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Information elaboration and team performance: Examining the psychological origins and environmental contingencies

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ABSTRACT

Information elaboration enables functionally diverse teams to transform their breadth of knowledge resources into actionable solutions to complex problems. The current study advances information elaboration theory and research in two ways. First, we identify how team ability and social motivation composition characteristics provide the psychological origins of complex information processing efforts. Second, we identify environmental turbulence as an important boundary condition, clarifying when information elaboration benefits team performance and when it does not. These ideas were tested in a sample of 4-person self-managed teams ($N = 68$) which were functionally diverse and performed a cooperative strategic decision-making task. Results indicate that cognitive ability equips teams with the “can do” ability for complex elaboration efforts through emergent team mental models, whereas low preferences for self-reliance provide the “will do” motivation for in-depth information exchange through collective leadership. In turn, teams benefited from information elaboration in turbulent but not stable environments.

Introduction

From management consulting projects to R&D laboratories to hospital trauma centers, organizations of all types are increasingly deploying teams whose members have diverse functional backgrounds. The allure of these cross-functional teams is their capacity to engage in complex problem solving; members bring with them a breadth of knowledge and expertise creating a pool of non-redundant informational resources for the team to draw upon (Bantel & Jackson, 1989; Jehn, Northcraft, & Neale, 1999; Milliken & Martins, 1996; Williams & O’Reilly, 1998). Yet, not all functionally diverse teams are able to leverage their informational resources (van Dijk, van Engen, & van Knippenberg, 2012; Webber & Donahue, 2001). Through openly exchanging task-relevant information and ideas, seeking clarification on the perspectives offered by others, and discussing and integrating this information—that is, by engaging in information elaboration processes—diverse teams are able to fully utilize their available knowledge resources (van Knippenberg, De Dreu, & Homan, 2004) and outperform homogenous teams (Homan, Van Knippenberg, Van Kleef, & De Dreu, 2007; van Ginkel & van Knippenberg, 2008). However, functionally diverse teams are the least likely to share unique information or engage in complex information processing even though it is precisely those teams that are most likely to benefit from in-depth information exchange (Mesmer-Magnus & DeChurch, 2009; Stasser & Titus, 1985, 1987).

An often overlooked consideration in staffing functionally diverse teams, is ensuring that teams are composed of members who possess the “can do” abilities and the “will do” motivation to engage in complex information processing efforts (van Knippenberg et al., 2004). The ability and motivation among team members provide a pool of general human capital resources that enable teams to leverage their more specific knowledge resources (Ployhart & Moliterno, 2011). To date, however, empirical studies of the compositional drivers of information elaboration have been sparse. In particular, the importance of team member cognitive ability in promoting information elaboration processes has not been tested. This is a critical oversight as the “can do” abilities of team members (Ployhart & Moliterno, 2011) provide a basis for recognizing the informational demands that are relevant to the task at hand and for determining how to use the team’s knowledge resources to accomplish its goals. Prior studies provide some evidence that members’ process accountability (Scholten, Van Knippenberg,

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Nijstad, & De Dreu, 2007) and need for cognition (Kearney, Gebert, & Voelpel, 2009) serve as motivational drivers of information elaboration. However, these studies have focused exclusively on members' motivation to engage in deep-level information processing (i.e., members' epistemic motivation; De Dreu & Carnevale, 2003; Kruglanski & Webster, 1996). The extent to which members' preferences for collective work arrangements (i.e., members' social motivation; De Dreu, Nijstad, & Van Knippenberg, 2008) serve as a motivational driver of information elaboration remains unclear. This is an important oversight as the "will do" preferences and tendencies among team members (Ployhart & Moliterno, 2011) equip teams with the prosocial motivation to engage in cooperative information exchange and integration efforts (De Dreu et al., 2008).

Additionally, not all teams are equally likely to benefit from extensive information processing. In developing their original theory, van Knippenberg and colleagues (2004) proposed task complexity as a boundary condition, with information elaboration processes being an important driver of success for teams working on complex as opposed to routine tasks. However, they failed to consider how the demands inherent in the team's operating context impact the need for information elaboration among team members. This is an important area for exploration as events occurring outside of the team, but within the team's operating context can create shifting goals or priorities, introduce new opportunities or threats, and alter how tasks and decisions affect desired outcomes. Further, the degree of task ambiguity and uncertainty inherent in the team's performance setting have been shown to heighten the importance of knowledge integration for effective team decision-making (De Dreu & Beersma, 2010) and creativity (Sung & Choi, 2012). However, the extent to which the importance of information elaboration for the success of functionally diverse teams differs across environmental contexts remains unclear.

In the current study, we seek to build on van Knippenberg et al.'s (2004) model of information elaboration by addressing two questions. First, we address the question, *How do the compositional characteristics of functionally diverse teams provide the "can do" ability and "will do" motivation to engage in information elaboration processes?* Individuals who possess higher as opposed to lower levels of general cognitive ability are able to learn faster, acquire and assimilate larger amounts of information, and structure knowledge for more efficient use (Hunter, 1986; Jensen, 1998). We propose that general cognitive ability composition provides an important, but incomplete understanding of ability as a driver of information elaboration processes. Team cognition in the form of shared task representations (van Ginkel & van Knippenberg, 2008, 2009, 2012) and diversity mindsets (van Knippenberg, van Ginkel, & Homan, 2013) provide a cognitive guide for information elaboration efforts. In line with this work, we propose and demonstrate the importance of general cognitive ability composition as a key driver of information elaboration through emergent team cognition in the form of similar strategy-focused mental models.

Low self-reliant individuals enjoy working in situations where there is a distribution of tasks and resources, and are both willing to contribute to a collective effort and to rely on others to do their part (Jackson, Colquitt, Wesson, & Zapata-Phelan, 2006; Ramamoorthy & Carroll, 1998). We propose and demonstrate that low levels of self-reliance among members provides the prosocial motivation to engage in complex collective information exchange efforts through the sharing of the team's leadership responsibilities. Our research, therefore, sheds light into the importance of ability, prosocial motivation, and emergent team properties for engendering information elaboration in functionally diverse teams.

Second, we address the question, *Do the demands of the team's operating environment provide a boundary condition on the performance implications of information elaboration in functionally diverse teams*? Turbulent environments are characterized by continuous and unpredictable changes which disrupt routines and create a need to be vigilant of environmental demands (Katz & Kahn, 1978; Lawrence & Lorsch, 1967). We expect that complex information elaboration processes are most beneficial for teams working in non-routine and unpredictable contexts. At the same time, information elaboration consumes time and energy; for teams that face a more stable performance environment, extensive elaboration is likely to be unnecessary because it drains time and cognitive resources. We propose and demonstrate that information elaboration among team members is critical to success for functionally diverse teams operating in turbulent environments while of minimal value in more routine environments. Therefore, our research sheds light on the boundary conditions of the utility of information elaboration for cross-functional team success by highlighting the importance of the team's environmental context, an often overlooked factor in team research (Mathieu, Maynard, Rapp, & Gilson, 2008).

