The Influence of Work Group Bonding on Effectiveness: Group Cohesion versus Transactive Memory Mediating Role and Boundary Conditions of the Process

Abstract

In today's complex world, organizations build their tasks based on working groups. This calls for a deeper understanding of the social processes that lead to more effective work groups (Kozlowski and Ilgen, 2006). The purpose of the present study was to further establish the importance of *group bonding* (friendship ties among group members) influence on work group effectiveness, and to reveal the mechanisms and boundary conditions that explicate this effect.

Although some existing literature has demonstrated that group bonding does increase group performance (Guzzo and Shea, 1992; Jehn and Shah, 1997), there is still a lack of evidence concerning group bonding effect on the overall work group effectiveness dimensions, and the group psychological mechanism of this process remains unclear (Balkundi and Harrison, 2006).

In the current study, a social network analysis perspective was integrated into the study of groups, with the intention of proposing a model that captures the complex nature of the influence of group bonding on work group effectiveness. The research further hypothesized that dense friendship ties among group members (group bonding) increases their sense of belonging to the group and their feelings of morale (group cohesion), thereby increasing group effectiveness to meet group goals. It was then hypothesized that this process is moderated by two central factors: time and leadership differentiation. Moreover, a cognitive group-related mechanism

(transactive memory systems - TMS) was also examined as an alternative mediator of the process.

The study followed 91 groups from the time of their initial establishment up to their graduation as a combat group (during 4 months of boot-camp training). Data collected on 1,039 participants (902 men and 137 women) was evaluated at three different time points, using a variety of measures and methods (network questionnaire, psychological questionnaires, manager evaluation and objective performance data) – see Table 1.

The study provides compelling support for most of the hypotheses. As expected, group bonding predicts group effectiveness dimensions: group performance (subjective - reported performance, objective - group outcome); group attitude (commitment and satisfaction); and group behavior outcomes (turnover and absence).

Moreover, group bonding was found to be related to objective group effectiveness variables (group outcome and absence), which were not found to be related to either cohesion or TMS. This finding is evidence of the unique importance of group bonding, as a better predictor of group effectiveness than these better known group concepts. This emphasizes the conceptual differentiation that should be made between group bonding and group cohesion (as was mentioned by Jehn and Shah, 1997; Moody and White, 2003). Accordingly, group bonding is a structural concept - "relational togetherness", while perceived cohesion is a psychological concept - the "sense of togetherness" that people express.

Some of these group bonding effects (reported performance, satisfaction and commitment) were mediated by emotional and cognitive group psychological mechanisms (perceived cohesion, transitive memory). Nevertheless, as expected,

when equating these two mechanisms in the study's model, cohesion was found to be the model’s main mediator, while TMS was not.

The study results indicate that leadership differentiation (group differentiation of leader-follower relationships) moderates the relation between group bonding and group cohesion. In groups with a high leader-follower relationship differential, group bonding matters more (as can be seen in Figure 1). Furthermore, findings indicate that group bonding predicts performance better as time goes by.

This study offers a mediated-moderation model, in which group bonding interacts with leadership differentiation, thereby influencing group cohesion which, in turn, affects reported performance, commitment and satisfaction (see Figure 2).

