Group & Organization Management

The Importance of Transformational Leadership Behaviors in Team Mental Model Similarity, Team Efficacy, and Intra-Team Conflict

The Importance of Transformational Leadership Behaviors in Team Mental Model Similarity, Team Efficacy, and Intra-Team Conflict

Oluremi B. Ayoko[1] and Eunice L. Chua[1]

Abstract

Using data from 36 combat teams, we examined how transformational leadership is connected with team mental model (TMM) similarity. In addition, we investigated the mediating role of TMM similarity and team efficacy in the link between transformational leadership and intra-team conflict. Data analysis revealed that well-defined transformational leadership behaviors were positively associated with TMM similarity, whereas TMM similarity was positively connected with team efficacy. Results also indicated that higher levels of team efficacy were associated with lower levels of intra-team conflict (task, relationship, and process). In addition, both TMM similarity and team efficacy mediated the link between transformational leadership and intra-team conflict. Implications of findings are discussed.

[1]The University of Queensland, Brisbane, Australia

Corresponding Author:
Oluremi B. Ayoko, Senior Lecturer, UQ Business School, The University of Queensland, St Lucia, Brisbane, Queensland 4072, Australia.
Email: r.ayoko@business.uq.edu.au

Two of the prominent areas of inquiry in teamwork are team leadership (Burke, Stagl, Klein, et al., 2006; Burke, Stagl, Salas, Pierce, & Kendall, 2006; Marks, Sabella, Burke, & Zaccaro, 2002) and team mental models (TMMs; Cannon-Bowers, Salas, & Converse, 1990; Lim & Klein, 2006; Mohammed, Ferzandi, & Hamilton, 2010). Leadership is the process of influencing others to accomplish individual, team, and organizational goals (Fu & Yukl, 2000). In addition, Burke, Stagl, Salas, and colleagues (2006) argue that team leaders have a key role in facilitating followers' understanding of their work environment. Also, Klimoski and Mohammed (1994) describe TMMs as organized mental representations of the key elements within a team's relevant environment that are shared across team members. Researchers in this area (e.g., Mohammed et al., 2010) agree that TMMs are important for team effectiveness, especially when teams are faced with complex, dynamic, and uncertain tasks. In such a complex and dynamic environment, the fundamental assumption underlying research in TMMs is that team members who share models of their work (i.e., are "on the same page"; Mohammed et al., 2010) are more likely to anticipate each other's needs and actions, which, in turn, may enhance team outcomes (Cannon-Bowers, Salas, & Converse, 1993).

Much research in TMMs has been devoted to the understanding of antecedents of mental models in teams. For example, research has shown that training (Marks, Zaccaro, & Mathieu, 2000), collective efficacy (Peterson, Mitchell, Thompson, & Burr, 2000), and team member tenure and experience (Rentsch & Klimoski, 2001) are antecedents to TMMs. Recently, however, there are suggestions that leadership (e.g., leader's mental model) may affect team cognitive states (Zaccaro, Rittman, & Marks, 2001). In addition, we know that team leadership is linked with team outcomes, such as performance (Ayoko & Callan, 2010; Srivastava, Bartol, & Locke, 2006), while Marks and colleagues (2000) show that leader's briefings are associated with TMMs. Nevertheless, there are important questions that remain unanswered when the "interface" (Zaccaro & Klimoski, 2002) between team leadership processes and emergent cognitive states such as TMM similarity (Burke, Stagl, Klein, et al., 2006; Burke, Stagl, Salas, et al., 2006) is considered. One of these questions relates to whether transformational leadership has a role to play in the development of TMM similarity.

There is evidence to suggest that TMM convergence is positively linked with various team processes, such as coordination and communication (Marks et al., 2002), as well as behavioral processes (DeChurch & Mesmer-Magnus, 2010a, 2010b). Also, team processes (e.g., conflict, team efficacy) have been shown to affect performance (Jehn, 1997; Srivastava et al., 2006), while research (Mathieu, Rapp, Maynard, & Mangos, 2010; McIntyre & Foti,

2013) has investigated the link between leadership and team efficacy. Yet, the role of TMM similarity in team efficacy is not immediately known. In the present study, therefore, we extend literature in the area of TMM similarity by focusing on team leadership as an antecedent to the development of TMM similarity, while we argue that TMM similarity may have an important impact on the team process variable of team efficacy.