Information elaboration and environmental turbulence

Information elaboration is a complex form of communication that involves "the exchange of information and perspectives, the process of feeding back the results of this individual-level processing into the group, and discussion and integration of its implications" (van Knippenberg et al., 2004, p. 1011). Information elaboration processes extend beyond information sharing to capture the extent to which team members contribute detailed explanations of their ideas, and spend time constructively discussing each other's perspectives, integrating information, and determining how to apply their knowledge resources to the problem at hand (Hoever, van Knippenberg, van Ginkel, & Barkema, 2012). In turn, teams are able to leverage their unique knowledge resources and outperform more homogenous teams (Hoever et al., 2012; Homan et al., 2007, 2008; Rico, Sanchez-Manzanares, Antino, & Lau, 2012; van Ginkel & van Knippenberg, 2008, 2009).

At the same time, the organizational sciences have long recognized that neither organizations nor teams are impervious to external forces (e.g., Burns & Stalker, 1961; Katz & Kahn, 1978; Lawrence & Lorsch, 1967; Mathieu et al., 2008). When environments are stable and predictable, operating procedures can be designed for routine efficiency. However, in turbulent environments change occurs rapidly and unpredictably; organizations must be cognizant of the environmental demands and continuously adjust their strategies, decisions, and routines to be effective (Bergh & Lawless, 1998; Katz & Kahn, 1978). For teams, turbulent environments create coordination challenges and heighten the importance of communication because previously relied-upon strategies and routines may no longer be appropriate (Kozlowski, Gully, Nason, & Smith, 1999; Marks, Zaccaro, & Mathieu, 2000; Thomas-Hunt & Phillips, 2003). In uncertain environments, knowledge integration is essential for teams to come up with creative solutions and perform at optimal levels (Sung & Choi, 2012).

We expect that the benefits of information elaboration differ substantially depending on the demands of the team's operating environment, even when teams are working on similar types of complex and non-routine tasks. Take, for example, a cross-functional R&D team charged with designing a next generation electronic medical device. A team that faces many disruptive events resulting from competitor practices, research and medical advances, and shifting consumer preferences will need to discuss their perspectives in greater detail to ensure that strategies and decisions are appropriate for the demands of the environment. Through information elaboration, these teams are able to draw on members' unique capabilities, exchange perspectives, and develop novel and useful solutions (Hoever et al., 2012; van Ginkel & van Knippenberg, 2009) to address the evolving demands of the environments. In contrast, extensive information elaboration is resource draining and less important when cross-functional teams face more stable operating environments with fewer disruptive events. Here, teams benefit from the formation of routines, adoption of accepted practices, and processes that bring about decision-making efficiencies (Nadkarni & Narayanan, 2007). Therefore, we propose the following hypothesis.

Hypothesis 1. Information elaboration is positively related to team performance, and this relationship is stronger in turbulent as opposed to stable environments.

Psychological origins of information elaboration

Human capital provides a ''unit-level resource that is created from the emergence of individuals' knowledge, skills, abilities, and other characteristics (KSAOs)'' (Ployhart & Moliterno, 2011, p. 128). Cross-functional teams need to be composed of members who provide the right mix of specific human capital to solve complex problems as well as the basic ability and motivation (i.e., general human capital) to use their knowledge resources effectively. The functional diversity inherent in cross-functional teams provides a basis for the emergence of specific human capital. In turn, the collective ability and motivation of team members are thought to be key compositional drivers of information elaboration (van Knippenberg et al., 2004). In the next section, we examine the roles of cognitive ability and self-reliance beliefs composition in creating a capacity for information elaboration through emergent team cognition and the collective enactment of leadership functions.

Team cognitive ability and self-reliance emerge from the characteristics of individual team members through a composition emergence process, which indicates that the team-level property is isomorphic to the individual-level property (Kozlowski & Klein, 2000). To form these team-level properties, the scores of individual members need to be aggregated using an appropriate composition model. Drawing on Steiner (1972) taxonomy of task types, van Knippenberg, Kooij-de Bode, and van Ginkel (2010) noted that information elaboration is an additive task because it requires all team members to contribute their unique knowledge and participate in the discussion and integration of information. For additive tasks, the underlying traits of team members are most appropriately modeled using team-level means (Beersma et al., 2003; Homan et al., 2008; van Knippenberg et al., 2010). Accordingly, we model team cognitive ability and team self-reliance using team-level means in the current study.

''Can do'' drivers of information elaboration

General cognitive ability, which is a stable characteristic that captures the capacity to comprehend, process, and create new information (Jensen, 1998; Kanfer & Ackerman, 1989), provides teams with a general type of human capital that is useful across situations (Bell, 2007; Ployhart & Moliterno, 2011). Individuals with high general cognitive ability are able to learn new and large amounts of information, retain information in memory, and structure information for efficient application in future situations (Hunter, 1986; Schmidt, Hunter, & Outerbridge, 1986). At the team level, cognitive ability reflects the extent to which team members possess ''the capacity to understand complex ideas, learn from experience, reason, problem solve, and adapt'' (Devine & Philips, 2001, p. 507), and has been linked to team effectiveness across studies (Bell, 2007). Teams composed of high cognitive ability members should have the ability to recognize the team's informational needs, provide detailed and understandable explanations of their ideas, reflect upon information, and integrate and apply task-relevant knowledge resources.

At the same time, organizational researchers are increasingly recognizing the cognitive underpinnings of effective information exchange in teams (DeChurch & Mesmer-Magnus, 2010; Mohammed, Ferzandi, & Hamilton, 2010). In particular, shared task representations have been found to be an important facilitator of information elaboration processes in diverse teams (van Ginkel, Tindale, & van Knippenberg, 2009; van Ginkel & van Knippenberg, 2008, 2009, 2012). Similarly, van Knippenberg et al. (2013) argued that members' diversity mindsets are a specific form of team cognition that enables teams to conceptualize diversity as an informational resource and leverage their informational diversity to perform at optimal levels. Building on this work, for teams performing cooperative strategic decision-making tasks we propose that the similarity among members' strategy-focused team mental models (TMM) is an emergent team cognition that links team ability composition with information elaboration. Strategy TMM are a type of mental model that captures members' collective understanding of the relationships among and implications of key decision alternatives (Randall, Resick, & DeChurch, 2011). We focus on strategy mental model similarity for three reasons. First, shared cognition within team has been found to be an important precursor to information elaboration (van Ginkel & van Knippenberg, 2008, 2009). Second, a team's strategic orientation has been found to guide information search efforts (Woolley, Bear, Chang, & DeCostanza, 2013). Third, strategy mental model similarity enables teams to execute strategies successfully because members have a common understanding of the implications of their decisions (Ensley & Pearce, 2001; Knight et al., 1999).