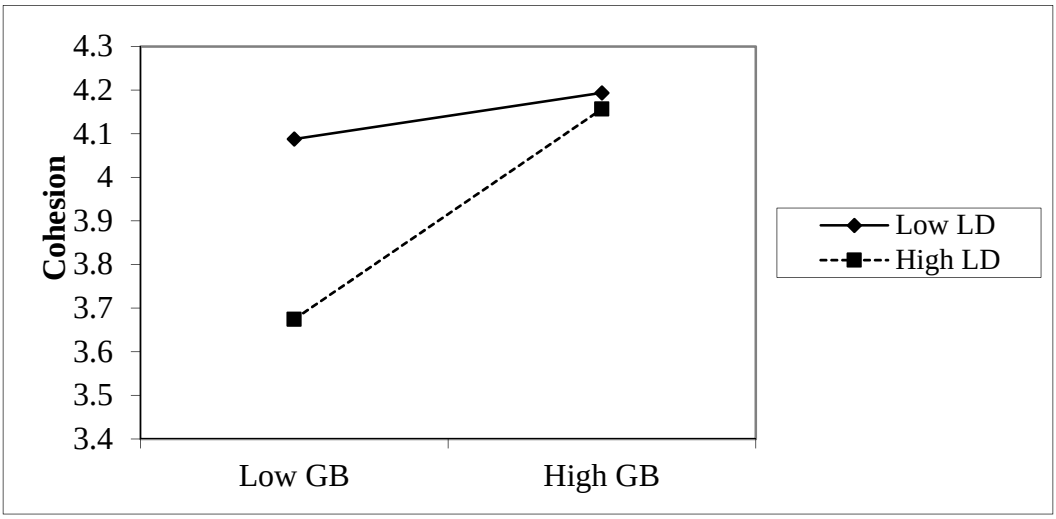
The study’s results allow for a deeper understanding of variations in group effectiveness resulting from group bonding. Organizations and managers wishing to increase group effectiveness among work groups should invest more effort in building and strengthening the friendship ties of their work-groups members, in order to promote enhanced group effectiveness. In addition, organizational consultants should develop the capability of mapping and understanding work groups' friendship network structures by using social network analysis techniques.

Table 1*: Means, Standard Deviations and Correlations of Study Variables*

Variables	*M*	*SD*	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
1. **Group Size**	11.42	1.41							-				
2. **Group Bonding**	0.46	0.11	-.12										
Mediators:													
3. **Group Cohesion**	4.19	0.37	.13	.29**									
4. **TMS**	3.53	0.27	-.10	.37**	.75**								
Group Effectiveness :													
5. **Reported Performance**	3.91	0.41	.10	.25*	.72**	.74**							
6. **Evaluated Performance**	3.90	0.46	.09	.09	.26*	.27**	.48**						
7. **Group Outcome**	48.98	19.74	-.32**	.30**	.03	.07	.06	.00					
8. **Commitment**	3.89	0.45	-.01	.41**	.85**	.76**	.68**	.26*	.12				
9. **Satisfaction**	3.96	0.41	.09	.31**	.86**	.78**	.76**	.20	-.09	.83**			
10. **Turnover**	0.07	0.08	.25*	-.35**	-.23*	-.27**	-.22*	.04	-.24	-.28**	-.19		
11. **Absence**	0.22	0.39	.05	-.44**	.03	-.03	.07	-.06	-.38**	-.03	.11	.16	
Moderators:													
12. **Leadership Differentiation**	0.69	0.21	0.00	.11	-.29**	-.18	-.13	.04	-.01	-.25*	-.21*	.11	-.17

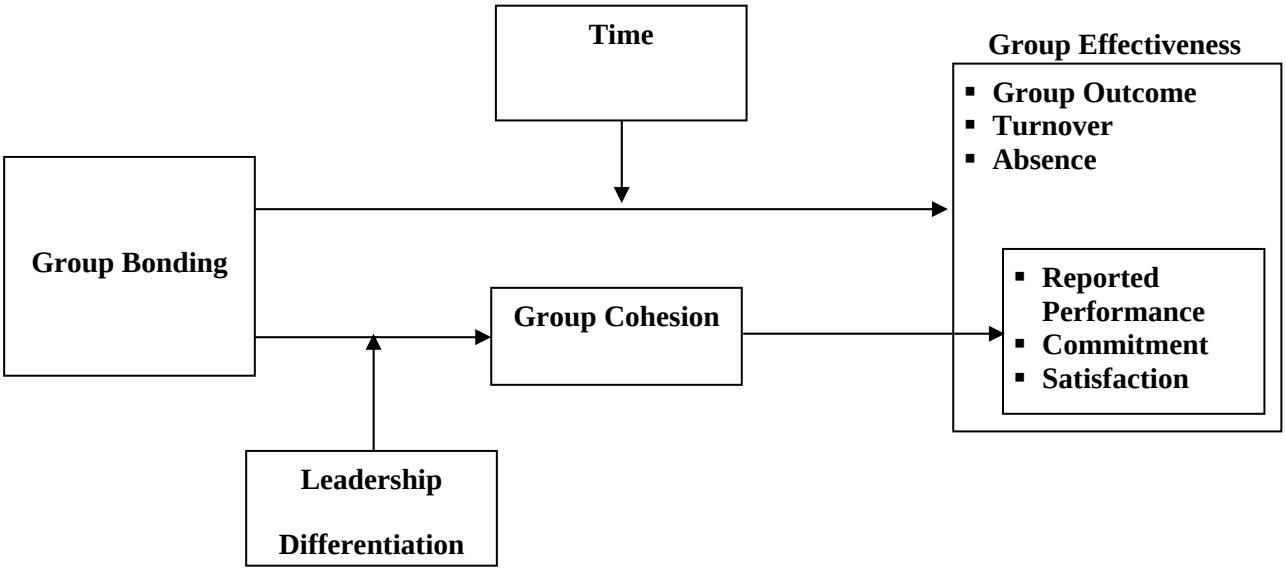
Note: N=91
*p<.05; **p<.01
TMS = Transactive Memory System
Reported Performance = Group members' perceived group performance
Evaluated Performance = Leaders' perceived group performance