We further argue that, given team members' shared understanding of the relevant team environments (i.e., TMMs), team efficacy would be impactful on the teams' experience of conflict. Although intra-team conflict can be detrimental to team outcomes if not effectively managed (Ayoko & Callan, 2010), little research has investigated how team cognition may be linked with conflict. Specifically, Mohammed and colleagues (2010) call for further research to expand the TMMs' criterion base by exploring other outcomes, such as conflict. Thus, we answer their call and extend the work on the consequences of TMMs by investigating TMM similarity and team efficacy as possible mitigating factors relative to intra-team conflict. Specifically, we build and test a model that conceptualizes leadership as an antecedent to TMM similarity, while depicting team efficacy and conflict as consequences of TMM similarity.

Taken together, our study makes three important contributions to the literature. First, a considerable research effort in this area has focused primarily on TMM similarity or sharedness (i.e., the degree to which members' mental models are consistent or converge with one another; Cannon-Bowers et al., 1993; Lim & Klein, 2006; Mohammed et al., 2010; Rentsch, Small, & Hanges, 2008) and TMM accuracy (defined as the extent to which TMM is accurate or correct; Gurtner, Tschan, Semmer, & Nägele, 2007; Lim & Klein, 2006). In the present study, we focus on TMM similarity and the factors that may assist in the development of similar TMMs. In particular, we extend TMM similarity and team leadership literature by exploring the direct effects of transformational leadership behaviors on TMM similarity and, in doing so, we enhance knowledge about how TMM similarity can be developed and managed to increase organizational effectiveness.

Second, previous research suggests that team efficacy (described as a team property that reflects members' confidence that they can collectively perform well on a given task; Bandura, 1986) has a positive influence on the content similarity of teamwork and taskwork mental models in student groups (Peterson et al., 2000). Therefore, our investigation of the impact of TMM similarity on team efficacy should deepen the understanding of the precursors to team efficacy and its outcomes.

Third, although we know that TMMs may propel team processes (Mathieu, Heffner, Goodwin, Cannon-Bowers, & Salas, 2005), extant literature is silent

on the connection between team efficacy and team outcomes such as conflict. In particular, conflict (especially destructive conflict) can be agonizing for team members, causing poor creativity (Chen, 2006) as well as poor decisions and process loss (Jehn, 1997). Is there a possibility that team efficacy (in the context of TMM similarity) has a role to play in minimizing intra-team conflict? In this study, we aim not only to advance research in team leadership and team efficacy but also to investigate the role of team efficacy in intra-team conflict. The understanding of how TMM similarity and team efficacy influence intra-team conflict is important because it should assist team leaders and members in minimizing negative conflict to enhance team effectiveness and performance.

Theoretical Background and Hypotheses Development

On one hand, existing research conceptualizes team leadership as the influence provided by a key team member—with whom and through whom everyone communicates—who gives directions, issues commands, makes decisions, and/or assigns roles to other team members (Cole & Critchton, 2006). On the other hand, some scholars (Carson, Tesluk, & Marrone, 2007) conceptualize team leadership as shared leadership (i.e., an emergent team property that results from the distribution of leadership influence across multiple team members; McIntyre & Foti, 2013). In the present research, because authority remains an important requirement for leadership (Künzle, Kolbe, & Grote, 2010), we focus on the single individual who influences his or her team members from a position of formal authority (e.g., a platoon leader) bestowed on him or her by the organization in which the team is embedded. Prior research suggests that such traditional individual leadership behaviors are major drivers to successful processes (Burke, Stagl, Klein, et al., 2006; Marks, Mathieu, & Zaccaro, 2001) and effectiveness (Burke, Stagl, Klein, et al., 2006; Zaccaro & Klimoski, 2002; Zaccaro et al., 2001). We thus argue that an individual team leader has capacity to influence his or her TMMs (see Figure 1).

TMMs

Team members have mental models when they "organize their knowledge of team tasks, equipment, roles, goals and abilities in similar fashion" (Lim & Klein, 2006, p. 404). TMMs are also referred to as mechanisms whereby humans are able to generate descriptions of a system's purpose, form explanations of system functioning, and observed system states as well as
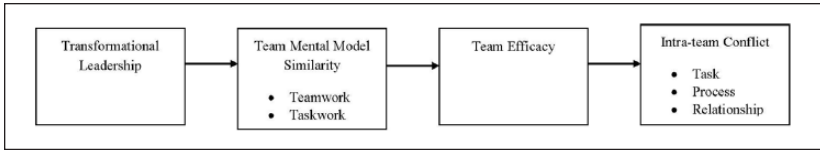
Figure 1. A conceptual model of the relationship between transformational leadership behaviors, team mental model similarity, team efficacy, and intra-team conflict.

predictions of future system states (Rouse & Morris, 1986). Mohammed and colleagues (2010) additionally argue that teams with well-developed mental models have a common understanding of "what is happening, what is likely to happen next, and why it is happening" (p. 879).

