

A MODERATED MEDIATION MODEL OF TEAM BOUNDARY ACTIVITIES, TEAM EMOTIONAL ENERGY, AND TEAM INNOVATION

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INTRODUCTION

As organizations become more and more hierarchically flat (Cross, Yan, & Louis, 2000; Zammuto, Griffith, Majchrzak, Dougherty, & Faraj, 2007) and work teams increasingly interact with their environment (Majchrzak, Jarvenpaa, & Hollingshead, 2007; Tortoriello, Reagans, & McEvily, 2012), a subject of debate concerns how teams can meet these challenges through managing their team boundaries. Past research has focused on two types of team boundary activities: boundary-spanning and boundary-buffering activities. *Boundary-spanning activities* refer to a team's efforts to manage linkages with external stakeholders (Ancona & Caldwell, 1992; Marrone, 2010), such as seeking crucial information from outside experts, coordinating task activities with external parties, bargaining and negotiating project scope with external stakeholders, building alliances and coalitions with other groups and managing changing customer requirements (Ancona, 1990; de Vries, Walter, Van der Vegt, & Essens, 2014; Faraj & Yan, 2009; Marrone, Tesluk, & Carson, 2007). By contrast, *boundary-buffering activities* refer to a team's efforts to deflect external demands (Cross et al., 2000), such as monitoring the information and resources that external stakeholders request from the team, sealing off the productive core of the team activities and reducing the variability of inputs and outputs in order to preserve time and effort so that team members can focus on achieving team performance (Yan & Louis, 1999).

To explain why boundary work matters to team performance, scholars have drawn on what we term as a "cold" perspective, which focuses on the process of information exchange between team members and external stakeholders. Although an impressive body of work supports the link between boundary work and team outcomes (Ancona & Caldwell, 1992; Edmondson, 1999; Faraj & Yan, 2009; Marrone et al., 2007), empirical studies on the proposed mechanism are surprisingly scant, and of those who study it, results are inconsistent with the "cold" perspective.

We designed the present study to enhance our understanding of what we call a "warm," affective mechanism linking boundary work and team outcomes, a mechanism that has not been fully investigated but that is hinted at by prior research. To theorize a "warmer," affective mechanism, we draw from interaction ritual (IR) theory (Collins, 1990, 2004) and propose that boundary work is positively associated with team outcomes via team emotional energy, defined as a team-level emergent state that is pleasant and energizing, such as team excitement and enthusiasm (Russell, 1980). IR theory suggests that emotional energy is created when a group of individuals establish clear psychological barriers to entry for outsiders and focus their attention on one other (Collins, 2004; Metiu & Rothbard, 2013). These activities enhance team members' sense of shared solidarity with other team members. Drawing from this insight, we suggest that

both boundary-spanning and boundary-buffering activities are associated with greater levels of team emotional energy, as these activities help improve team members' relationships with one another, increase their sense of distinctiveness within the group and enhance a sense of solidarity with the group, thereby creating team emotional energy.

HYPOTHESES DEVELOPMENT

We choose IR theory as our theoretical framework for two reasons. First, a primary assumption of IR theory is that at least two persons must be present in a relatively stable setting, allowing them to interact with each other on a regular basis (Collins, 1990, 2004). Given our interest in studying team boundary work, the IR theory is appropriate in terms of levels of analysis. Second, as Collins (1990) observed, group behavior has been predominantly explained by theories that emphasize the informational nature of social interactions within groups (Homans, 1961; Thibaut & Kelley, 1959), which downplays the importance of emotions during these interaction processes. Such a concern parallels our observation that current team boundary work literature is primarily focused on the information exchange between teams and the external environment, neglecting the importance of team affect.

Team Boundary Work and Team Emotional Energy

Team boundary spanning. When team members engage in boundary-spanning activities with external parties, they recognize that the external parties may have their distinctive point of view regarding interests, goals and expertise that may differ from those of their own team. As such, team members should become aware of their own distinctive team stance from that of the other parties. Furthermore, team boundary-spanning activities require team members to coordinate their boundary-spanning efforts with each other, providing multiple opportunities for them to interact with one another. This builds a stronger sense of solidarity than with teams that engage in fewer boundary-spanning activities. For instance, when certain team members need a specific resource to complete a subtask, another team member might have an informal relationship with an external party that can provide such a resource. In sum, boundary-spanning activities should enhance team members' experience of psychological barriers toward outsiders, increase the levels of interaction between team members, and thereby generate a greater level of emotional energy within the team.

Hypothesis 1: Team boundary-spanning activities are positively associated with team emotional energy.

Team boundary buffering. By engaging in boundary-buffering activities, teams protect themselves from external distractions and interruptions, as these activities involve intentionally deciding whether to allow entry for outsiders to the group, protecting the team from outside pressures, and providing resources or information to outsiders only if the team has decided that these requests are legitimate (Ancona & Caldwell, 1988). As a result of boundary-buffering activities, team members are likely to experience a sense of psychological distinctiveness of the group that creates a sense of emotional energy. In addition, by shielding external disturbances through team boundary-buffering activities, team members have additional opportunities to interact with one another and learn more about each other's interests and needs. As such, we

expect that higher levels of boundary-buffering activities should help create a sense of solidarity within the team and subsequently generate a greater level of emotional energy.

