed in this way, unequal cell sizes have no effect on interpretation of the B's or the statistical test of those: "As was the case fordummy variables and effects coding, it is noted again that the contrast coded B values are not affected by varying sample sizes. Because they are a function of means or unweighted means of means, the expected value of a contrast is invariant over changes in relative sample size." (p. 210).

[5] The DDD task provides information at both at the individual and team level continuously updated on the screen. Teams are not provided with norms, and so it is not easy for them to interpret where they stand relative to other teams. Individuals are not provided with norms either, and so it is difficult to compare how one performed in his or her role relative to people on other teams. Individuals can see their relative standing within the team, however, and this is true regardless of condition.

The third indicator that tapped lack of coordination was the time it took the team members to learn the nature of the "novel" tracks. No one individual could learn the nature of these tracks by him or herself because of the limited nature of their personal experience (i.e., managing a single vehicle). Thus, in order to learn the nature of the novel tracks, the team had to coordinate the sequence and timing of their attacks, and then share information about the outcomes of those attacks. The experimenter measured the time used to learn the nature of the novel tracks. As soon as a team started the task, the experimenter set a stopwatch. When teams verbally reported the correct solution to the novel tracks, the experimenter recorded the time. Thus, there was only one score per team at this measure. Teams that failed to identify the novel tracks correctly were assigned the maximum time (30 min), reflective of the worst coordination possible. We converted the three behavioral indices of coordination into *Z*-scores and summed these to arrive at the total score for coordination per team.

Operationally, the three processes we investigated under the label "coordination," namely waste, coming up short, and learning the identity of unknown tracks, reflect the definition of Marks et al. (2001). Specifically, when team members do not communicate and exchange information about the tracks that are in their respective quadrants, this will result in waste of resources, using insufficient resources, and a failure to learn the nature of unknown tracks. In contrast, when members do share information, they will be able to "pace and sequence their contributions" in such a way that the right vehicle is at the right place at the right time, and then they will not show high levels of waste and coming up short and a lack of learning.

To compute the convergent validity for our measure of behavioral coordination, we collapsed the "coming up short" (CUS) and "wasteful attack" (WA) indicators into one indicator, and then calculated the correlation between this value and the value for the "time to learn new targets". We collapsed CUS and WA because these are two different ways of failing to coordinate effectively on a single target, and one cannot do both with respect to any single target. The convergent validity between CUS and WA on the one hand and time to learn new targets on the other was $r = .20$. We have to note that this correlation is restricted by a distributional problem with time to learn (censored on one side, as teams that failed to identify the novel tracks correctly were assigned the maximum time).

The strength of the relationship between these two indicators becomes more evident when one calculates a Binomial Effect Size Display, which Rosenthal and Rosnow (2008) recommend in contexts such as this. A BESD is less affected than the correlation coefficient by non-normal distributions, and merely compares the relative odds of alternative outcomes under alternative situations. We computed how likely teams were to never learn the nature of the u-tracks for different levels of CUS/WA. This showed that teams scoring in the top 1/3 for CUS/WA (i.e., teams that relatively made a lot of coordination errors) had a probability of 48% of never learning the nature of the u-tracks. Teams in the bottom 1/3 for CUS/WA (i.e., teams that coordinated relatively well) only had a 16% chance of never figuring out the nature of the u-tracks. This results in odds of .19 of never learning the nature of the u-tracks for teams in the bottom 1/3 of CUS/WA, and odds of .92 of never learning the nature of the u-tracks in the top 1/3 of CUS/WA, resulting in an odds ratio of 4.8. Thus, in this context, the odds of a team never learning the nature of the unknown targets were nearly five times higher when a team scored within the top 1/3 in CUS/WA relative to those teams that scored in the bottom 1/3 for CUS/WA (Rosenthal & Rosnow, 2008, 318–322; Rosenthal & Rubin, 1982).

Results

Descriptive statistics and manipulation checks

Table 1 presents descriptive statistics for the variables in the current study. Analysis of variance (ANOVA) on the manipulation checks for reward structure showed that the manipulation in Task 1 was successful. Teams that worked under a cooperative reward structure in Task 1 scored higher on the cooperation scale ($M = 4.26$, $SD = .46$) than teams that worked under a competitive reward structure during Task 1 ($M = 2.65$, $SD = .53$, $F(1,73) = 184.77$, $p < .01$, $\eta^2 = .72$). Also, teams that worked under a competitive reward structure during Task 1 scored higher on the competition scale ($M = 3.51$, $SD = .52$) relative to teams that worked under a cooperative reward structure during Task 1 ($M = 2.24$, $SD = .53$, $F(1,73) = 104.74$, $p < .01$, $\eta^2 = .59$). In Task 2, all teams worked under a cooperative reward structure, and thus, we should not find any differences on the manipulation checks. This was indeed the case. Cooperation scale scores concerning Task 2 for teams that worked under a cooperative structure in Task 1 ($M = 4.40$, $SD = .38$) did not differ from those of teams that worked under a competitive structure in Task 1 ($M = 4.31$, $SD = .41$, $F(1,73) < 1.0$, ns.). Likewise, competition scale scores concerning Task 2 for teams that worked under a cooperative structure in Task 1 ($M = 2.00$, $SD = .45$) did not differ from those of teams that worked under a competitive structure in Task 1 ($M = 1.88$, $SD = .46$, $F(1,73) = 1.48$, ns.). Thus, the teams clearly understood the nature of the reward contingencies for Task 2, even those that were making the transition from a competitive to cooperative structure.

We analyzed scores on the manipulation check for role decision procedure using ANOVA. The analysis showed that our manipulation was successful. Teams in the role discussion condition reported that the team members themselves had made the decision to a higher extent ($M = 4.75$, $SD = .30$) than teams in the control condition ($M = 2.15$, $SD = .92$, $F(1,73) = 337.72$, $p < .001$, $\eta^2 = .82$).