TMM Similarity and Accuracy

TMM similarity (or sharedness) involves an understanding established through experience among team members regarding expected collective behavior patterns during team action (Cannon-Bowers et al., 1990). It encompasses the notion of sharing in terms of overlapping knowledge and expectations (Cannon-Bowers et al., 1993). On one hand, TMM similarity suggests that team members may be able to anticipate each other's actions and reduce the amount of processing and communication required during team performance (Zaccaro et al., 2001). On the other hand, TMM accuracy refers to the quality of TMMs and suggests the possibility that TMM sharedness may be accurate (correct) or inaccurate (incorrect; see Mohammed et al., 2010).

While researchers have studied mental models in various ways, such as similarity (Mathieu et al., 2010) and accuracy (Klimoski & Mohammed, 1994), the majority of research in TMMs has stressed the importance of TMM convergence or similarity (DeChurch & Mesmer-Magnus, 2010b; Mathieu et al., 2005). In the current article, like other researchers (e.g., Gurtner et al., 2007; Mathieu et al., 2010), we focus on similarity (rather than accuracy) for two reasons. First, the core concept of TMMs (Mohammed et al., 2010) is predicated on shared organizational knowledge across teams, such that teams with compatible (rather than accurate) mental models should have common expectations for their taskwork and teamwork (Cannon-Bowers et al., 1993). Second, there is evidence that conflict is triggered by parties' belief that their goals or interests are incompatible or in opposition (Jehn, 1997) and, by implication, we argue that a shared TMM may reduce the perception that goals or interest are incompatible. Also, TMM similarity

involves similar understandings among individuals who utilize these understandings to make sense of, attribute meaning to, and interpret internal and external processes, such as affect, behaviors, and thoughts (Rentsch et al., 2008). Thus, we propose that TMM similarity (rather than accuracy) is likely to more significantly influence intra-team conflict.

Taskwork and Teamwork Mental Models

A taskwork mental model encompasses team members' shared understanding of equipment (e.g., technology and instruments) employed to carry out tasks. It also describes the members' shared perceptions and understanding of intra-team processes, strategies, task contingencies, and environmental contexts (Mathieu et al., 2000). In contrast, a teamwork mental model comprises of a team's shared understanding of intra-team interactions (e.g., an understanding of members' responsibilities, team norms, and interaction patterns) and a shared understanding of each other's knowledge, skills, attitudes, strengths, and weaknesses (Mathieu et al., 2000). Although empirical studies have consistently demonstrated that both taskwork and teamwork mental models are positively connected with team performance (Lim & Klein, 2006; Mathieu et al., 2000), relatively few studies have empirically examined the connection between leadership behavioral styles and TMM (teamwork and taskwork) similarity or, importantly, "how leaders create and handle effective teams" (Zaccaro et al., 2001, p. 451). We extend research in this area by examining the link between transformational leadership behaviors and TMM similarity.

Transformational Leadership and Similar TMMs

Transformational leadership (Bass & Avolio, 1994) is linked with several constructs such as team efficacy, trust, commitment (Jung & Sosik, 2002), empowerment, cohesiveness (Jung & Sosik, 2002), and team potency and performance (Schaubroeck, Lam, & Cha, 2007). However, in this study, we are interested in the role of transformational leadership in the development of TMM similarity. Followers perceive transformational leaders as paying attention to ideals and ethics while being confident and powerful (Brown & Treviño, 2009). In this way, transformational leaders enable subordinates to transcend their self-interests, cope with change, and perform beyond expectations (Judge & Piccolo, 2004). Therefore, it is reasonable to expect that team members' constant exposure to leaders' ideals and values may elicit a shared perception of leaders' behaviors (Charbonnier-Voirin, Akremi, & Vandenberghe, 2010), which, in turn, can shape team norms that are important for teamwork and taskwork (Taggar & Ellis, 2007).

Furthermore, by motivating their followers, transformational leaders challenge the existing status quo and solicit followers' ideas and suggestions (Bass & Avolio, 1994). Hence, we argue that transformational leaders provide meaning to their team members, so they might better understand the processes that are important for effective teamwork and taskwork (Maynard & Gilson, 2014; Zaccaro et al., 2001). The team leaders' regular sense giving and sense making should assist team members to converge on similar perceptions about their team and taskwork (Morgeson, 2005).