Cognitive ability is related to how individuals acquire, process, and use information in future settings (Hunter, 1986; Kanfer & Ackerman, 1989). Cognitive ability has been linked to the emergence of similar mental models among members by aiding team learning and creating the capacity for members to gain a shared understanding of their objectives and strategies to accomplish them (Edwards, Day, Arthur, & Bell, 2006; Randall et al., 2011; Resick, Dickson, Mitchelson, Allison, & Clark, 2010). Teams composed of members with higher as opposed to lower cognitive ability levels should be more likely to recognize the interdependencies that exist among members (Resick et al., 2010) and the need to work toward an agreed upon strategy (Randall et al., 2011). In turn, strategy TMM similarity provides a key mechanism linking cognitive ability composition to information elaboration by guiding the understanding of informational relevance and the exchange of knowledge and information that is consistent with the shared understanding of the team's strategies. Therefore, we offer the following hypothesis.

Hypothesis 2. The positive relationship between team cognitive ability and information elaboration is mediated by strategy TMM similarity.

''Will do'' drivers of information elaboration

The team's motivation to spend time and effort cooperatively processing information is also an important determinant of information elaboration (De Dreu et al., 2008; Nijstad & De Dreu, 2012; van Knippenberg et al., 2004). Composition characteristics such as members' openness to experience (Homan et al., 2008), pro-diversity beliefs (Homan et al., 2007), and need for cognition (Kearney et al., 2009) provide some insights into this motivational capacity. Similarly, process accountability has also been identified as a motivational driver of information elaboration (Scholten et al., 2007). However, openness to experience and pro-diversity beliefs are broad characteristics that reflect one's receptiveness to new ideas and different people, while process accountability and need for cognition are aspects of epistemic motivation that are reflective of one's desire to develop a deep-level understanding of the world (De Dreu & Carnevale, 2003). Beyond these factors, an emerging stream of research argues that teams with a high level of prosocial motivation (i.e., the desire to cooperate and a preference for fair outcomes that have joint benefits) proactively search for, disseminate, encode, and integrate information that is relevant for achieving the team's success (De Dreu et al., 2008). In contrast, teams with a pro-self orientation are more likely to strategically withhold information or to deceive others for personal gain (De Dreu, 2007; De Dreu et al., 2008). We propose that low preferences for self-reliance among members provide teams with a prosocial motivational capacity for in-depth information exchange efforts.

Self-reliance is a facet of psychological collectivism that captures a core belief that success cannot be accomplished working alone (Jackson et al., 2006; Ramamoorthy & Carroll, 1998). Specifically, self-reliance addresses the extent to which individuals form a sense of responsibility to their groups, are comfortable with a distribution of tasks, resources, and information, and are willing to rely on others (Jackson et al., 2006). Teams composed of members with low self-reliance beliefs are naturally inclined to be trusting, believe that members are responsibility to their team, and comfortable contributing information and effort toward collective endeavors; in contrast, teams composed of high self-reliant members are naturally inclined to be skeptical of one another, believe that members are accountable for themselves and not to their group, and may withhold information and effort to protect their personal interests.

Yet, functionally diverse teams need to manage their pool of unique knowledge resources effectively to solve problems and attain goals. Leadership is thought to play a particularly important role helping teams to effectively use their human capital and informational resources by encouraging communication, information exchange and integration, idea vetting, and knowledge application (Zaccaro, Rittman, & Marks, 2001). We propose that low preferences for self-reliance among members give rise to a particular role set, termed collective leadership, when teams are also self-managed. The collective view of leadership holds that direction setting, coordination, and social facilitation can be enacted by multiple team members (Day, Gronn, & Salas, 2004; Erez, LePine, & Elms, 2002; Gronn, 2002; Klein, Ziegert, Knight, & Xiao, 2006). Collective leadership is an informal, internal leadership mechanism (Morgeson, DeRue, & Karam, 2010) that is particularly beneficial for teams without formally designed leaders (Yammarino, Salas, Serban, Shirreffs, & Shuffler, 2012) by promoting problem-solving activities that enable goal attainment (Zaccaro et al., 2001). Building on the notion that both task- and relationship-focused leadership functions contribute to team effectiveness (Burke et al., 2006), particularly in teams with diverse membership (Klein, Knight, Ziegert, Lim, & Saltz, 2011), Hiller, Day, and Vance (2006) conceptualized collective leadership in terms of task- and relationship-oriented functions. Task-oriented functions involve direction setting, planning strategies for accomplishing goals, boundary spanning, and managing internal operations. Relationship-oriented functions aim to strengthen the social fabric of the team, enhancing member's capacity to work together effectively.

For teams that are self-managed, we expect that low preferences for self-reliance among members create a prosocial orientation that motivates members to participate in the mutual enactment of the team's leadership functions. In turn, members are motivated to seek out information, spend time and effort integrating and applying unique knowledge, and persist through difficulties. When team members are highly self-reliant, members are less motivated to perform unassigned leadership functions, less interested in exchanging knowledge, less willing to engage in information integration activities, and more likely to be protective of their knowledge. Therefore, we propose that self-reliance composition provides functionally diverse teams with the "will do" motivation to engage in information elaboration through the collective enactment of leadership functions among members, and present the following hypothesis.A model of the hypothesized relationships is depicted in Fig. 1.

Hypothesis 3. The negative relationship between team self-reliance beliefs and information elaboration is mediated by collective leadership.

Method

Participants and simulation

Participants included 272 undergraduate students from a large public university in the Southeastern United States. Participants were predominantly female (65%), with a mean age of 20 years (*SD* = 4.64), and represented a wide range of ethnic backgrounds (68% Hispanic, 12% Caucasian, 11% African-American, 3% Asian-American, and 6% unspecified). Participants were randomly assigned to 68 four-person teams; teams were randomly assigned to either a turbulent ($n = 33$) or stable ($n = 35$) environment condition.

Teams performed a computerized strategic decision-making task created using the pc-game SimCity4 Deluxe Edition (EA Games, 2004), which is a city building simulation in which users design, build, and govern a city. We structured the task so that participants formed the city council of a simulated city. To create functional diversity, and ensure that knowledge and expertise were distributed across team members, we created four distinct roles. Through a task analysis that involved reviewing the Official Strategy Guide (Kramer, 2003), playing the game, and consulting with four subject matter experts (SMEs), we created a list of tasks and actions that impacted the population of the simulated city. These tasks were clustered into four roles on the basis of content similarity to ensure a distribution of importance and minimize knowledge overlap. The four roles were then pilot-tested on two teams and reviewed with the SMEs. We incorporated adjustments and developed four separate training modules; the training modules and revised roles were piloted tested on six additional teams and again reviewed with the SMEs. Adjustments were incorporated, and the four roles and four training modules were finalized.

Participants were randomly assigned to one of the four roles. Participants in the City Planner role were trained to determine the optimal uses for land, how to zone and develop land, and to manage transportation issues throughout the simulated city. Participants in the Financial Officer role were trained on the city financials and given responsibility for managing budgets, tax revenues, and expenditures. Participants in the Public Works Officer role were trained to build and manage the simulated city's power grid and plants, water and sanitation facilities, and public safety departments, including fire and police. Participants in the Social Welfare role were trained to address the simulated city's health and welfare concerns, including environmental pollution, and building and funding hospitals and schools. The combination of these roles was needed to effectively manage the city, ensuring that information and expertise were distributed among members and that members were dependent upon each other to accomplish their objectives. As a result, there was no hierarchy among roles and teams were self-managed.