Tests of hypotheses

We used hierarchical regression analysis to test our hypotheses. In all regression analyses, we controlled for Task 1 performance, which was entered in the first step. In subsequent steps we then entered the independent variables reward structure history, team role discussion, and their interaction, following their perceived importance as dictated by our theory. Table 2 (first column) shows the results of the regression analysis testing our first hypothesis. Whereas history and team role discussion, entered in the analysis in the second and third step, respectively, did not have significant main effects on performance, we did find the interaction effect be-

Table 1
Means, standard deviations and intercorrelations for variables in the study

	Variable	Mean	*SD*	1	2	3	4
1.	History	.60	.47				
2.	Team role discussion	.68	.49	.02			
3.	Conflict	1.23	.27	−.11	.05		
4.	Coordination	0	1	−.22	.02	−.09	
5.	Performance	0	1	−.11	.07	−.29*	.50**

Note. $N = 75$ teams. History is the dummy coded variable comparing the cooperative reward structure in Task 1 condition (0) and the competitive reward structure in Task 1 condition (1). Team role discussion is the dummy coded variable comparing the no team role discussion (control) condition (0) and the team role discussion condition (1).

* $p < .05$.

** $p < .01$.

Table 2
Results of regression analyses in which team performance, conflict, and behavioral coordination are regressed on history, team role discussion, and their interaction

Step	Independent variables	Team performance			Conflict			Behavioral coordination		
		B	Standard error	β	*B*	Standard error	β	*B*	Standard error	β
1	Performance in Task 1	−.18	.33	−.06	.04	.03	.15	.17	.12	.17
2	Performance in Task 1	−.45	.38	−.16	.04	.04	.13	.08	.14	.08
	History	−1.06	.77	−.19	−.03	.07	−.05	.36	.27	.18
3	Performance in Task 1	−.51	.39	−.18	.03	.04	.12	.08	.14	.08
	History	−1.15	.77	−.20	−.03	.07	−.05	−.26	.28	−.18
	Team role discussion	.61	.70	.10	.02	.07	.04	.03	.25	.02
4	Performance in Task 1	−.57	.38	−.20	.04	.04	.15	.05	.14	.05
	History	−3.07	1.22	−.54*	.13	.12	.25	−1.14	.43	−.56**
	Team role discussion	−1.02	1.07	−.17	.16	.10	.27	−.63	.38	.30
	History × Team role discussion	2.77	1.38	.50*	−.23	.13	−.42***	1.13	.49	.56*

Note. $N = 75$ (1 observation per 75 teams). *B* values are unstandardized, and β's are standardized coefficient estimates. History is the dummy coded variable comparing the cooperative reward structure in Task 1 (0) and the competitive reward structure in Task 1 condition (1). Team role discussion is the dummy coded variable comparing the no team role discussion (control) (0) and the team role discussion condition (1).

* $p < .05$.
** $p < .01$.
*** $p < .10$.

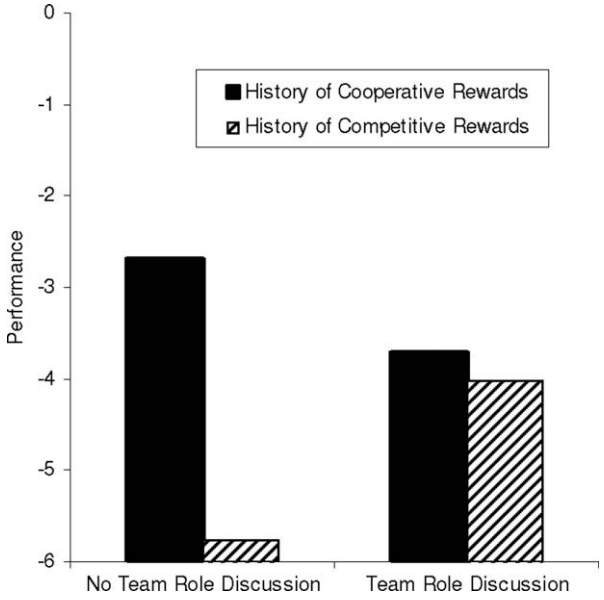

Fig. 1. Team performance as a function of history and team role discussion.

tween history and team role discussion that was predicted in Hypothesis 1 (see step four of the analysis, $\beta = .50$, $p = .049$, Total $R^2 = .09$, $\Delta R^2 = .05$).

Fig. 1 demonstrates this effect. The left hand portion of this figure displays the cutthroat cooperation effect documented by Johnson et al. (2006). That is, our results show that in a context where teams did not decide about roles themselves, history matters, in the sense that it is difficult for teams to make the transition from competitive to cooperative reward conditions, and teams with a history of competitive rewards fail to perform as accurately as teams with a history of cooperative rewards. However, the right hand portion of this picture shows that team role discussion neutralizes this effect. Consistent with Hypothesis 1, we found that team role discussion was beneficial for teams that had a history of competitive rewards, but not for teams that had a history of cooperative rewards.

Hypotheses 2 and 3 referred to the possible mediating mechanisms conflict and coordination. Table 1 shows that both conflict and coordination were correlated with performance. Coordination was, as expected, positively correlated with performance ($r = .50$, $p < .01$), whereas conflict, also as expected, was negatively correlated with performance ($r = -.29$, $p < .05$), As Hypotheses 2 and 3 focused on both moderated relationships (with team role discussion being the moderator variable that was predicted to moderate the effects of history) and mediated relationships (with conflict and coordination being the potential mediating variables), we tested these hypotheses using the procedure described by Muller, Judd, and Yzerbyt (2005) to test mediated moderation.