Hypothesis 2: Team boundary-buffering activities are positively associated with team emotional energy.

Team Emotional Energy and Team Innovation

According to IR theory (Collins, 2004), team emotional energy is an emergent state in which team members feel excited and enthusiastic about working together as a team. The experience of positivity motivates team members to be collaborative and supportive with each other so that they can maintain a sense of team emotional energy. Drawing from this insight, we propose that team emotional energy is positively associated with team innovation, because team members will seek to interact with one another over and over again to experience the positive feeling of team emotional energy.

Hypothesis 3: Team emotional energy is positively associated with team innovation.

Given the overall model that underlies this research, we explicitly specified a mediation hypothesis. This hypothesis captures our argument that greater levels of team boundary-spanning and boundary-buffering activities are associated with greater levels of team emotional energy. In turn, the experience of team emotional energy will be positively associated with team innovation.

Hypothesis 4a: Team emotional energy mediates the association between team boundary-spanning activities and team innovation.

Hypothesis 4b: Team emotional energy mediates the association between team boundary-buffering activities and team innovation.

Moderation of Team Role Overload

IR theory makes several implicit assumptions in explaining how emotional energy is created within a group. We aim to relax one of these assumptions in the context of team boundary work (Collins, 1990, 2004). IR assumes that team members must exert a significant amount of effort in what they do for teams to experience shared emotional energy. Yet, in a team setting, different teams may exert different levels of effort and thus experience different levels of team role overload, defined as teams having too much work to do in the time available (Beehr, 1976).

Team boundary spanning and team role overload. When a team experiences higher levels of team role overload, it becomes more difficult for its members to interact with one another and notice each other's needs and interests, resulting in a lower level of shared solidarity. As such, team boundary-spanning activities might be particularly helpful in creating team emotional energy, because these activities help focus team members' attention on the shared common interest of the whole team, thereby generating higher levels of team emotional energy. As a result, we expect that the influence of boundary-spanning activities on team emotional energy will be weaker when team role overload is lower.

Hypothesis 5a: Team role overload moderates the relationship between team boundary-spanning activities and team emotional energy, such that the relationship is stronger when team role overload is greater.

Hypothesis 5b: Team role overload moderates the positive indirect relationship between team boundary-spanning activities and team innovation (as mediated through team emotional energy), such that the relationship is stronger when team role overload is greater.

Team boundary buffering and team role overload. With higher levels of team role overload, team members are more preoccupied with their own work and feel less able to focus their time and energy on each other. Furthermore, it becomes important that team members not be distracted by interruptions so that they can focus their time and energy on completing their tasks. Consequently, boundary-buffering activities are more crucial for building a sense of team emotional energy when team role overload is higher, because team boundary-buffering activities help protect the team from external requests and increase team members' interactions with each other, enhancing team emotional energy. Furthermore, team boundary-buffering activities can help create a sense of psychological distinctiveness of the team, as team members are working toward reducing team role overload and not being distracted by external demands. By contrast, when teams experience lower levels of team role overload, team members are less absorbed by their tasks and spend more time building a sense of unity and creating a sense of psychological barrier to entry toward outsiders. As such, we expect the impact of boundary-buffering activities on team emotional energy will be less positive when team role overload is lower.

Hypothesis 6a: Team role overload moderates the relationship between team boundary-buffering activities and team emotional energy, such that the relationship is stronger when team role overload is greater.

Hypothesis 6b: Team role overload moderates the positive indirect relationship between team boundary-buffering activities and team innovation (as mediated through team emotional energy): The positive indirect relationship is stronger when team role overload is greater.

METHODS

Data Collection and Sample

We collected data from research & development (R&D) teams in a multinational automotive company based in Germany. These teams were especially suitable for our investigation of team boundary work because team members worked within a highly interconnected, project-based organizational design that involving interaction with the external environment, providing ample opportunities for boundary activities. We collected data from three different sources to reduce common method bias. In total, we distributed surveys to 102 teams (1,119 team members, 102 direct supervisors and 22 managers.); our final sample comprised 89 teams (724 team members, 89 direct supervisors and 18 managers), representing a

response rate of 85% of the teams (65% for team members, 87% for direct supervisors, and 82% for manager respectively) with matched data between different sources.

Measures

Team boundary-spanning activities. We used a four-item measure developed by Faraj and Yan (2009) to measure team boundary-spanning activities.

Team boundary-buffering activities. We measured team boundary-buffering activities using a four-item scale of Faraj and Yan (2009).

Team role overload. We adapted three items of a scale from Beehr (1976) to measure team role overload.