Marks and colleagues (2000) find that leadership processes and the quality of the leader's own mental processes may trigger subsequent development of his or her team's mental models. We argue therefore that team leaders may convey their own understandings and mental models of the problem situation (Zaccaro et al., 2001) through intellectual stimulation—a core activity of transformational leadership (Bass & Avolio, 1994). In this way, transformational leaders would most likely be able to promote a shared perception of the key elements in the team's environment for team innovation and effectiveness (Dvir, Eden, Avolio, & Shamir, 2002).

By serving as mentors and coaches, transformational leaders provide support and tools for individuals to accomplish their job (Howell & Hall-Merenda, 1999). Such leaders also help team members to understand the perspectives and reasoning of others, which, in turn, enables team members to develop new conclusions (Zhang, Cao, & Tjosvold, 2011). In terms of shaping mental models in teams, we argue that leaders who act as mentors for their followers and respect their followers' uniqueness will endear themselves to their followers. Such behaviors are more likely to promote followers' identification with the leader, which, in turn, should assist leaders to guide individual team members in their perceptions of taskwork and teamwork (Wu, Tsui, & Kinicki, 2010) and thus promote TMM (teamwork and taskwork) similarity. Thus, we hypothesize the following:

> **Hypothesis 1:** Transformational leadership positively affects TMM similarity (taskwork and teamwork).

TMMs and Team Efficacy

Zaccaro et al. (1995) describe team efficacy as team members' confidence that they can collectively and successfully achieve a particular task or mission. Bandura (1997) also argues that high levels of collective efficacy (i.e., individual's assessment of his or her group's collective capacity to perform job-related behaviors; Riggs, Warka, Babasa, Betancourt, & Hooker, 1994) assist teams to face obstacles and to persist in the resolution of a problem. In

addition, Jex and Thomas (2003) find that collective efficacy is positively related to job satisfaction and commitment. Therefore, we argue that high levels of team efficacy is associated with increased team members' tenacity to resolve a problem because the team members similarly perceive their TMMs such that the more similar their TMMs, the higher the levels of their efficacy beliefs. Therefore, we hypothesize the following:

> **Hypothesis 2:** TMM similarity (taskwork and teamwork) is positively associated with team efficacy.

Team Efficacy and Intra-Team Conflict

Intra-group conflict occurs when there is an " . . . experience between parties or among parties that their goals or interests are incompatible or in opposition" (Korsgaard, Jeong, Mahony, & Pitariu, 2008, p. 1224). More specifically, Jehn (1997) categorizes conflict into task, relationship, and process conflict. Task conflicts are concerned with disagreements regarding ideas and opinions about the task, whereas relationship conflicts are associated with conflicts arising from social events, gossip, or political views. Finally, process conflicts result from disagreements regarding the procedural issues surrounding task accomplishment, such as delegation and logistical matters. To date, the full range of triggers of intra-team conflict is not completely understood. In this respect, there are suggestions that the dimensions of perceived incompatible interests may be triggered by representation gaps (i.e., team members' dissimilarity in shared representation on given aspects of work; Cronin & Weingart, 2007) that are likely to provoke conflict. In the present research, we explore the role of TMM similarity and team efficacy as to their capacity to minimize conflict.

In terms of task conflict, individuals who perceive their group members to be highly competent may react to task conflict more positively (Zellars, Hochwarter, Perrewé, Miles, & Kiewitz, 2001). Similarly, team members who do not believe that they can perform their tasks successfully because of poor skills may experience increased task conflict (Ayoko, Callan, & Härtel, 2003). Increased task conflict is experienced because members with poor skills are likely to refuse to do tasks that stretch them, leading to conflict (Ayoko et al., 2003). Likewise, confidence in team members' ability to perform their tasks successfully may minimize conflict, because a team's challenges are more likely to be positively perceived. We thus argue that team members who believe in each others' ability (competence/skills) to successfully complete their tasks would also report minimal task conflict.

Relationship conflict emanates from animosity, anxiety, and antagonistic attributions (Jehn & Mannix, 2001). We argue, therefore, that teams with low confidence in their ability to perform their tasks will experience bickering and negative attributions (Jehn, 1997). These, in turn, will trigger more relationship conflict.

By the same token, we argue that the confidence team members derive from each others' skills and abilities in the context of TMM similarity should make it easier for them to know who should be doing what job, thereby minimizing process conflict. Likewise, the team members' confidence in the abilities of others in the group may determine how tasks and duties are assigned in the team. Thus, team members are unlikely to debate about the task processes when they trust each other to do the job diligently. We propose, therefore, that teams that have similar TMMs and fewer representation gaps (team members' dissimilarity in shared representation on given aspects of work; Cronin & Weingart, 2007) will be better able to communicate efficiently. Increased effective communication should stimulate in the team members a "conflict efficacy," which Alper, Tjosvold, and Law (2000, p. 627) define as a team's belief that it can manage the team's conflict productively. Taken together, we hypothesize the following:

> **Hypothesis 3:** Team efficacy is negatively related to conflict (task, relationship, and process).