According to Muller et al. (2005), to demonstrate mediated moderation, there should first be a moderated effect (i.e., an interaction between the independent variable and the moderator) on the dependent variable. This was the case in our study; history and team role discussion interacted to predict performance, as demonstrated by the regression analysis we used to test our first hypothesis (see Table 2). Second, a model should be estimated in which the mediator variable (conflict or coordination in our case) is regressed on the independent variable (history in our case), the moderator (team role discussion in our case), and their interaction (cf. H2a and H3a). Finally, a model should be estimated in which the dependent variable (team performance in our case) is regressed on the independent variable, the moderator, their interaction, the mediator, and the interaction between the mediator and the moderator. Mediated moderation is demonstrated when the independent variable and the moderator have a significant effect on the mediator and the mediator has a significant effect on the dependent variable, or the independent variable has a significant effect on the mediator and the mediator and moderator have a significant interaction effect on the dependent variable, or both of these conditions are true (see Muller et al., p. 856, for a more elaborate explanation, cf. H2b and H3b).

We first tested Hypothesis 2, in which we predicted mediation of the history × team role discussion interaction by relationship conflict. Because conflict was measured with individual self-report ratings, we first had to establish within team agreement about conflict ratings. Although we found that there was acceptable agreement within teams regarding the level of conflict ($r_{wg} = .92$), intraclass correlations (which test whether there is less variance within than between teams) were low (ICC1 = .021, ICC2 = .081). Because our dependent variable (team performance) was measured at the team level, and using teams rather than individuals as the unit of analysis makes the tests of our hypotheses more, rather than less, conservative (see Kenny, Kashy, & Bolger, 1998, for a discussion), we decided to aggregate the conflict ratings to the team level in spite of the low ICC-values, by computing the mean conflict rating for each team.

We then regressed conflict on history, team role discussion, and their interaction (see Table 2, second column). We found a marginally significant interactive effect of history and team role discussion on conflict, $\beta = -.42$, $p = .095$, Total $R^2 = .07$, $\Delta R^2 = .04$. Although this result shows that history tended to affect conflict differently depending on whether the team was in the no team role discussion condition or in the team role discussion condition, the effect failed to reach the .05 level of statistical significance.

The previously significant interaction effect between history and team role discussion (see the test of Hypothesis 1) was reduced and no longer significant when we controlled for conflict and the conflict x team role discussion interaction, $\beta = .41$, $p = .071$. Yet, conflict had a marginally significant effect on performance only ($\beta = .35$, $p = .072$). This effect was qualified by a significant conflict $\times$ team role discussion interaction ($\beta = -.73$, $p < .001$). Examining the pattern of correlations between conflict and performance showed that whereas conflict was not significantly related to performance in the no team role discussion condition ($r = .24$, $p = .26$), there was a significant negative relationship between conflict and performance in the team role discussion condition ($r = -.53$, $p < .001$). As the effect of conflict was marginally significant only, and a Sobel test testing the significance of the moderated indirect path through conflict fell short of being significant, $z = 1.24$, $p = .21$, Hypothesis 2a and b were not supported. We will return to this in the Discussion.

To test Hypothesis 3 (i.e., to establish mediation of the history x team role discussion interaction by behavioral coordination), we used the same approach as for the mediated moderation analyses involving conflict. We regressed behavioral coordination on history, team role discussion, and their interaction, and found a significant history x team role discussion interaction ($\beta = .56$, $p = .025$, Total $R^2 = .12$, $\Delta R^2 = .07$, see Table 2, third column). As predicted in Hypothesis 3a, these results show that history had a different effect on coordination depending on whether the team is in the no team role discussion condition or the team role discussion condition. As shown in Fig. 2, in a context where teams did not discuss their roles, teams with a history of competitive rewards failed to reach the coordination levels of teams with a history of cooperative rewards. However, in a context where teams did discuss their roles, this effect is neutralized.

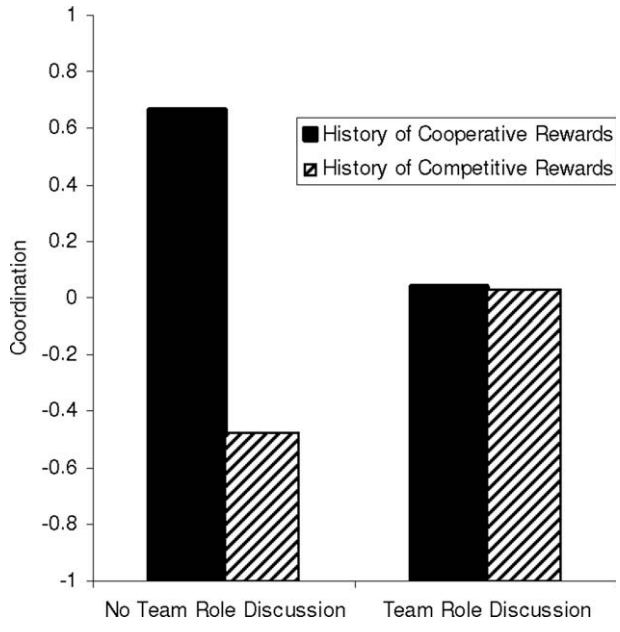

Fig. 2. Coordination as a function of history and team role discussion.

Consistent with Hypothesis 3a, we find that in terms of coordination, team role discussion was beneficial for teams that had a history of competitive rewards, but not for teams that had a history of cooperative rewards.