Teams were given responsibility for the management of a partially developed city, and informed that, together, they were the city council of the simulated city. The city was developed near a coastal area and the landscape created both opportunities and challenges for growth and expansion. The northern portion of the city contained medium-density industrial zones, while the southern portion of the city contained low- and medium-density residential and commercial zones. An island off of the southeastern part of the city consisted of both high-density residential and commercial zones. Approximately one-fifth of the simulated city's land was unzoned. Each team began with a simulated population of 38,468 residents and a financial reserve of $100,693. Participants were tasked with the responsibility for making and implementing decisions regarding all aspects of city governance. Teams were given the goal of making their city as desirable a place to live and work as possible, a task that was measured through growth in the city's population. The game was programmed so that decisions that increased the desirability of the city resulted in a corresponding increase in city population, while decisions that decreased the desirability of the city resulted in a decrease in population. Teams were informed that they would be able to see the impact of their efforts by monitoring changes in the city's population.

Procedure

Each experimental session lasted approximately 3 h. Participants were provided a brief introduction to the purpose of the study and asked to provide informed consent. Next, participants completed measures of general cognitive ability, self-reliance beliefs, and demographics, and then progressed through 2 computer-based training (CBT) modules. The first module outlined the basic goals of the simulation, how to operate various controls, and where to locate important information about the city's status. Participants then completed a role-specific training module that outlined the responsibilities of the respective roles, and received instructions on: (a) how to use specific functions of the game, (b) how to retrieve and monitor information, and (c) the social and economic impact of various strategic decisions associated with their specific role. In addition, participants were provided a handout to use during the remainder of the session which contained role-specific information covered during training. After the CBTs, an experimenter asked each participant to demonstrate a series of critical, role-specific tasks. If a participant was unable to complete a given task, the experimenter demonstrated how to complete the task and then asked the participant to demonstrate it again. All participants correctly demonstrated all tasks by the second trial. This process ensured that all participants had acquired a basic level of knowledge necessary for the task. Training lasted approximately 45 min.

Upon completion of the training modules, participants met in a conference room equipped with a 32″ television connected to a desktop computer. Additionally, a 56 in. × 36 in. color map of the city was posted on the wall and identified important buildings, such as power plants, hospitals, schools, police stations, and fire houses.

An experimenter provided an overview of the city and reiterated the team's goal. Teams were then provided an initial period of 15 min to examine their city, identify any problems or areas where changes may be needed, and to make and implement decisions. During this time, the simulation was paused. After 15 min, the simulation was started and progressed for four simulated months, which lasted approximately 3 min. As time elapsed, teams were able to watch the evolution of their city; however, they were unable to make any changes. Teams were instructed to use this time to plan their next decisions. After four simulated months the simulation was paused, and teams were then given 5 min to examine their city, identify changes, and implement decisions. The simulation was then started and ran for another four simulated months. In total, teams progressed through nine cycles of making and implementing decisions and then allowing the simulation to run for a total of 36 simulated months.

Teams within the two conditions experienced the exact same circumstances during the first five cycles (20 simulated months). For teams in the turbulent environmental condition, a series of four unforeseen disasters occurred during the final four cycles (16 simulated months). Teams in the stable conditions did not experience any changes in their environment.

Environmental condition manipulation

Each team was randomly assigned to either a stable or a turbulent environment condition. A turbulent environment: (a) is characterized by unexpected and inconsistent changes that are difficult to predict, (b) is stressful, confusing, and intimidating, (c) requires different strategic approaches for goal accomplishment, and (d) places a significant demand on communication and coordination among people (Bergh & Lawless, 1998; Burns & Stalker, 1961; Katz & Kahn, 1978; Lawrence & Lorsch, 1967). We operationalized environmental turbulence by creating a series of four unforeseen disasters (e.g., fires, tornados, and attacks from hostile forces) that occurred during consecutive intervals beginning after the fifth decision cycle. To increase uncertainty, each disaster differed from the previous disaster and caused substantial damage to a different section of the city. These events disrupted normal operating conditions requiring the team to redirect their attention and decisions to repair damage and restore operations.

To verify that participants perceived the two environmental conditions differently, we administered a 4-item manipulation check after 36 simulated months. Responses were made on a 5-point response scale (1 = *Strongly Disagree* to 5 = *Strongly Agree*), and then items were averaged into a composite variable ($\alpha = .82$). Participants in the turbulent condition ($m = 4.04$, $sd = 0.65$) agreed more strongly than participants in the stable condition ($m = 3.03$, $sd = .83$; $t = -12.16$, $p < .01$) that events which occurred made the simulation unpredictable and chaotic. We also asked participants about the perceived level of difficulty of the task. Participants in the stable ($m = 3.28$, $sd = 1.07$) and turbulent ($m = 3.49$, $sd = 1.21$; $t = -1.52$, ns) conditions did not differ in their perceptions of task difficulty. Taken together, the manipulation checks indicated that participants in the two conditions differed in their perceptions of the stability and predictability of the environment, but not in the level of difficulty of the task.

Measures

Team composition

We assessed cognitive ability using the Wonderlic Personnel Test Form IV (Wonderlic, 1992). Participants were given 12 min to complete the 50-item measure. We measured self-reliance beliefs ($\alpha = .66$) using Ramamoorthy and Carroll's (1998) 4-item scale. We focused on self-reliance beliefs as they reflect ones' willingness to rely on others and share in collective responsibilities. Participants responded using a 5-point Likert-type scale (1 = *Strongly Disagree* to 5 = *Strongly Agree*). As our intent was to model the influence of team compositional characteristics on information elaboration through emergent team properties, we aggregated ability and self-reliance using team-level means.

TMM

To elicit team members' strategic understanding of the various decision options, we asked each participant to complete a matrix reporting his or her perception of the relationships among 12 strategic decisions (see Appendix A) identified through our task analysis procedures. Participants read each pair of strategic decisions and rated the relationship on a 9-point scale ranging from

1 = *totally unrelated* to 9 = *strongly related*. The ratings capture members' knowledge regarding how key city governing decisions are related to one another in achieving the team's goal. Mental model structure was represented using Pathfinder Networks (or PFNET; Schvaneveldt, 1990). The Pathfinder algorithm calculates a network of direct and indirect links between concepts with related concepts separated by fewer links (and being closer in proximity) while unrelated concepts are separated by greater distance.

The degree of similarity among team members' mental models was determined using Pathfinder's metric of closeness (*C*), which calculates the degree of similarity between two PFNETs. For each team, six strategy *C* scores were calculated by comparing the 4 members' PFNETs to one another. Two networks without any common links would have a $C = 0$, and two networks that have identical network structures would have a $C = 1$. The six scores were then averaged together to create the TMM score for the team.