Mediating Role of TMM Similarity and Team Efficacy

On the basis of the perceptions of their efficacy, people choose what to do, how much effort to exert, and how long to persevere at different activities (Bandura, 1982). The perception of efficacy therefore suggests that efficacy determines whether people become courageous or discouraged after failure, such that those who have low levels of efficacy will become less motivated after failure, while those with higher levels of efficacy will intensify their efforts after failure (Bandura & Cervone, 1983). In like manner, we argue that team efficacy is a crucial determinant of how team members react to conflict because teams with increased efficacy tend to react to conflict positively based on their confidence (e.g., conflict efficacy; Alper et al., 2000) in their ability to manage it successfully. Similarly, Mitchell (1986) argues that the working relationship among team members improves when their frame of reference (e.g., about task and how to perform their tasks) is shared among members. The shared frame of reference suggests that teams with similar TMMs (through team efficacy) may be able to minimize conflict. Therefore, we argue that TMM similarity and team efficacy act as mediators in the rela-

tionship between transformational leadership and conflict. Thus, we hypothesize the following:

> **Hypothesis 4a:** Taskwork TMM similarity and team efficacy mediate the relationship between transformational leadership and conflict (task, relationship, and process).
>
> **Hypothesis 4b:** Teamwork TMM similarity and team efficacy mediate the relationship between transformational leadership and conflict (task, relationship, and process).

Method

Sample and Procedure

We collected data from 255 servicemen in 36 combat teams from one of the armed forces in the Asia Pacific region. Participants were all males with ages ranging from 18 to 27 years. All participants had a minimum of high school education, and 73% had completed at least a diploma or degree. About 81% of the participants had been with the organization for at least 2 years. Furthermore, all participants had spent more than 3 months in their current team. The average size of the team was seven (one leader and six members).

To test our conceptual model, we designed separate surveys for team leaders and members. Team members rated their team leaders' leadership behaviors, while both leaders and team members reported on the mediating and dependent variables in the study. Completed surveys were mailed to one of the authors via registered airmail with a response rate of 83%. The soldiers were initially randomly assigned to teams, all of which were trained in accordance with their appropriate vocation.

Measures

Transformational leadership behaviors. We employed the Multifactor Leadership Questionnaire (MLQ) designed for teams (Bass & Avolio, 1990) to assess team transformational leadership behaviors. Specifically, we employed the 25 questions on the four dimensions of transformational leadership (idealized attributes/behaviors, inspirational motivation, intellectual stimulation, and individualized consideration; see Bass & Avolio, 1994) from the version of the team MLQ with a 7-point response scale (1 = *not at all*, 7 = *frequently*). Sample items include "Our team leader motivates team members to do more than they thought they could do" and "Our team leader emphasizes the importance of having a collective sense of mission." Team members evaluated

each statement and judged the frequency of their team leader's display of the behaviors described.

TMM similarity. Measuring taskwork and teamwork mental models as team-level cognitive structures remains challenging. To date, there is yet to be a consistent or dominant approach in literature to measure TMMs (DeChurch & Mesmer-Magnus, 2010b ; Mohammed et al., 2010). To assess similar task-work and teamwork mental models, we employed Lim and Klein's (2006) scales specifically because they were previously developed for military teams and had been previously used to collect data from a military setting, as with the current study. Specifically, we assessed team members' taskwork mental models with 14 statements tapping their team procedures, equipment, and tasks. Items include "Team members agree on a strategy to carry out the team task," "Team members understand other members' tasks," and "Tasks in the team are assigned according to individual member's ability." We asked team members to judge the relatedness of all items on the scale to their team characteristics. Similarly, we assessed team members' teamwork mental model similarity with 14 statements describing team interaction processes and team characteristics such as "Team members agree on decisions made in the team," "Team members are aware of other team members' abilities," and "Team members back each other up in carrying out team tasks." Again, like Lim and Klein (2006), we asked participants to judge the relatedness of the items to their team characteristics. All items were rated on a 7-point scale (1 = *unrelated* to 7 = *totally related*).

Team efficacy. To measure team (collective) efficacy, we employed the Riggs et al. (1994) scale. We followed the recommendation of Kozlowski and Ilgen (2006) that items assessing team efficacy should be treated as a "reference shift aggregation model (i.e., individuals respond to items that reference the team" (p. 91). Sample items include "The team I work with has above average ability" and "Some members of my team cannot do their jobs." Responses were rated on a 7-point response scale (1 = *highly inaccurate* to 7 = *totally accurate*).