We then regressed team performance on history, team role discussion, their interaction, behavioral coordination, and the interaction between behavioral coordination and team role discussion. We found that in this analysis, the previously significant interaction effect between history and team role discussion became non-significant, $\beta = .15$, $p = .57$. Moreover, the effect of behavioral coordination was significant, $\beta = .59$, $p = .013$. As a final check on the significance of the moderated indirect path, we ran a Sobel test, $z = 1{,}71$, $p = .087$. It has to be noted that the Sobel test is conservative and requires high power in order to become significant (Fritz & MacKinnon, 2007; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; Wood, Goodman, Beckmann, & Cook, in press). Therefore, we see this marginally significant result as in line with our predictions.

The above analyses thus show support for a mediated moderation model in which history interacts with team role discussion to affect behavioral coordination, and behavioral coordination in turn affects team performance. When teams did not discuss their roles, teams with a history of competitive rewards failed to coordinate as efficiently as teams with a history of cooperative rewards, and therefore perform worse. However, when teams did get the opportunity to allocate roles themselves, teams with a history of competitive rewards coordinated just as well as teams with a history of cooperative rewards, and reached equal performance levels. These results support Hypothesis 3b.

Discussion

As teams face different tasks and challenges over time, changes in team reward structure and roles may be required. The purpose of this study was to learn whether role discussion can ensure behavioral coordination and accurate performance for teams going through a reward structure change. We proposed that the effects of role discussion depend on the team's history in terms of cooperative or competitive rewards. Earlier research on Structural Adaptation Theory (Johnson et al., 2006) showed that changing from a competitive to a cooperative reward structure poses a problem for teams. These teams did not perform as accurately as teams that had always worked within a cooperative structure, and Johnson et al. labeled this the "cutthroat cooperation effect." This effect implies that "history matters," and challenges the conventional wisdom that simply switching to team-based pay policies is sufficient for promoting cooperative team dynamics in contexts where teams have had an individualistically-oriented history. In the present experiment, we studied whether role discussion could solve the problem of cutthroat cooperation and investigated the mediating mechanisms that could explain the attenuating effect of role discussion.

In support of our predictions, we found that role discussion helps teams undergoing a change from competition to cooperation to perform accurately, thus buffering the cutthroat cooperation effect. Specifically in our "no team role discussion" (control) condition, we directly replicated the cutthroat cooperation effect demonstrated by Johnson et al. (2006), in that teams with a competitive history performed less accurately in a cooperative context than teams with a cooperative history. However, this effect was no longer observed when teams got the opportunity to discuss their roles among themselves. When members from teams with a history of competitive rewards allocated their roles in the new task through team discussion, they performed as accurately as teams with a history of cooperative rewards.

Examining the mediating mechanisms that are responsible for the attenuating effect of team role discussion on cutthroat cooperation showed that behavioral coordination mediated the interaction between past reward structure and team role discussion on performance. We proposed that conflict would also mediate this effect, but the effects we found were weaker than we expected and the test for mediated moderation failed to reach significance. This may be due to the scale we used to measure conflict. This scale is the most widely used measure for conflict in the literature, but although we found that there was acceptable agreement within teams regarding the level of conflict as measured with this scale (r_{wg} = .92), intraclass correlations (which test whether there is less variance within a team than between a team) were very low (ICC1 = .021, ICC2 = .081), indicating that the scale may have picked up little variance in conflict in our experimental setting. The problems with the measure seem to be twofold: First, the participants in our experiment may have been reluctant to label their experiences as "conflict" as required by this measure, and second, the variance that is picked up by the measure can often be attributed to teams that had asymmetrical scores on the conflict measure (i.e., some team members scoring higher than others).

To address the first issue, a measure may be needed that measures conflict more subtly (i.e., with less explicit terminology) in an experimental setting. Concerning the second issue, the variability in conflict ratings within teams that we observed may be interesting in themselves. The current study is not the first to find that conflict perceptions can differ across team members. Jehn and Chatman (2000), Jehn, Rupert, and Nauta (2006), and Greer, Jehn, and Van Beest (2007) also report intra-team variance regarding conflict perceptions. In fact, in the above studies it has been argued and found that situations in which members of the same team report differing levels of conflict are an antecedent to ineffective team performance. Thus, evidence seems to be accumulating that shows that the idea that there needs to be consensus regarding conflict perceptions within team is in need of adjustment. All in all, the results we found in combination with this recent work on within team variance in conflict perceptions shows that rather than the conceptual arguments on which we built our theory, the measure of conflict may be in need of revision in order to incorporate the possibility of intra-team differences.

Having said this, another issue worthy of attention is that our theory rests largely on the assumption that it is the *discrepancy* between the status quo (the history of the team in terms of reward structure and concomitant cooperative or competitive atmosphere) and the team role discussion is what would drive the effects we predicted. By looking only at results for the conflict measure, while not comparing them with what team members expected, we may have failed to capture this process.

To address this issue, we ran additional analyses of self-report data that yield some insight into team members' expectations and behaviors. After teams had performed Task 1, and before it was made known to the team members how the role allocation decision would be made, we asked all participants whether they would expect their team members to behave cooperatively if the role allocation decision would be made through team role discussion (using three Likert-type items; 1 "very unlikely", 5 "very likely"). As one would expect, we found that teams with a cooperative history rated the likelihood that their team members would behave cooperatively in such a team role discussion to be higher (M = 3.48, SD = .28) than teams with a competitive history (M = 3.29, SD = .36), F (1,74) = 5.60, p < .05. We also measured actual cooperative team role discussion behavior (using four Likert-type items; 1 "very unlikely", 5 "very likely").