Figure 1: *The Moderating Role of Leadership Differentiation on Group Bonding and Cohesion*



LD = Leadership Differentiation
GB = Group Bonding

Figure 2: *The Mediated-Moderation Model Linking Group Bonding with Group Effectiveness*



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Transforming Individual Creativity into Group Innovation:

The Mediating Roles of Knowledge Hiding and Psychological Entitlement

Rapid and dynamic changes in contemporary organizational environment require creative solutions and innovative reactions. Innovation is a complex and continuing process that can be reached through the creative performance by the individuals and employees (Amabile, 1988; Anderson, Potočnik, & Zhou, 2014). In this way, every innovation starts with the stimulation of an employee to generate creative ideas, which begins at the individual level (Kanter, 1988). However, as proposed Levitt (Levitt, 2002), ideas need to be used, otherwise they are useless, and we are seeing an increased amount of studies looking into the transformation of creative ideas into implemented solutions (e.g., Baer, 2012; Škerlavaj, Černe, & Dysvik, 2014), thereby focusing on not only idea generation, but also its implementation.

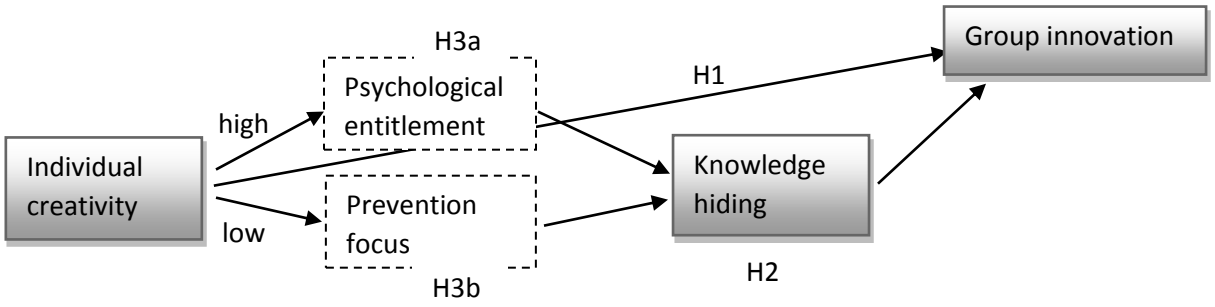
However, the abovementioned studies examine the micro-innovation process exclusively at the individual level. How individual creativity emerges to the team level, its patterns of aggregation (cf., Kozlowski, Chao, Grand, Braun, & Kuljanin, 2013), and how it effects group innovation remain predominantly unexplored. Furthermore, the mechanisms underlying the process of transforming individual creativity to group innovation are not yet clear (Bharadwaj & Menon, 2000; De Dreu, Nijstad, Bechtoldt, & Baas, 2011; Rousseau, Aubé, & Tremblay, 2013). Thus, in this paper, we first provide evidence that group innovation is affected by the pattern of individual creativity.