Collective leadership

Collective leadership was assessed by two raters who were trained on the simulation task and behaviors associated with collective leadership. The raters were blind to the study hypotheses and performance of the teams. All sessions were recorded. The raters watched the teams' decision making processes from the beginning of the simulation through the 8th decision-making trial; raters were unable to see the performance of the team or the city. The raters assessed collective leadership using 15 items from Hiller et al.'s (2006) scale with the item stem "How often do team members share in". These items measured the Planning and Organizing, Problem Solving, & Support and Consideration dimensions from Hiller and colleagues (2006) measure. These dimensions are most relevant to understanding the collective leadership processes that link self-reliance beliefs with information elaboration. Each rater worked independently rating each item on a 5-point scale (1 = *rarely* to 3 = *sometimes* to 5 = *very often*). An acceptable level of inter-rater agreement ($r_{wg\,(moderately\,skewed)} = .90$ to $r_{wg\,(uniform)} = .95$) and reliability ($ICC_1 = .56$, $ICC_2 = .72$, $F = 3.53$, $p < .01$) was found. All items were averaged together to create a composite rating ($\alpha = .93$).

Information elaboration

Information elaboration was assessed by two raters who were trained on the simulation task and information elaboration processes. The raters were blind to the hypotheses and performance of the teams. Different raters assessed collective leadership and information elaboration. We developed a behaviorally anchored rating scale (BARS) to assess the core behaviors associated with information elaboration (i.e., the exchange, processing, and integration of information and perspectives) based on van Knippenberg and colleagues (2004) work. Several pilot testing sessions were recorded and used for scale construction. Observers identified incidents of exceptionally good and exceptionally bad information elaboration. These incidents were then combined and scaled to create a 5-point scale representing a continuum from 1 (*No Information Elaboration*) to 5 (*High Information Elaboration*). The raters independently watched and rated the teams from the 4th through the 8th decision-making cycle; raters were unable to see team performance. The raters then met to discuss and finalize their individual assessments, and ratings were averaged together to obtain an information elaboration score for each team. An acceptable level of inter-rater agreement ($r_{wg\,(moderately\,skewed)} = .87$ to $r_{wg\,(uniform)} = .94$) and reliability ($ICC_1 = .63$, $ICC_2 = .87$, $F = 7.67$, $p < .01$) was found.

Team performance

City population at the end of 36 simulated months was used as the indicator of team performance. Population scores ranged from 11,208 to 56,538.

Controls

Three control variables were included in the analyses. Two control variables were team inputs addressing prior experience playing SimCity (0 = *Never*, 1 = *Less than once a month*, 2 = *A few times per month*, 3 = *A few times per week*, and 4 = *Daily*), and working with their teammates (0 = *Never to 6 = all three of my teammates at the same time prior to today's study)*. Mean experience across members was used to create two team-level experience variables. To determine whether the relationships with team performance were due to team information elaboration and not simply to the amount of talking among members, we also controlled for team talking. Two raters independently watched the team's decision making segments (with the game paused) in the 2nd through the 8th decision-making cycles; raters were unaware of the city's population and rated talking on a 5-point scale (1 = *Barely Talked* to 5 = *Talked Majority of the Session*). This rating did not incorporate what teams talked about or whether it was constructive to the task. An acceptable level of inter-rater agreement ($r_{wg\,(moderately\,skewed)} = .82$ to $r_{wg\,(uniform)} = .92$) and reliability ($ICC_1 = .64$, $ICC_2 = .78$, $F = 4.54$, $p < .01$) was found.

Analytical approach

We conduct path-analyses, which allows researchers to model relationships using observed variables as single indicators of latent constructs (Raykov & Marcoulides, 1999), using AMOS 20 to test the hypothesized model of relationships. Model fit was determined using the chi-square goodness of fit, root mean square error of approximation (RMSEA), and comparative fit index (CFI). For RMSEA, we used established rules of thumb (see MacCallum, Browne, & Sugawara, 1996) and considered values below .05 to indicate excellent fit, values between .05 and .08 to indicate good fit, and values between .08 and .10 to indicate mediocre fit. For CFI, we used rules of thumb presented by Hu and Bentler (1999) and considered values above .95 to indicate excellent fit and values between .90 and .95 to indicate good fit. Analyses controlled for time talking by estimating a direct path to team performance and covariances with TMM, collective leadership, and information elaboration. Analyses also controlled for: (a) prior SimCity experience and (b) prior team experience by estimating direct paths from both experience variables to TMM, collective leadership, information elaboration, and performance.

To test the moderating role of environmental turbulence, we first centered the information elaboration and environmental turbulence latent variables and then created an interaction term from the center variables (Cohen, Cohen, West, & Aiken, 2003). Then, we tested the fit of a main-effects-only path model. Next, we followed procedures previously identified (see Cortina, Chen, & Dunlap, 2001; Mathieu, Tannenbaum, & Salas, 1992; Ping, 1995) and used (e.g., Netemeyer, Maxham, & Lichtenstein, 2010) to test for moderation. Specifically, we added environmental turbulence and the information elaboration by environmental turbulence interaction term to the model and included direct paths from turbulence and the interaction term to team performance. The fit of the model and the statistical significance of the interaction term were evaluated to determine if the moderation hypothesis (Hypothesis 1) was supported.

To test for mediation (Hypotheses 2 and 3), we followed procedures put forth by James, Mulaik, and Brett (2006). Specifically, mediation is said to exist when (a) fit indices indicate acceptable model fit, (b) the path coefficient from the predictor to the mediator is statistically significant, (c) the path coefficient from the mediator to the outcome is statistically significant, and (d) the indirect effect of the predictor on the outcome through the mediator is statistically significant. To test the indirect effects, we used the AMOS bootstrapping procedure, which is a nonparametric procedure that does not assume any distribution shape, and produces a sampling distribution to compute point estimates and confidence intervals (CIs) for indirect effects under the assumption of full mediation. Indirect effects are said to be statistically significant if the bias corrected 95% confidence intervals do not include zero. We conducted 5000 iterations for all bootstrapping analyses. Bootstrapping is a preferred approach to testing indirect effects in small sample size studies, as is often the case in teams research, because standard errors for indirect effects obtained with parametric approaches may be incorrect with small sample sizes, resulting in lower statistical power (MacKinnon, Lockwood, & Williams, 2004).

Results

Table 1 presents descriptive statistics and zero-order correlations among study variables. To test Hypothesis 1, which proposed that environmental turbulence moderates the relationship between information elaboration and team performance, we first fit a main effects only model to the data. This model fit the data well ($\chi^2_{(19)} = 8.27$, ns, CFI = 1.00, RMSEA = .00), which is not surprising given the small number of degrees of freedom. In addition, information elaboration had a statistically significant main effect on performance ($\beta = .41$, $p < .01$). Next, we fit the hypothesized moderation model to the data which included environmental turbulence and the information elaboration by environmental turbulence interaction term. This model also fit the data well ($\chi^2_{(36)} = 30.74$, ns, CFI = 1.00, RMSEA = .00).