Because we did not want to introduce a confound between measuring team role discussion behavior by asking participants questions about it on the one hand and the actual experience of having engaged in team discussion on the other, we administered these questions to a random sub-sample of teams in the team role discussion condition only (n = 27), and we did not find any differences in coordination or performance between teams that did fill in the questions and teams that did not. We found that teams with a competitive history rated actual team role discussion behavior as more cooperative (M = 3.67, SD = .36) than teams with a cooperative history (M = 3.25, SD = .43), F (1,26) = 7.82, p < .01. Thus, although teams with a history of cooperative rewards *expected* more cooperation, teams with a history of competitive rewards *perceived* more cooperation in the actual team role discussion. Although neither the expectation of cooperation nor its perception were statistically related to team performance, the difference between the two (e.g. actual cooperative team role discussion behavior - expected cooperative team role discussion behavior) was; the correlation between the difference score and team performance was .43 (p < .05). We have to be careful interpreting these effects, because they are based on a small sub-sample (n = 27) only. However, findings point in the direction that it is the discrepancy between what team members expect and what they actually get during a team role discussion that drives further coordination and performance. This is consistent with predictions of Control Theory and Prospect Theory in that team members seem to have compared outcomes to a reference point (cf. Conlon & Ross, 1993; Kahneman & Miller, 1986; Kahneman & Tversky, 1979; Kernan & Lord, 1991; Lord & Hanges, 1987).

Whereas the cooperative aspects of team role discussion are emphasized in teams with a history of competitive rewards, the competitive aspects are emphasized in teams with a history of cooperative rewards. In teams with a history of competitive rewards, team role discussion can thus break the competitive bonds of reciprocity, whereas it stirs up latent conflict in teams with a history of cooperative rewards (Murnighan & Conlon, 1991). Rather than the level of conflict per se, unmet expectations of conflict seem to explain the results in teams that changed structures. The finding that team role discussions can facilitate the transition from competitive to cooperative reward structures is interesting because contemporary organizational teams often have to deal with transitions from competition to cooperation. For example, many organizations such as Daimler and Chrysler, Pfizer and Warner-Lambert, and Mannesmann AG and Vodafone AirTouch PLC have merged with former competitors. When assembling teams in the merged organization, employees may have to cooperate with others they have competed with before, and thus colleagues have to be created out of former competitors.

Our findings show that in this context, role discussion may be beneficial for these teams. Team role discussion processes, which embody both competitive and cooperative elements, represent a move in the cooperative direction for people who had only known competitive relationships. The process may give former competitors the chance to experience that their team members are not as competitively motivated as they thought they were going to be, and to focus on working cooperatively with them in the future. Our findings imply that when team members would participate in the change process via intensive interaction where they can discuss their common goals and make decisions about how to proceed as a team in the upcoming project, this may counteract the negative effects of their prior competitive experience. Although our findings are on the team level, they are consistent with research in the area of inter-group relations that suggests that exposure to members of different groups and common goals can help bridge the gap between former adversaries (Gaertner et al., 1999).

The finding that role discussion can facilitate the change from competitive to cooperative reward structures could thus help organizations fulfill the promise that is potentially offered by

team-based pay solutions that are being increasingly adopted in real world organizations (Garvey, 2002), but which are yielding just mixed effects (Novak, 1997). As one practitioner has noted, "culture has a more powerful impact on rewards than rewards have on culture," (Garvey, 2002, p. 21), and in the context of a team with a specific past history, the role discussion process may help the team shift its culture in a manner that is not achieved by simply switching reward practices.

Although team role discussion processes represent a move in the cooperative direction for people who have only known competitive relationships (due to their reward structure) in the past, for teams that do not make the transition from competition to cooperation but rather remain working under a cooperative reward structure, we found that role discussion did not benefit performance. For these teams, coordination processes may have already emerged naturally and a direct, formal team role discussion process may have disrupted the routines of these teams. This result is similar to what was discovered by Okhuysen (2001) in a different context. Okhuysen (2001) found that a formal intervention directed at improving creativity worked effectively with a group of strangers but hindered performance in a familiar group because it disrupted pre-established interaction patterns. This suggests that when teams have already developed cooperative interaction patterns and roles need to be changed, a managerial decision about team roles that leaves no room for intra-team debate may be a better alternative than team role discussion. In this situation, an autocratic decision prevents the airing of divergent preferences and conflict perceptions that might detract from the team's ability or willingness to engage in future coordinated efforts. Indeed, in many ways, our results corroborate the findings of Murnighan and Conlon (1991) who, albeit in a static context, found that effective string quartets preferred decisions by the team leader as opposed to the endless emotional discussions that characterized less effective ensembles.

Theoretical implications

This paper makes several contributions to theory on team role discussion and team performance. First of all, this study replicates and extends prior research on Structural Adaptation Theory by duplicating the cutthroat cooperation effect shown in previous research. As Hambrick (2007) has recently noted, relative to other more mature sciences, the organizational sciences have not placed enough emphasis on replication, and thus this work is consistent with the call to develop more robust, replicable empirical findings around which to inductively build theory. Similarly, since McGrath and colleagues (McGrath, 1997; McGrath et al., 2000) have noted that research on team processes and performance has not paid enough attention to groups' history, studies have started to take teams' pasts and futures into account, and this study is part of an expanding literature that examines how one task or context may affect team performance when teams move to a different task or context (Harrison, Mohammed, McGrath, Florey, & Vanderstoep, 2003; Johnson et al., 2006; Moon et al., 2004).

Second, the current study adds to a growing literature dealing with the negative aspects of team self-management (Hackman, 1998), and it especially provides new insights into the dynamics of team role discussion in teams. Our findings show that self-management via role discussion is not always the best way to allocate tasks. Rather, the effects of team role discussion depend on the team's history in terms of reward structure. Thus, this work is consistent with other contingency theories or studies of internal and external team fit (Hollenbeck et al., 2002; Kristof, 1996; Muchinsky & Monahan, 1987). It also corroborates earlier findings from intergroup contexts, such as those of Pate, Watson, and Johnson (1998) who found that groups performed best when matched with a situation that enhanced their innate group processing styles (inter-group cooperation or inter-group competition).