Conflict. We employed the intra-group scale of Jehn (1995, see also Jehn, Greer, Levine, & Szulanski, 2008) to measure the three dimensions of conflict (task, relationship, and process). Items on the scale include "My team members had task-related disagreements," "My team members disagree over personal matters," and "My team members disagreed about the process to get the work done." Responses were rated on a 7-point response scale (1 = *none* to 7 = *a great deal*).

Results

Before conducting our analyses, we screened the data for outliers, input errors, and missing data. Due to incomplete data, of the 255 surveys, only 203 (from 36 teams) were finally used for data analysis. Teams produced an average response rate of 95%. Test of normality using the Shapiro–Wilk test and histograms revealed that only process conflict needed to be transformed, so we used the square-root method. In addition, we performed reliability checks to examine the internal consistency of all the scales used in this research, all of which produced an alpha score above .70.

Confirmatory Factor Analysis (CFA)

We performed CFA using maximum likelihood estimation to assess the underlying factor structure of each of our measures. For transformational leadership, we combined all its dimensions to form a composite transformational leadership index (Bass, Avolio, Jung, & Berson, 2003) for two reasons. First, the combination of these dimensions is consistent with recent empirical developments on transformational leadership that portray these dimensions as highly correlated and reflective of transformational leadership as a higher order construct (Schaubroeck et al., 2007). Second, combining the dimensions of transformational leadership assists in the reduction of the number of estimated parameters in the study, especially given the modest sample size.

After removing one item of the transformational leadership scale, "Our team leader displays confidence in team members," which was not loading satisfactorily, the remaining 24 items produced a composite measure of transformational leadership (α = .82). The best model fit produced a comparative fit index (CFI) of 0.90, a normed fit index (NFI) of 0.85, and a root mean square error of approximation (RMSEA) of 0.08. Existing guidelines show that a CFI of 0.90 to 0.95 is an acceptable model fit (Hu & Bentler, 1999), a NFI approaching 1.0 is a good model fit (Hevey et al., 2010), while a RMSEA below 0.08 is acceptable (Browne & Cudeck, 1993).

We removed three items that were not loading distinctly for shared task-work mental model ("Team members are proficient with own weapons and roles," "Team members are proficient with other members' weapons and roles," and, finally, "Team members are allowed to bring their personal weapons home"). Similarly, for shared teamwork mental models, we removed three items that did not load distinctly ("Team members interact with one another outside the camp compound," "Team members are similar to each other (e.g., personality, temperament, and abilities)," and "Team members know each other team members' family members"). The resulting 22-item

factor analysis showed all items to have acceptable communalities producing two distinct factors (shared taskwork and teamwork mental models) with a CFI of 0.92, a NFI of 0.94, and a RMSEA reading of 0.09 ($\alpha_{\text{teamworkMM}}$ = .84; $\alpha_{\text{taskworkMM}}$ = .92).

For team efficacy, we removed two items that were not loading clearly ("Some members of my team should be fired due to lack of ability" and "The members of this team have excellent job skills"). Results from the factor analysis of the remaining five items showed one distinct factor with CFI = 0.95, NFI = 0.93, RMSEA = 0.08 (α = .93).

Finally, the CFA conducted on the 14 original conflict items showed a three-factor solution. Three items did not load distinctly and were removed ("My team members disagreed about work matters," "My team members often disagreed about work things," and "To what extent did you and your team disagree about the way to do things in your team?"). The remaining 11-item factor analysis showed that all items have acceptable communalities for task, relationship, and process conflict and with CFI = 0.96, NFI = 0.94, and RMSEA = 0.08 (α_{task} = .88, $\alpha_{\text{relationship}}$ = .91, α_{process} = .93).

Data Aggregation and Analysis

Although there are several methods of measuring and analyzing TMMs, no one approach is dominant in the field (Mohammed et al., 2010). Specifically, Klimoski and Mohammed (1994) suggest that having similar TMMs could mean either having overlapping TMMs, compatible TMMs, or identical TMMs, all of which point to high inter-rater agreement and reliability (see also Klimoski & Mohammed, 1994). To test the TMM similarity, we first collected data with global reference to the team. Second, and consistent with multi-level theory (Klein & Kozlowski, 2000) and the measurement of team constructs (Taggar & Ellis, 2007), we calculated intra-class correlation coefficients (ICCs) that denote the variance explained by the group membership and the estimate of the reliability of the group means. We also calculated inter-rater agreement ($r_{\text{wg}(j)}$) to justify data aggregation for TMM similarity and other constructs in the study (Webber, Chen, Payne, Marsh, & Zaccaro, 2000).