Focusing first on the control variables, the path coefficients for prior game experience ($\beta = -.01$, ns), prior team experience ($\beta = -.14$, ns), and talking ($\beta = -.15$, ns) in relation to team performance were not statistically significant. Additionally, team talking was correlated with information elaboration ($r = .26$, $p < .01$), collective leadership ($r = .67$, $p < .01$), and TMM ($r = .18$, $p < .05$). The path coefficient for prior game experience ($\beta = .26$, $p < .05$) was positively related to TMM, but the path coefficient for prior team experience ($\beta = .08$, ns) was not. Neither prior game experience ($\beta = .13$, ns) nor prior team experience ($\beta = .15$, ns) were related to collective leadership. Finally, the coefficient for team experience ($\beta = -.25$, $p < .05$) but not prior game experience ($\beta = .19$, ns) was related to information elaboration.

Regarding Hypothesis 1, the path coefficients for the information elaboration main effect ($\beta = .35$, $p < .01$) and the information elaboration by environmental turbulence interaction ($\beta = .20$, $p < .05$) in relation to performance were statistically significant. Standardized path coefficients and standard errors are depicted

Table 1
Zero-order correlations among variables.

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9
1. Turbulence	.49	.50									
2. Experience – SimCity	.36	.29	−.13								
3. Experience – Team	.14	.36	.06	−.08							
4. Talking	3.85	.86	.19	−.05	.07						
5. Cognitive Ability	20.40	2.32	.12	.11	−.08	.08					
6. Self-Reliance	2.66	.30	−.03	.17	.04	.02	−.03				
7. Collective Leadership	3.69	.57	.06	.04	.18	.64**	.06	−.23			
8. TMM	.25	.05	.18	.27*	.09	.21	.25*	−.08	.13		
9. Info Elaboration	4.53	1.09	−.06	.28*	−.16	.49**	.20	−.08	.38**	.35**	
10. Team Performance	42262.59	8671.12	−.51**	.19	−.25*	−.10	.07	.04	−.09	.11	.31*

Note. Turbulence = Environmental Turbulence Condition (0 = Stable, 1 = Turbulent). TMM = Team Strategy Mental Model Similarity. Info Elaboration = Information Elaboration. Self-Reliance and Cognitive Ability represent the team-level mean.
* $p < 05$ (two-tailed).
** $p < .01$ (two-tailed). $N = 68$.

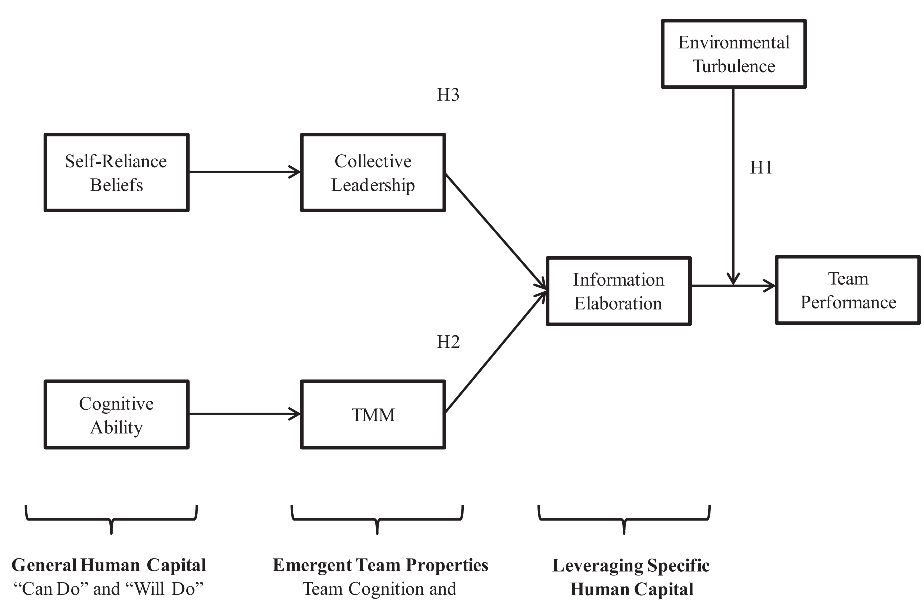

Fig. 1. Hypothesized structural model of the ability and social motivational origins of team information elaboration and the moderating role of environmental turbulence.

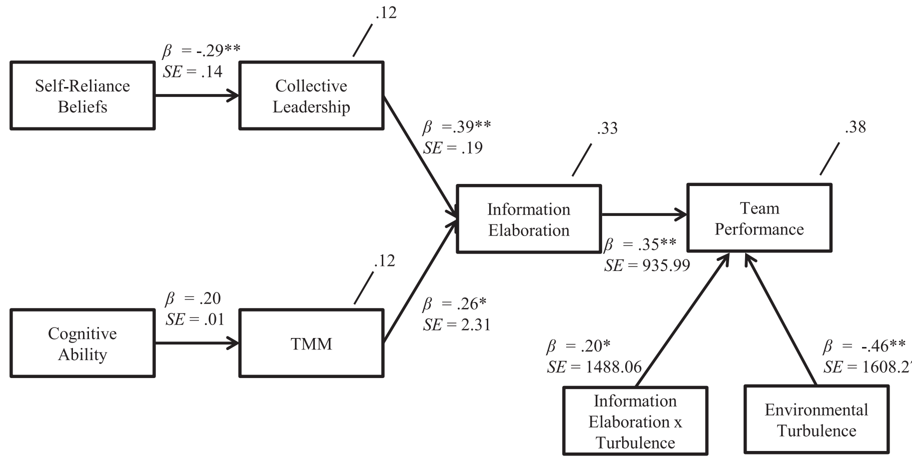

Fig. 2. Path analysis results. *$p < .05$. **$p < .01$. $\chi^2_{(68, df=36)} = 30.74$, *n.s.*, CFI = 1.00, RMSEA = .00. *Note.* Standardized path coefficients are listed. Two-tailed tests of statistical significance were used for all path coefficients. Analyses control for: (a) time talking with a direct path to team performance and covariances with TMM, collective leadership, and information elaboration, (b) prior SimCity experience and (c) prior team experience, both with direct paths to TMM, collective leadership, information elaboration, and team performance; paths are not listed to reduce clutter.

in Fig. 2. Next, we graphed the interaction and conducted simple slopes analyses following procedures outlined by Cohen et al. (2003). As shown in Fig. 3, information elaboration was positively related to team performance for teams operating in turbulent environments ($\beta = .55$, $t = 3.51$, $p < .01$) but not for teams operating in stable environments ($\beta = .16$, $t = .68$, ns). Therefore, we concluded that Hypothesis 1 was partially supported as information elaboration was unrelated to performance in stable environments. Additionally, the set of team processes, emergent properties, composition characteristics and context factors explained 38% of the variance in team performance.