Practical implications

Our study has several implications for practitioners who have to deal with the issue of how to make decisions about role allocation in teams. First, we showed that employing team role discussion as a means to allocate roles for teams undergoing changes is an effective way to neutralize the cutthroat cooperation effect. By discussing their roles, teams with a history of competitive rewards are better able to make the transition to a cooperative structure; these teams were shown to perform as accurately as teams that had functioned in a cooperative structure all along. However, letting team members discuss their role allocation decisions is not always the best approach. Although self-management certainly has its advantages, it is not the solution to all team problems, and one needs to be careful when applying it in an organizational context (Hackman, 1998). Practitioners dealing with the issue of how to allocate roles to team members should first look at the history of the team. Is this team already functioning cooperatively, or does it have a history of competitive rewards? Whether to use team role discussion as a means to allocate roles should depend on the answer to this question.

Limitations and questions for future research

As any study, our study suffers from a number of limitations. Although our findings give insight into some of the mediating mechanisms responsible for the effects we found (i.e., coordination and unmet expectations regarding conflict), in the current study we did not collect process data concerning what was said and done during the discussions in the team role discussion condition. As our findings provide insight into the contingencies that determine which role decision procedures work best, future research should examine which micro-mediational processes are responsible for these effects. Further investigating the discrepancies between expectancies and actual experiences by monitoring team role discussion processes in more detail might be a direction future studies could take.

Also, although we had a specific prediction about the direction of the effect of past history on coordination and conflict, we did not have a specific prediction regarding the exact timing of *when* this effect would take place. Because of this, we did not build anything into the study design that would allow us to decompose effects at different points in time (as discussed above, we did not tape and transcribe strategy sessions or discussions during performance sessions). The conflict measure was taken after task engagement and so we cannot tease out timing effects related to strategy sessions and task engagement. Regardless of *when* the effects occur, however, the *direction* of these effects according to our analysis is clear, such that conflict harms and coordination helps future performance. Future research might directly examine the question of when the coordination or conflict occurs, but in terms of actionable knowledge, we feel that the direction of the effect is the most important aspect of the findings.

The nature of the task employed here might also serve as a boundary condition for the results we found. In his task circumplex, McGrath (1984) distinguished between several types of group tasks, which differ in the extent to which they involve conflict versus cooperation and in the extent to which they are conceptual versus behavioral. As the interaction effect between decision procedure and previous history was shown to be mediated by team member coordination, it is likely that the processes demonstrated in our study will have their greatest impact in tasks for which coordination is important (i.e., cooperative tasks in McGrath's typol-

ogy). Tasks that require independent, individual effort may, in contrast, benefit from the internal conflict that is raised when teams with a history of cooperative rewards have to allocate their roles themselves. In fact, this is consistent with arguments recently raised by Beersma and colleagues (see Beersma et al., 2003; Beersma & De Dreu, 2005).

Furthermore, our research suffers from some of the traditional limitations of laboratory experiments. Although the participants in our experiment were highly involved in and motivated by the task we used, and we therefore believe that experimental realism was achieved (Berkowitz & Donnerstein, 1982; Dipboye, 1990), participants were college students, and whether results generalize to team members in organizational settings remains an empirical question. Future research needs to examine the external validity of these results with different samples, tasks and contexts. However, one needs to keep the nature of the research question in mind when assessing the relevance of external validity. In the current study, we were concerned with the conceptual question of whether team role discussion would help or hinder teams going through a reward structure change, and we developed and tested some specific predictions regarding this question based on earlier theories. Because there is no reason to think that our theory would not hold in a laborator context, this context serves as a meaningful venue for testing our hypotheses (Ilgen, 1986).

Clearly, the stakes for individual participants performing our task in the laboratory are lower than in real world tasks. However, we would predict that when the team members are strongly committed to their task, allocating roles might lead to *even more conflict*, not less, and expectations regarding conflict may play an even *larger*, not smaller, role. Thus, our findings are probably conservative relative to the conflict that one might expect and encounter among people who are very strongly committed to their jobs and careers, and hence react even more strongly to being assigned roles that they do not like.

Conclusion

We predicted and found that employing team role discussion as a means to allocate roles can help teams make the change from a competitive to a cooperative reward structure. For teams with a history of working under a competitive reward structure, team role discussion means a de-escalatory process, in which existing tendencies for competition are reduced. Teams with a history of cooperative rewards lack these benefits. For them, team role discussion and reduces coordination and performance. We hope these insights will help managers facing the challenge of guiding their teams through reward structure changes to choose the most optimal role allocation procedure.

References

Bales, R. F. (1950). *Interaction process analysis: A method for the study of small groups*. Cambridge: Addison-Wesley.

Bates, S. (2003). Forced ranking. *HR Magazine*, 63–68.

Beersma, B., & De Dreu, C. K. W. (2005). Conflict's consequences: Effects of social motives on post-negotiation creative and convergent group functioning and performance. *Journal of Personality and Social Psychology, 89*, 358–374.

Beersma, B., Hollenbeck, J. R., Humphrey, S. E., Moon, H., Conlon, D. E., & Ilgen, D. R. (2003). Cooperation, competition, and team performance: Towards a contingency approach. *Academy of Management Journal, 46*, 572–590.

Belbin, R. M. (1993). *Team roles at work*. Oxford: Butterworth.

Benne, K. D., & Sheats, P. (1948). Functional roles of group members. *Journal of Social Issues, 4*, 41–49.

Berkowitz, L., & Donnerstein, E. (1982). External validity is more than skin deep: Some answers to criticisms of laboratory experiments. *American Psychologist, 37*, 245–257.

Boyle, M. (2001). Performance reviews: Perilous curves ahead. *Fortune*, 187–188.