To do this, we conducted a series of one-way ANOVAs. Following significant ANOVAs, we proceeded to calculate ICC(1) and ICC(2). Bliese (2000) suggests that ICC(1) values should be different from 0, with values above .20 indicating strong within-team agreement, while values above .60 are recommended for ICC(2) (Glick, 1985). All the ICC values for the constructs in this study are within the stipulated range except for task conflict, ICC(1) = .16 and ICC(2) = .57, and relationship conflict, ICC(1) = .13 and ICC(2) = .51.

The low ICC scores for conflict are not uncommon (Greer, Jehn, & Mannix, 2008). We also calculated the $r_{wg(j)}$ values using Cohen, Doveh, and Eick's (2001) formula because it appeared more user-friendly than the James, Demaree, and Wolf (1993) formula. The average $r_{wg(j)} = .74$, ranging from .56 to .89. Again, all $r_{wg(j)}$ values were within stipulated cutoff points of .70 (Glick, 1985) except for relationship conflict (.56). Given the above, we conclude that the within-team ratings were homogenous enough to warrant aggregation to the team level (Greer et al., 2008). We conducted analysis with and without relationship conflict because its $r_{wg(j)}$ value did not meet the stipulated cutoff. However, the removal of relationship conflict had no significant impact on the other predicted links in the model, probably because it was an outcome variable. Table 1 presents the inter-correlations among variables hypothesized in the study.

McIntyre and Foti (2013) suggest that there is a direct link between transformational leadership and team efficacy. We conducted a simple non-parametric bootstrapping analysis (Hayes, 2013) to test the mediational model of teamwork and taskwork TMM similarity as mediators of the relationship between transformational leadership and team self-efficacy. Results indicated that, while the total effect of transformational leadership on team self-efficacy was significant, the direct effect between transformational leadership and team efficacy was not significant.

Hypotheses Testing

We employed Hayes' (2013) PROCESS bootstrap macro for SPSS to conduct multiple mediation analysis assessing the connection between transformational leadership and conflict (task, relationship, and process) as mediated by both TMM (teamwork and taskwork) similarity and team efficacy. We conducted the analysis for each of the conflict dimensions. The application of bootstrapped confidence intervals (CIs) avoids problems introduced by asymmetric and other non-normal sampling distributions of an indirect effect (Preacher & Hayes, 2008).

As can be seen in Table 2, team transformational leadership was positively linked with the TMM (teamwork). In the same way, results (see Table 3) indicated that team transformational leadership was positively associated with the TMM (taskwork) similarity, providing support for H1. The exclusion of zero value in the bias-corrected CIs further indicates a significant association ($p < .05$), suggesting that teams that reported higher transformational leadership also reported increased TMM (taskwork and taskwork) similarity.

Our analyses revealed that both similar teamwork mental model and the taskwork mental model have positive associations with team efficacy, for all

Table 1. Descriptive Statistics: Mean, Standard Deviation, and Correlations (*n* = 203).

	M	SD	1	2	3	4	5	6	7
1. Transform leadership	4.17	0.63	—						
2. Teamwork mental model	4.88	0.58	.51*	—					
3. Taskwork mental model	5.14	0.58	.57*	.61**	—				
4. Team efficacy	5.29	0.57	.56**	.57**	.51**	—			
5. Task conflict	3.06	0.67	.29**	−.34**	−.40**	−.60**	—		
6. Relationship conflict	3.00	0.65	−.13	−.06	−.10	−.39**	.55**	—	
7. Process conflict	2.83	0.81	.38**	−.48**	−.46**	−.55**	.57**	.45**	—

*Correlation based on individual measures is significant at the .05 level (two-tailed).
**Correlation is significant at the .01 level (two-tailed).

three conflict dimensions, thus supporting Hypothesis 2 (see Table 2). As the bias-corrected bootstrap CIs exclude 0, these associations are significant at the *p* < .05 level (two-tailed) confirming Hypothesis 2.

As expected, there was a negative association between team efficacy and task conflict, relationship conflict, and process conflict supporting Hypothesis 3 (see Table 3). The omission of 0 in the bias-corrected bootstrap CIs indicated a significant result at the *p* < .05 level (two-tailed), suggesting that teams that reported higher levels of team efficacy also reported low levels of all conflict dimensions.