We then narrow in on the psychological mechanisms underlying this process, and specifically focus on knowledge hiding as a mediator. Knowledge hiding has been established as a negative predictor of individual creativity (Černe, Nerstad, Dysvik, & Škerlavaj, 2014), and the key premise of our present research is that individuals sometimes hide knowledge about their creative ideas from their coworkers, thereby hindering creative and innovative processes within their groups. We intend to show that individuals hide knowledge regarding their creative ideas both in the case of their low creativity, as well as their high creativity, and derive from the social psychology of justice and psychological entitlement (Campbell, Bonacci, Shelton, Exline, & Bushman, 2004; Lerner, 1987) and regulatory focus theory (Brockner & Higgins, 2001; Higgins, 1998) in developing our hypotheses. The logic behind them is that when their creative ideas are

low, individuals develop a cognitive state of prevention focus, trying to block others' out of their creative endeavors, hide knowledge and hinder group innovation. When individuals' ideas are highly creative, they would develop a sense of psychological entitlement over their ideas, again hide knowledge, and obstruct group innovation processes.

Our conceptual model (Figure 1) is tested in two studies: a field study among 286 Chinese employees nested into 66 groups, and an experimental study among 108 undergraduate students in a European university. The field Study 1 established the basic relationships between self-reported individual creativity and leader-rated group innovation, mediated by knowledge hiding. In the experimental Study 2, we manipulated different levels of individual creativity, again supported the basic mediating role of knowledge hiding predicting group innovation for both low and high levels of creativity, and tested the explanatory psychological mechanisms of prevention focus (in the case of low creativity) and psychological entitlement (in the case of high creativity).

Figure 1: Conceptual Model with Hypotheses



Our studies intend to contribute to the literature on creativity and micro-innovation in several ways. First, we derive from the multi-level theory in order to theorize about different aggregation emergence patterns of creativity, adding insight into how individuals' creative ideas get transformed to group innovations. Second, we propose and test a mediating mechanism of knowledge hiding, and show that it occurs in two different conditions, of low and high individual creativity, but based on two theoretically distinct explanations: psychological entitlement in the case of high creativity and prevention focus in the case of low creativity. This enhances our understanding of the underlying mechanisms of transforming individual creativity into group innovation, and in practical terms provides the managers with input on how to deal with creative (or not) individuals and how they may either predictably or surprisingly hinder group innovation processes in organizations.

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When Differences Create Deference:
Pros and cons of performance disparity for team innovation

Innovation describes the development of novel, useful ideas and their successful implementation (West & Farr, 1990). It drives organizational competitiveness and growth (Lovelace, Shapiro, & Weingart, 2001; West & Farr, 1990) and teams serve as the epicenter for innovative performance (Hülshegar, Anderson, & Salgado, 2009). Consequently, scholars and practitioners alike share common interest in unearthing ways to foster team innovation. Research has revealed a number of team processes that promote team innovation (van Knippenberg, 2017) but knowledge of team inputs to innovation pales in comparison (for exception, Miron-Spektor, Erez, & Naveh, 2011). This seem an under-exploited opportunity, as composition of members shapes social and task processes (Hackman, 1992) and is often tractable.

With this research, I focus on team composition and develop a model that delineates how individual member performance disparity—as induced by the presence of a high performer—creates a more pronounced social hierarchy, which can both hinder and promote processes critical to team innovation. Unless all teammates are similarly performing, the high performers in project teams induce performance disparity, or the unequal dispersion of a valued resources (Harrison & Klein, 2007). Greater performance disparity implies steeper stratification of social hierarchy (Grusky, 1994). When it is high within teams, I expect performance disparity influences team innovation paradoxically through its core components: team creativity and team idea implementation. First, I suggest performance disparity hampers *divergent participation* (i.e., exchange of differing information, alternative ideas, and opposing views across team members), such as task conflict (i.e., disagreement over ideas and opinions related to accomplishing the collective task; Jehn, 1995). Second, in contrast, I expect that performance disparity promotes *convergent participation* (i.e., efficient exchange, synchronization, and coalescence efforts), such as team coordination (i.e., orchestration and sequence of actions; Marks, Mathieu, & Zaccaro, 2001). Figure 1 summarizes the model, which seeks reconcile the inconsistent link between social hierarchy and team innovative performance, or what others have referred to as "the innovation dilemma" (Zaltman, Duncan & Holbeck, 1973).