Burke, C. S., Stagl, K. C., Salas, E., Pierce, L., & Kendall, D. (2006). Understanding team adaptation: A conceptual analysis and model. *Journal of Applied Psychology, 9*, 1189–1207.

Cohen, J., & Cohen, P. (1983). *Applied multiple regression/correlation analysis for the behavioral sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc..

Colquitt, J. A., Conlon, D. E., Wesson, M. J., Porter, C. O. L. H., & Ng, K. Y. (2001). Justice at the millennium: A meta-analytic review of 25 years of organizational justice research. *Journal of Applied Psychology, 86*, 425–445.

Conlon, D. E., & Ross, W. H. (1993). The effects of partisan third parties on negotiator behavior and outcome perceptions. *Journal of Applied Psychology, 78*, 280–290.

De Dreu, C. K. W., Weingart, L. R., & Kwon, S. (2000). Influence of social motives on integrative negotiation: A meta-analytic review and test of two theories. *Journal of Personality and Social Psychology, 78*, 889–905.

Dipboye, R. L. (1990). Laboratory vs field research in industrial and organizational psychology. *International Review of Industrial and Organizational Psychology, 5*, 1–34.

Edmondson, A. C., Bohmer, R. M., & Pisano, G. P. (2001). Disrupted routines: Team learning and new technology implementation in hospitals. *Administrative Science Quarterly, 46*, 685–716.

Fisher, S. G., Hunter, T. A., & Macrosson, W. D. K. (1998). The structure of Belbin's team roles. *Journal of Occupational and Organizational Psychology, 71*, 283–288.

Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science, 18*, 233–239.

Gaertner, S. L., Dovidio, J. F., Rust, M. C., Nier, J. A., Banker, B. S., Ward, C. M., et al. (1999). Reducing intergroup bias: Elements of intergroup cooperation. *Journal of Personality and Social Psychology, 76*, 388–402.

Garvey, C. (2002). Steer teams with the right pay. *HR Magazine*, 19–20.

Gersick, C., & Hackman, R. (1990). Habitual routines in task-performing groups. *Organizational Behavior and Human Decision Processes, 47*, 65–97.

Greer, L. L., Jehn, K. A., & Van Beest, I. (2007). The effects of faultline solo splits on relationship conflict asymmetry and performance. Paper presented at the 20th annual conference of the International Association for Conflict Management, Budapest, Hungary.

Gross, S. E. (1995). *Compensation for teams*. New York, NY: AMACOM Publishing.

Guetzkow, H., & Gyr, J. (1954). An analysis of conflict in decision-making groups. *Human Relations, 7*, 367–381.

Hackman, J. R. (1998). Why teams don't work. In R. S. Tindale & L. Heath (Eds.). *Theory and research on small groups. Social psychological applications to social issues* (Vol. 4, pp. 245–267). New York, NY: Plenum Press.

Hambrick, D. C. (2007). The field of management's devotion to theory: Too much of a good thing? *Academy of Management Review, 50*, 1346–1352.

Harrison, D. A., Mohammed, S., McGrath, J. E., Florey, A. T., & Vanderstoep, S. W. (2003). Time matters in team performance: Effects of member familiarity, entrainment and task discontinuity on speed and quality. *Personnel Psychology, 56*, 633–669.

Heath, C., Larrick, R. P., & Wu, G. (1999). Goals as reference points. *Cognitive Psychology, 38*, 79–109.

Hollenbeck, J. R., Moon, H., Ellis, A. P. J., West, B. J., Ilgen, D. R., Sheppard, L., et al. (2002). Structural contingency theory and individual differences: Examination of external and internal person-team fit. *Journal of Applied Psychology, 87*, 599–606.

Ilgen, D. R. (1986). Laboratory research: A question of when, not if. In E. A. Locke (Ed.), *Generalizing from laboratory to field settings* (pp. 257–265). Lexington, MA: Lexington Books.

Ilgen, D. R. (1999). Teams embedded in organizations. *American Psychologist, 54*, 129–139.

Ilgen, D. R., & Hollenbeck, J. R. (1991). The structure of work: Job design and roles (2nd ed.. In M. D. Dunnette & L. M. Hough (Eds.). *Handbook of industrial and organizational psychology* (Vol. 2, pp. 165–207). Palo Alto, CA: Consulting Psychologists Press, Inc.

Ilgen, D. R., Hollenbeck, J. R., Johnson, M. D., & Jundt, D. (2005). Teams in organizations: From I-P-O Models to IMOI models. *Annual Review of Psychology, 56*, 517–543.

Jehn, K. (1995). A multimethod examination of the benefits and detriments of intragroup conflict. *Administrative Science Quarterly, 40*, 256–282.

Jehn, K. A., & Chatman, J. A. (2000). The influence of proportional and perceptual conflict composition on team performance. *The international journal of conflict management, 11*, 56–73.

Jehn, K. A., Rupert, J., & Nauta, A. (2006). The effects of conflict asymmetry on mediation outcomes: Satisfaction, work motivation and absenteeism. *International Journal of Conflict Management, 17*, 96–109.

Johnson, M. D., Hollenbeck, J. R., Ilgen, D. R., Humphrey, S. E., Meyer, C. J., & Jundt, D. K. (2006). Cutthroat cooperation: Asymmetrical adaptation of team reward structures. *Academy of Management Journal, 49*, 103–120.

Kahneman, D., & Miller, D. T. (1986). Norm Theory: Comparing reality to its alternatives. *Psychological Review, 80*, 136–153.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decisions under risk. *Econometrica, 47*, 313–327.

Kenny, D. A., Kashy, D. A., & Bolger, N. (1998). Data analysis in social psychology. In *The handbook of social psychology*. Boston, MA: McGraw-Hill.