Hypothesis 2 proposed that team cognitive ability composition is positively related to information elaboration through strategy TMM. The path coefficient from TMM to information elaboration was statistically significant ($\beta = .26$, $p < .05$); however, the path coefficient from cognitive ability to TMM ($\beta = .20$, $p = .07$) was not statistically significant at the $p < .05$ cut-off level. Given that our focus was the indirect effect of team cognitive ability on information elaboration and not the direct effect on TMM, we continued to conduct the bootstrapping analyses to test the indirect effects. The estimated 95% confidence interval around the indirect effect did not include zero ($\beta_{indirect} = .05$, 95% CI [.001, .148]), indicating some support for Hypothesis 2. The findings from the bootstrapping analyses are not entirely consistent with the tests of each stage of the mediation effect as the coefficient for the team cognitive ability to TMM path exceeded the traditional $p < .05$ cut-off level for statistical significance. Bootstrapping provides a powerful and preferred approach to examining mediation effects in small sample size research where statistical power is reduced (MacKinnon et al., 2004), which may provide some explanation for the inconsistent findings. Therefore, we concluded that team cognitive ability has a weak indirect effect on information elaboration through TMM similarly.

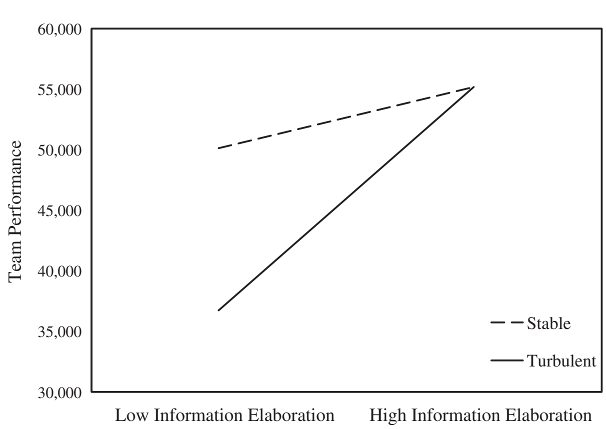

Fig. 3. The differential effects of information elaboration on team performance across stable and turbulent environments.

Hypothesis 3 proposed that team self-reliance beliefs composition is negatively related to information elaborate through the collective enactment of leadership functions among members. The path coefficient for self-reliance beliefs was negatively related to collective leadership ($\beta = -.29$, $p < .01$), and collective leadership was positively related to information elaboration ($\beta = .39$, $p < .01$). Further, the bootstrapping analyses indicated that the estimated 95% confidence interval around the indirect effect of self-reliance beliefs on information elaboration through collective leadership did not include zero ($\beta_{indirect} = -.11$, 95% CI [−.211, −.039]). Therefore, the results were supportive of Hypothesis 3. Overall, the set of "can do" and "will do" drivers explained 33% of the variance in information elaboration.

We also conducted supplemental analyses using Preacher, Rucker, & Hayes, 2007 bootstrapping technique to determine whether information elaboration mediated the effects of collective leadership and TMM on team performance, and whether moderation of the information elaboration to performance path (stage two moderation) resulted in stronger indirect effects in turbulent as opposed to stable environments. For TMM, the bias corrected CI excluded zero for teams in the turbulent condition (PE = 24642.56; 95% CI [2528.96, 67591.47]) but not in the stable condition (PE = 3556.30; 95% CI [−9584.02, 16809.34]). Similarly, the bias corrected CI associated with collective leadership excluded zero for teams in the turbulent condition (PE = 3023.10; 95% CI [604.98, 6796.07]) but not in the stable condition (PE = 436.28; 95% CI [−915.42, 2428.37]). The results indicate that for functionally diverse teams working in turbulent but not stable environments, strategy-focused TMM and collective leadership are indirectly related to team performance through information elaboration processes.

Discussion

Organizations are increasingly operating in dynamic environments (Bergh & Lawless, 1998; Osterman, 2010), and turning to functionally diverse teams to address complex, strategically important problems and build a competitive advantage (Grant & Parker, 2009; Jackson, Joshi, & Erhardt, 2003; van Knippenberg et al., 2004). Findings from the current study suggest that information elaboration is essential for these functionally diverse teams to perform effectively when they operate in highly turbulent contexts, but may be of little value in more stable settings. Additionally, while equipping teams with functionally diverse members creates a broad pool of problem-specific human capital, our findings shed light on the general human capital needed to create the "can do" ability and "will do" social motivation for information elaboration. We now examine the theoretical and practical implications of these findings.

Theoretical and practical implications

The current study makes several contributions to team information elaboration theory and research. First, our study questions when functionally diverse teams benefit from the elaborate discussion and integration of informational resources. Looking beyond team task complexity, our findings demonstrate empirically that the teams' operating environment provides a boundary condition on the benefits of information elaboration for the success of functionally diverse teams. Novel and uncertain environments impede the formation of routines, heightening the need for team communication (Marks et al., 2000) and knowledge integration (Gardner, Gino, & Staats, 2012; Sung & Choi, 2012). Information elaboration processes enable cross-functional teams to leverage their knowledge resources to develop the innovative and useful solutions (Hoever et al., 2012) that are needed in turbulent environments. In contrast, stimuli are more clear and predictable in stable environments making it easier for team members to determine cause and effect associations (Nadkarni & Barr, 2008). Viable solutions can be arrived at without the extensive integration of knowledge (Sung & Choi, 2012). Teams can look to past precedents or follow tried-and-true strategies to achieve their objectives (Nadkarni & Narayanan, 2007) without fully exploiting the team's knowledge resources through extensive explanations of ideas or detailed discussion of perspectives. In stable contexts, elaboration is less beneficial and may even impede progress or decision-making efficiencies for some teams.

Our study also departs from much of the empirical study of information elaboration by focusing exclusively on functionally diverse teams instead of contrasting the processes and performance of diverse and homogeneous teams. This approach enabled us to examine the ability and social motivation drivers of information elaboration specific to functionally diverse teams. As such, our second contribution is demonstrating empirically how team cognitive ability composition engenders information elaboration processes. The general cognitive ability among team members is a cognitive form of general human capital (Ployhart & Moliterno, 2011) that creates the capacity to comprehend, process, and apply information (Hunter, 1986; Jensen, 1998). At the same time, team cognition such as members' shared task representations (van Ginkel & van Knippenberg, 2008, 2009, 2012) and diversity mindsets provide a cognitive basis for information elaboration. Similarly, a team's collective strategic orientation aids information search processes (Woolley et al., 2013) and decision adaptation (Randall et al., 2011). Our findings illustrate that a team's cognitive human capital creates the capacity for members to use specific knowledge resources through the exchange and integration of information by facilitating the emergence of strategy-focused TMM. Importantly, TMM did not lead to decision rigidity (or a myopic view of their task). Instead, TMM provided a platform for understanding strategic options and exchanging information. Therefore, our study sheds light on the linkages between team ability composition and information elaboration in functionally diverse teams.

Third, our findings provide insights into the importance of prosocial motivation by empirically demonstrating that low preferences for self-reliance equip functionally diverse teams with the "will do" motivation (Ployhart & Moliterno, 2011) for information elaboration. When the mean level of self-reliance preferences among members is low, members are comfortable with a distribution of knowledge and responsibilities and relying on others to live up to their commitments (Ramamoorthy & Carroll, 1998). On tasks that focus on a "cooperative integration of perspectives", a prosocial orientation motivates members to contribute their insights and process information (De Dreu et al., 2008, p. 36) ensuring that the team uses its knowledge resources. We further illustrate that the effects of self-reliance composition are transmitted through members' mutual enactment of leadership functions such as problem solving, planning, organizing, and support. As the environment rendered one member's expertise more relevant, the team could shift towards taking direction from that person. Therefore, our findings also contribute toward an understanding of the compositional bases of collective leadership and the types of teams where collective leadership is important, which have been identified as key areas in need of future study (Dust & Ziegert, 2012; Yammarino et al., 2012). In turn, through collectively enacting leadership functions, teams were aroused to the need to elaborate on task-relevant information and willing to put forth the effort needed to do so.