Team emotional energy. We measured team emotional energy using five items of an adapted version of Van Katwyk, Fox, Spector, and Kelloway's (2000) job-related affect scale.

Team innovation. We measured team innovation with a nine-item scale developed by Janssen (2001).

Controls. We controlled for the average time team members had worked on the team, the extent to which team members belonged to additional project teams, team psychological safety (Edmondson, 1999), and the exchange of task-relevant information among team members (Kearney & Gebert, 2009).

Data Analysis

We computed within-group interrater agreement (r_{wg} ; James, Demaree, & Wolf, 1993) and ICC values to justify the aggregation of constructs to the team level, which provided adequate support. To ensure construct differentiation, we conducted confirmatory factor analyses, which suggested that the five latent constructs were empirically distinct. We employed ordinary least-squares (OLS) regression analyses to test our hypotheses and used Hayes's (2012) PROCESS program to test indirect effects. Variables were centered on the mean prior to analysis to reduce potential problems of multicollinearity (Aiken & West, 1991).

RESULTS

In support of Hypotheses 1 and 2, we found that boundary-spanning and boundary buffering activities were significantly associated with team emotional energy ($B = .48$, $SE = .17$, $p < .01$; $B = .21$, $SE = .11$, $p < .05$, respective). Furthermore, in line with Hypotheses 3, we found a significant relationship between team emotional energy and team innovation ($B = .22$, $SE = .11$, $p < .05$). Consistent with Hypotheses 4a and 4b, we found a significant indirect effect between team boundary-spanning activities and team innovation through the mediation of team emotional energy ($a \times b = .14$, CI [.02, .36]) and between team boundary-buffering activities and team innovation through the mediation of team emotional energy ($a \times b = .08$, CI [.01, .22]).

Furthermore, the moderation hypotheses were also supported. Corroborating Hypotheses 5a, we found a significant interaction between team boundary-spanning activities and team role overload on team emotional energy ($B = .59$, $SE = .25$, $p < .05$). In line with Hypotheses 5b, we found that when team role overload was small, team boundary-spanning activities had no significant effect on team innovation through team emotional energy (low: $a \times b = .07$, CI [-.01, .25]), whereas when team role overload was high, the indirect effect through team emotional

energy was significant ($a \times b = .20$, CI [.03, .48]). Furthermore, corroborating Hypotheses 6a, we found a significant interaction between team boundary-buffering activities and team role overload on team emotional energy ($B = .34$, $SE = .15$, $p < .05$). In line with Hypotheses 6b, we found that when team role overload was small, team boundary-buffering activities had no significant effect on team innovation through team emotional energy ($a \times b = .03$, CI [-.04, .17]), whereas when team role overload was high, the indirect effect through team emotional energy was significant ($a \times b = .11$, CI [.01, .28]).

DISCUSSION, LIMITATIONS, AND FUTURE RESEARCH

Our study contributes to the theory of team boundary work, interaction rituals and the team literature in several important ways. First, we examine a theory-driven mechanism – team emotional energy – in explaining why team boundary work matters for a particular type of team outcome: team innovation. This is a key contribution to the team boundary work literature, as past research has assumed that team boundary work operates through a “cold,” information exchange mechanism. In this article, we provide empirical evidence that team boundary work might impact team innovation through a “warmer,” affective mechanism, and examine two contextual conditions under which the relationship is more or less pronounced. By doing so, we provide not only the first empirical evidence on why boundary work impacts important team outcomes, but also offer a more complete understanding of when the relationship is strengthened.

Furthermore, our study expands IR theory by testing and expanding its key assumptions on the impact of team role overload on team emotional energy. We extend the generalizability of this idea by showing that team emotional energy is more likely to be created only when teams experience a significant level of work overload; when teams are not overloaded, team emotional energy is unlikely to be created by boundary activities aimed at creating emotional energy. By testing this moderating condition, we add to the body of knowledge on IR theory and extend our understanding of when team emotional energy is more likely to be generated.

Our contributions should be considered in light of some limitations. Our data on team emotional energy is evaluated by team leaders and not by individual team members, raising a concern that ratings on team emotional energy by team leader is observed rather than actual. We decide on this approach to avoid common method bias between team boundary work and team emotional energy (Podsakoff, et al., 2003). Furthermore, team leaders are likely to be more objective and provide more accurate ratings of team emotional energy than a team individual member, who may confound team emotional energy with their own levels of emotional energy within the group. Future research may gather team members’ perceptions on team emotional energy and compare whether their ratings of team emotional energy are similar to that provided by team leader.

Furthermore, the generalizability of team emotional energy as an explanatory mechanism to other important team-related consequences may be limited due to the fact that we have only examined team innovation as an outcome. However, given that our research is conducted with R&D teams, team performance should be strongly correlated associated with team innovation (Keller, 2001). To address the concern with generalizability, future research could additionally include a general measure of team performance, as well as other objective outcomes such as sales and financial performance.

REFERENCES ARE AVAILABLE FROM THE AUTHOR(S)