Kernan, M. C., & Lord, R. G. (1991). An application of control theory to understanding the relationship between performance and satisfaction. *Human Performance, 4*, 173–185.

Kristof, A. L. (1996). Person-organization fit: An integrative review of its conceptualizations, measurement, and implications. *Personnel Psychology, 49*, 1–49.

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. (2005). Adaptation of Teams in response to unforeseen change: Effects of goal difficulty and team composition in terms of cognitive ability and goal orientation. *Journal of Applied Psychology, 90*, 1153–1167.
Lind, E. A., & Tyler, T. R. (1988). *The social psychology of procedural justice*. New York: Plenum Press.
Lopes, L. (1987). Between hope and fear: The psychology of risk. *Advances in Experimental Social Psychology, 20*, 255–295.
Lord, R. G., & Hanges, P. J. (1987). A control system model of organizational motivation: Theoretical development and applied implications. *Behavioral Science, 32*, 161–178.
Lowery, M. (2003). Forcing the issue. *Human Resource Executive*, 26–29.
MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods, 7*, 83–104.
Manz, C. C., & Sims, H. P. Jr., (1987). Leading workers to lead themselves: The external leadership of self-managing work teams. *Administrative Science Quarterly, 32*, 106–128.
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.
McGrath, J. E. (1984). *Groups: Interaction and performance*. Englewood Cliffs, N.J: Prentice-Hall.
McGrath, J. E. (1997). Small group research, that once and future field: An interpretation of the past with an eye to the future. *Group Dynamics: Theory, Research, and Practice, 1*, 7–27.
McGrath, J. E., Arrow, H., & Berdahl, J. L. (2000). The study of groups: Past, present, and future. *Personality and Social Psychology Review, 4*, 95–105.
McGregor, J. (2006). The struggle to measure performance. *Business Week*, 26–28.
Meisler, A. (2003). Dead man's curve. *Workforce Management*, 44–49.
Miller, D. L., Young, P., Kleinman, D., & Serfaty, D. (1998). *Distributed dynamic decision-making simulation Phase 1 release notes and user's manual*. Woburn, MA: Aptima, Inc..
Moon, H., Hollenbeck, J. R., Humphrey, S. E., Ilgen, D. R., West, B., Ellis, A. P. J., et al. (2004). Asymmetric Adaptability: Dynamic team structures as one-way streets. *Academy of Management Journal, 47*, 681–696.
Muchinsky, P. M., & Monahan, C. J. (1987). What is person-environment congruence? Supplementary versus complementary models of fit. *Journal of Vocational Behavior, 31*, 268–277.
Mudrack, P. E., & Farrell, G. M. (1994). The need for dominance scale of the manifest needs questionnaire and role behaviour in groups. *Applied Psychology: An International Review, 43*, 399–413.
Mudrack, P. E., & Farrell, G. M. (1995). An examination of functional role behavior and its consequences for individuals in group settings. *Small Group Research, 26*(4), 542–571.
Muller, D., Judd, C. M., & Yzerbyt, V. Y. (2005). When moderation is meditated and when mediation is moderated. *Journal of Personality and Social Psychology, 89*, 852–863.
Mumford, T. V. (2002). Team role knowledge and performance: Development of a team role situational judgment test. Unpublished doctoral dissertation, Purdue University, Indiana.
Murnighan, J. K., & Conlon, D. E. (1991). The dynamics of intense work groups: A study of British string quartets. *Administrative Science Quarterly, 36*, 165–186.
Novak, J. (1997). Proceed with caution when paying teams. *HR Magazine*, 22–23.
Okhuysen, G. A. (2001). Structuring change: Familiarity and formal interventions in problem-solving groups. *Academy of Management Journal, 44*, 794–808.
Pate, S., Watson, W. E., & Johnson, L. (1998). The effects of competition on the decision quality of diverse and nondiverse groups. *Journal of Applied Social Psychology, 28*, 912–923.
Rice, R. W., McFarlin, D. B., & Bennett, D. E. (1989). Standards of comparison and job satisfaction. *Journal of Applied Psychology, 74*, 591–598.
Rosenthal, R., & Rosnow, R. L. (2008). *Essentials of behavioral research: Methods and data analysis* (3rd ed.). McGraw-Hill.
Rosenthal, R., & Rubin, D. B. (1982). A simple, general purpose display of magnitude of experimental effect. *Journal of Educational Psychology, 74*, 166–169.
Rubin, J. Z., Pruitt, D. G., & Kim, S. H. (1994). *Social conflict; Escalation, stalemate, and settlement* (2nd ed.). New York: McGraw-Hill, Inc..
Schelling, T. C. (1960). *The strategy of conflict*. Cambridge: Harvard University Press.
Senior, B. (1997). Team roles and team performance: Is there 'really' a link? *Journal of Occupational and Organizational Psychology, 70*, 241–258.
Sundstrom, E., DeMeuse, K. P., & Futrell, D. (1990). Work teams: Applications and effectiveness. *American Psychologist, 45*, 120–133.
Tesser, A. (1999). Toward a self-evaluation maintenance model of social behavior. In R. Baumeister (Ed.), *The self in social psychology* (pp. 446–460). Philadelphia, PA: Psychology Press.
Tjosvold, D. (1998). Cooperative and competitive goal approach to conflict: Accomplishments and challenges. *Applied Psychology: An International Review, 46*, 285–342.
Weaver, D., & Brickman, P. (1974). Expectancy, feedback, and disconfirmation as independent factors in outcome satisfaction. *Journal of Personality and Social Psychology, 30*, 420–428.
Wood, R. E., Goodman, J. S., Beckmann, N., Cook, A. (in press). Mediation testing in management research: A review and proposals. *Organizational Research Methods*.