The Creativity Path. First, team creativity, "production of novel and useful ideas concerning products, services, processes, and procedures by a team of employees working together" (Shin & Zhou, 2007: 1715) is a necessary antecedent to team innovation (Zhou & Shalley, 2008). When the creative process among teammates is at its best, it is all-absorbing (Csikszentmihalyi, 1997); however, social hierarchies can suppress creative processes (Harrison & Klein, 2007: 1206). Creativity requires divergent participation—including fluid exchange of ideas, information, and insights across members (Paulus, Nakui, & Putman, 2005). In teams, high performers create performance disparity and social hierarchy can follow. I propose this disadvantages team creative processes since greater disparities increase conformity, withdrawal, and deferral (Hollingshead, 1996; Pfeffer & Langton, 1993) while also decreasing exploration (e.g., Perretti & Negro, 2006). Social hierarchies also hinder critical thinking and the sharing of unique opinions (Tannenbaum, 1957). Taken together, I propose that performance disparity reduces important, divergent forms of team participation in the creative process, such as task conflict. Second, as creative co-production is cognitively demanding (Amabile, 1993), it requires dynamic, divergent participation (Zhou & Shalley, 2010). This includes being exposed to dissent and alternative ideas that can prompt creative thinking (Nemeth & Nemeth-Brown, 2003). Without sufficient task conflict, the number and quality of creative ideas is likely to suffer.

Hypothesis 1. In project teams, team performance disparity decreases team members' divergent participation in the form of team task conflict.

Hypothesis 2. In project teams, team performance disparity negatively predicts team

creativity via decreased divergent participation (i.e., team task conflict).

The Implementation Path. First, implementing novel, useful ideas transforms team creativity into team innovation. Idea implementation requires that teams succeed in converting concepts, designs, and plans in to tangible realities. Social hierarchies can helps teams by creating social order, simplifying interactions, and centralizing coordination (Halvey et al., 2011; Magee & Galinsky, 2008). Social hierarchies promote efficient division of work decision-making (Anderson & Brown, 2010; Gruenfeld & Tiedens, 2010; Halevy, Chou, & Galinsky, & Murnighan, 2012; Kelter, Gruenfled, & Anderson, 2003). They can facilitate coordination among colleagues by establishing patterns of deference (Kwaadsteniet & van Dijk; 2010). In effect, greater team social order fosters member reluctance to challenge, preference for deferral, and convergent participation. Second, mavigating the idea implementation process requires deft coordination (i.e., orchestration and timing of members' interdependent actions; Marks et al., 2001). Achieving clear, centralized agreement on teamwork processes enables more efficient implementation of ideas. A wealth of studies have offered evidence that successful coordination of teamwork is paramount to team efficiency, production, and adaptation (e.g., Ancona & Caldwell, 1992; Pinto, Pinto, & Prescott, 1993; Reagans, Argote, & Brooks, 2005).

Hypothesis 3. In project teams, team performance disparity increases team members' convergent participation in the form of team coordination

Hypothesis 4. In project teams, team performance disparity positively predicts team idea implementation via increased convergent participation (i.e., team coordination).

STUDY 1: METHODS

Sample, Design, & Procedure. I first tested the model using a between-team experiment (performance disparity: high versus low). Random assignment and manipulation performance disparity helped (1) to rule out the concern of an omitted third variable affecting the relationships and (2) to enable causal inference. Participants were 204 undergraduates (nested in 68 teams of 3) enrolled in management courses. Part 1 was an individual online task cast as a pre-survey assessment of innovative performance (i.e., remote associates test; Mednick, 1962, unusual uses task; Guilford, 1967). For Part 2, participants completed an open-ended innovative team task in the lab. Teams were incentivized, with the the top 5 teams earning $150 (approx. 530₪) at the end of the term for designs deemed most innovative. Performance disparity was manipulated by sharing each participants' "individual performance results from Part 1" In the control condition (i.e., no performance disparity), team members received a score of 3 of 10. In the experimental condition (i.e., performance disparity), one participant received a 9 of 10 while the others received 3 out of 10. They worked together to design and construct model for "an innovative, state-of-the-art scientific research facility in Greenland". Teams completed the task, which unfolded in two phases. First, they were provided sketchpads and pencils to collaborate on design concept (10 mins). Then, they pitched their creative concept "for the engineering judges" (2 min; recorded). Second, they were given building blocks of various sizes and colors to refine and implement their design (12 mins). After the implementation phase, they presented their final model (2 min; recorded)[1]. The experimenter took 5 photos of the design, one from each angle.