TMM have been linked to epistemic motivation (i.e., the motivation for deep level information processing) in prior studies (Nijstad & De Dreu, 2012; Randall et al., 2011; van Ginkel et al., 2009). As epistemic motivation and prosocial motivation have been found to have an interactive effect on information exchange efforts (see Nijstad & De Dreu, 2012), we explored this possibility by testing the fit of a model adding a collective leadership by TMM interaction term. This model fit poorly ($\chi^2_{(46)} = 68.26$, ns, CFI = .84, RMSEA = .09) and the interaction to information elaboration coefficient was not significant ($\beta = .09$, ns). Our findings suggest that mental models are an emergent team property that may better reflect the ability as opposed to the epistemic motivation among team members to engage in information elaboration efforts.

The current study also has several practical implications for organizations staffing and developing functionally diverse, self-managed teams. First, information elaboration is particularly important for cross-functional teams working in intensely competitive business environments or under complex and unpredictable conditions. This same complex and detailed processing of information is likely to be unnecessary in stable and predictable business settings. Managers should prepare their staff for cross-functional team assignments by helping them to read cues from the business environment and determine when information elaboration efforts are most vital to assignment success, and to intervene when necessary to ensure the dissemination and integration of unique information. Training should also ensure that team members understand the diversity of knowledge and perspectives within the team and encourage members to reflect upon that knowledge (Hoever et al., 2012; van Ginkel & van Knippenberg, 2009; van Knippenberg et al., 2013). Another way to create the capacity for effective information elaboration is through the similarity of members' strategy mental models. Providing training that helps members to identify critical functions and decision options, and understand the implications and opportunities among those decisions should facilitate the emergence of a strategic consensus that guides information elaboration efforts. Further, when teams are self-managed, the collective enactment of leadership may be a particularly important driver of information elaboration. Organizations should train members to understand the team's functional leadership needs and how those functions can be mutually enacted by team members.

The findings also illustrate the importance of carefully considering the general-human capital needs when staffing functionally diverse teams. The general cognitive ability among members creates the capacity for teams to use their unique informational resources through the emergence of team cognition. Likewise, a low preference for self-reliance among members creates the prosocial motivational capacity to work together and expend energy discussing and integrating knowledge resources through the collective enactment of leadership functions.

Limitations, future directions and conclusions

Despite the benefits of using a laboratory setting, there are a number of limitations that should be noted. For one, teams worked together for a relatively short amount of time on a task where the consequences of success or failure to the participating teams were minimal. As a result, the simulation did not fully capture the complexities that project and management teams experience when their decisions have a substantial strategic impact on both their teams' and organizations' success. Likewise, the level of functional diversity may be restricted as teams likely did not have the same depth and breadth of functional knowledge that many cross-functional project teams would possess. A related concern is that team members interacted with one another over a relatively short period of time, thereby minimizing the complexity of their interactions. On the one hand, finding statistically significant effects in the limited amount of time highlights the importance of the ability and motivational drivers of information elaboration, and the moderating role of environmental turbulence. On the other hand, it is possible that these internal processes and external forces will be less influential for teams operating in field as opposed to laboratory settings because of the complexity of the environment. At the same time, the SimCity scenario closely resembles many features of tasks performed by cross-functional knowledge teams suggesting that the task had a high level of psychological realism, which is an important consideration in conducting laboratory-based research (Berkowitz & Donnerstein, 1982; Marks, 2000). In addition, the structure of the simulation enabled us to distribute core knowledge across the four team members, and provided a practical method for testing our hypotheses. To more fully understand the nature of these relationships, future research should examine the relationships between team composition, emergent team properties, information elaboration and business context in field settings using a longer timeframe.

The timing of the measures also limits the conclusions that can be drawn from the current study. The time periods in which collective leadership (cycles 1–8) and TMM (after cycle 6) were rated overlap with the time period in which information elaboration processes (cycles 5–8) were rated. While a temporal ordering of relationships is implied, the findings should not be interpreted as causal in nature. Given the duration of the study, we opted to assess team interactions as comprehensively as possible. We trained the raters to base their assessments on the behaviors they observed across the entire time period to provide comprehensive assessments instead of micro snap shots of behaviors. Changes from one episode to the next could be due to evolving interaction patterns or to changes in the demands of the task. In addition, we took care to ensure that different raters assessed collective leadership, information elaboration, and team talking, thereby reducing chances for common method bias to inflate the relationships (e.g., Doty & Glick, 1994). A related limitation regarding measurement is the somewhat low observed internal consistency of the self-reliance beliefs scale which may have attenuated relationships with collective leadership and information elaboration.

In addition, team processes and emergent states unfold in a dynamic manner (Kozlowski & Ilgen, 2006; Mathieu et al., 2008) as teams cycle through action and transition phases (Marks, Mathieu, & Zaccaro, 2001). Given the brief duration of the performance cycles, the simulation task did not provide an ideal platform to model the dynamic nature of these relationships. Future research should examine teams which work together over multiple days or even weeks to more fully understand how TMM, collective leadership and information elaboration co-evolve across time. In addition, the degree of ambiguity in the team's performance context is likely to heighten task complexity in turbulent settings and weaken complexity in stable environments. Therefore, turbulence could affect the importance of information elaboration in isolation, through task complexity, or in conjunction with task complexity. While teams in the current study perceived a similar level of task difficult across conditions, future research should examine how context and task characteristics jointly affect the importance of information elaboration processes more closely. Future research is also needed to understand the ability and motivational bases of information elaboration processes in more complex collectives such as multiteam systems, where goal accomplishment requires informational inputs from members across multiple teams embedded within or across organizational boundaries (DeChurch & Mathieu, 2009).

In conclusion, our study advances information elaboration theory and research in two ways. First, we demonstrate how composition characteristics equip teams with the ability and prosocial motivation to engage in information elaboration processes. Second, we find that context provides insights into when information elaboration benefits team performance and when it does not. Therefore, our findings contribute actionable knowledge regarding how to appropriately staff and develop functionally diverse teams to achieve their performance potential.

Appendix A

Strategic decisions (nodes) represented in the strategic consensus measure
1. Build schools/increase education funding
2. Balance city budget
3. Build roads/increase transportation funding
4. Build parks/plant trees/increase city beautification budget
5. Increase taxes
6. Build power plants/water treatment facilities/increase funding
7. Build police stations/increase public safety funding
8. Zone new areas/rezone existing areas
9. Decrease taxes
10. Reduce air and water pollution
11. Build clinics/increase healthcare funding
12. Revitalize existing buildings/neighborhoods

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