[1] This task was modeled after a team study by Woolley (2009), which used building blocks as a way to create an open-ended task while not requiring specified knowledge that would advantage some team members over others. It thus better enabled study of collaboration within laboratory setting while still modeling tasks that are common to organizations: those in which members have limited resources (i.e., time and materials) and an overarching goal is set but discretion is left to the team as to how to achieve it.

Measures. All variables were operationalized at the team level. Team task conflict and coordination were assessed with established scales (Jehn, 1995 and Lewis, 2005, respectively). Participants were surveyed at the end of the study. Team membership explained 56% of the variance in team task conflict (ICC(1) = .56) and 67% of the variance in team coordination (ICC(1) = .67). Statistics indicated acceptable reliability of team means for team task conflict and coordination (ICC(2) = .30 and .41, respectively; Bryk & Raudenbuch, 1992; Bliese, 2000) and good within-team agreement (r_{wg} = .88 and .93, respectively; James, Demaree, & Wolf, 1993).

Observed Dependent Variables. Three trained researchers, blind to hypotheses, coded the two facets of team innovation—creativity and idea implementation. First, after listening to each team's pitch (recorded at the midpoint), coders provided independent ratings for team effective in generating concepts that were (1) *new and unique* and (2) *useful* (-3 = ineffective to 3 = extremely effective). Ratings were combined to represent overall creativity and averaged across raters, who demonstrated both agreement (r_{wg} = .89) and reliability (ICC(2) = .87). Second, coders reviewed photos and watched the videos recorded after implementation. Coders rated teams on how effective they *implemented* their designs (-3, ineffective to 3, extremely effective). Ratings again achieved agreement and reliability (r_{wg} = .86; ICC(2) = .90) and were averaged.

STUDY 1: RESULTS

To ensure that the performance disparity was perceived by participants. I captured members' recollection of each teammates' performance results from Part 1. In the experimental condition, participants reported significantly higher performance results for the focal performer compared to themselves and their peer (range -1, low, to 1, high; t_{41} = 13.83, $p < .001$). Those in the control group reported no meaningful performance differences (t_{43} = 1.104, *n.s.*).

Table 1 presents descriptives. I tested hypotheses with hierarchical multiple regression (Table 2; Aiken & West 1991). The first path of the model proposed performance disparity negatively predicted team creativity through decreased divergent participation in the form of task conflict, Performance disparity indeed had a direct negative effect on task conflict (β = -.36, $p <$ .01; H1) and a negative indirect negative effect on team creativity through task conflict (-.13; CI_{90} = [-.28; -.08][2]; H2). The second path of the model proposed performance disparity would positively affect team idea implementation via improved team coordination. Supporting Hypotheses 3 & 4, results indicated that performance disparity had a positive direct effect on team coordination (β = .20, p < .05) and a positive indirect effect team idea implementation through team coordination (.062; CI_{90} = [.002; .122]).

STUDY 2: METHODS

For Study 2, I seek to (a) constructively replicate the team experiment results and (b) boost confidence in generalizability of findings with test of the model in longer-term project teams. To do so, I designed and just completed a multi-source, three-wave field study of 1,164 business school students working in 241 teams on a 14-week project at a U.S. university. At Time 1, I measured peer-rated teammate performance using a round robin (i.e., network) design and a 4-item measure (Welbourne et al., 1998). At Time 2, 6 weeks later, members reported task conflict and coordination (Jehn, 1995; Lewis, 2005). At Time 3, members of the audience rated each team's project presentation of their analysis and recommendation in terms of creativity and implementation. I will analyze these results in Summer 2017.

[2] Bias-corrected confidence interval constructed using Mackinnon, Lockwood, and William's (2004) bootstrap-based approach.

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FIGURE 1

Hypothesized Model of Effects of Performance Disparity on Team Innovation
(with Summarized Results)

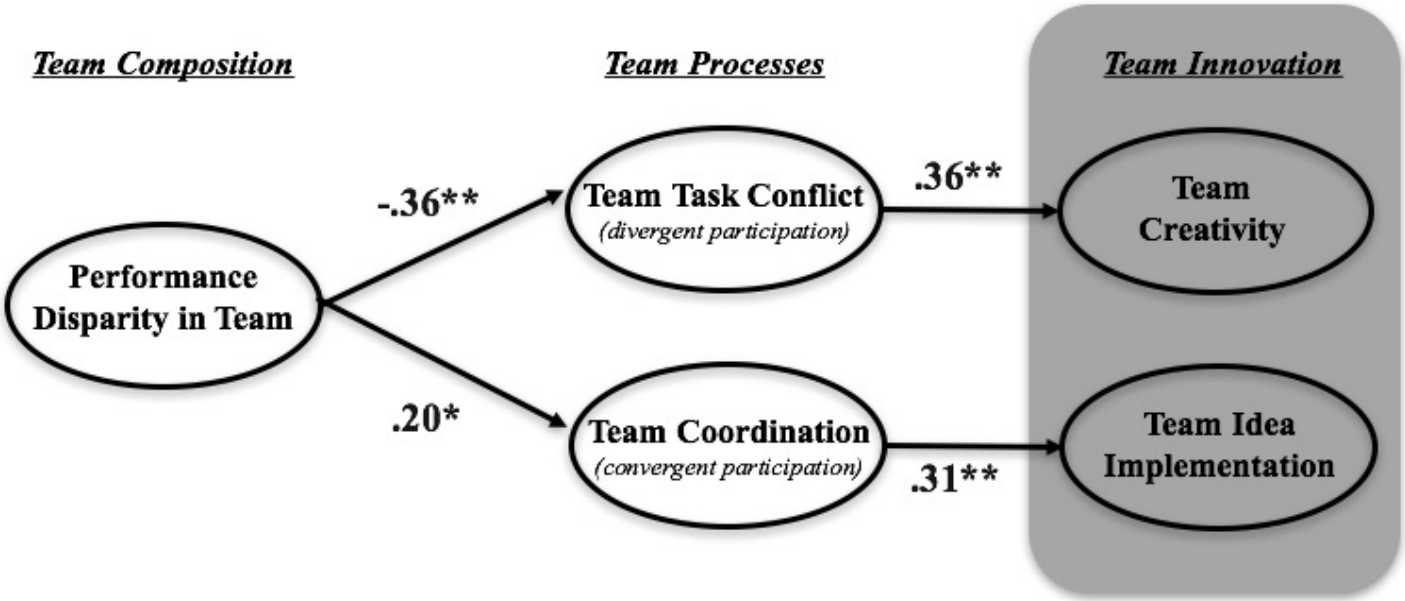

TABLE 1
Descriptive Statistics and Correlations

		M	*SD*	1	2	3	4	5
1	Performance Disparity *(0 = no performance disparity; 1 = performer disparity)*	.48	.50	--				
2	Team Task Conflict *(divergent participation)*	2.24	.50	-.36**	*(.79)*			
3	Team Coordination *(convergent participation)*	4.01	.46	.20	-.31*	*(.81)*		
4	Team Creativity	1.11	.65	-.07	.31*	.01	--	
5	Team Idea Implementation	1.30	1.09	.14	.18	.16	.32**	--

Note: N = 68 teams; internal consistencies display on the diagonal (Cronbach's alpha)
* *p* > .05
** *p* > .01 *(two-tailed)*

TABLE 2
Hierarchical Regression Results

Variable	Team Task Conflict Model 1			Team Coordination Model 2			Team Creativity Model 3			Team Idea Implementation Model 4		
	b	***s.e.***	***β***	***b***	***s.e.***	***β***	***b***	***s.e.***	***β***	***b***	***s.e.***	***β***
Performance Disparity *(0 = no performance disparity; 1 = performance disparity)*	**-.36****	**(.11)**	**-.36****	**.19***	**(.11)**	**.20***	.02	(.16)	.02	.51*	(.28)	.23*
Team Task Conflict *(divergent participation)*							**.46***	**(.17)**	**.36***	.70*	(.28)	.32*
Team Coordination *(convergent participation)*							.04	(.20)	.03	**.72***	**(.34)**	**.31***
R^2	.13*			.04*			.13*			.14*		
F	9.83			2.83			2.37			2.87		

Note: N = 68 teams
* *p* > .05
** *p* > .01 *(one-tailed)*