Team Efficacy and Teamwork (TMM) Similarity as Mediator

Table 2 presents the results of the mediating role of team efficacy and TMM (teamwork) similarity in the relationship between transformational leadership and conflict. Bootstrap results indicated a non-significant total effect of transformational leadership on task conflict. However, a significant positive association between transformational leadership and task conflict was found. Furthermore, when TMM (teamwork) similarity and team efficacy were included in the model, the positive association became negative via indirect effects, indicating that team efficacy and TMM (teamwork) similarity partially mediate the link between transformational leadership and task conflict (see Table 2). The exclusion of zero value in the bias-corrected CIs indicates significant mediation (*p* < .05).

Table 2. Conditional and Indirect Effects of Similar Teamwork Mental Model and TE on TL and Conflict.

Paths	β	SE	t	P	CI	
					LL	UL
IV to M_1 (a_1 path)	.24	0.03	9.47	<.001	0.20	0.29
IV to M_2 (a_2 path)	<.01	0.02	0.27	.786	−0.03	0.04
M_1 on M_2 (d_{21} path)	.30	0.04	8.08	<.001	0.22	0.37
M_2 on DV (b_2 path)						
DV: Task conflict	−.31	0.05	−5.83	<.001	−0.42	−0.21
DV: Relationship conflict	−.30	0.06	−4.70	<.001	−0.42	−0.17
DV: Process conflict	−.33	0.05	−6.92	<.001	−0.43	−0.24
Total effect of IV on DV (c path)						
DV: Task conflict	−.01	0.01	−0.44	.663	−0.03	0.02
DV: Relationship conflict	−.01	0.01	−0.83	.406	−0.04	0.01
DV: Process conflict	−.01	0.01	−0.54	.593	−0.03	0.02
Direct effects IV on DV (c' path)						
DV: Task conflict	.03	0.01	2.01	.046	<0.01	0.05
DV: Relationship conflict	.03	0.01	1.76	.079	<−0.01	0.05
DV: Process conflict	.02	0.01	2.06	.041	<0.01	0.02

Indirect effect of IV on DV (via M_1 and M_2 in serial)	β	Boot SE		CI	
				LL	UL
DV: Task conflict	−.02	0.01		−0.03	−0.01
DV: Relationship conflict	−.02	0.01		−0.03	−0.01
DV: Process conflict	−.02	0.01		−0.04	−0.01

Note. Degree of freedom: $df_1 = 1.00$, $df_2 = 203.00$; number of bootstrap resamples = 5,000; IV: TL; M_1: teamwork mental model; M_2: TE; DV: team conflict (task, process, or relationship). TE = team efficacy; TL = transformational leadership; CI = confidence interval; LL = lower limit; UL = upper limit; IV = independent variable; DV = dependent variable.

The total effects of the model suggest a non-significant association of transformational leadership with relationship conflict. Furthermore, no significant direct effect of transformational leadership upon relationship conflict was found when controlling for TMM (teamwork) similarity and team collective efficacy. However, the bootstrap results revealed support for full mediation via indirect effects. As shown in Table 3, the exclusion of zero value in the bootstrap CI suggested that TMM (teamwork) similarity and team efficacy fully mediated the link between transformational leadership and relationship conflict ($p < .05$).

Table 3. Conditional and Indirect Effects of Similar Taskwork Mental Model and TE on TL and Conflict.

Paths	β	*SE*	*t*	*p*	CI	
					LL	UL
IV to M_1 (a_1 path)	.26	0.02	11.14	<.001	0.21	0.30
IV to M_2 (a_2 path)	<.01	0.02	0.19	.853	−0.03	0.04
M_1 on M_2 (d_{21} path)	.28	0.04	6.70	<.001	0.20	0.36
M_2 on DV (b_2 path)						
DV: Task conflict	−.31	0.05	−5.92	<.001	−0.41	−0.20
DV: Relationship conflict	−.32	0.06	−5.25	<.001	−0.44	−0.20
DV: Process conflict	−.35	0.05	−7.53	<.001	−0.44	−0.26
Total effect IV on DV (c path)						
DV: Task conflict	−.01	0.01	−0.44	.663	−0.03	0.02
DV: Relationship conflict	−.01	0.01	−0.83	.406	−0.04	0.01
DV: Process conflict	−.01	0.01	−0.54	.593	−0.03	0.02
Direct effects IV on DV (c′ path)						
DV: Task conflict	.03	0.01	2.27	.025	<0.01	0.05
DV: Relationship conflict	.02	0.02	1.51	.132	−0.01	0.05
DV: Process conflict	.02	0.01	1.61	.109	<−0.01	0.04

Indirect effect of IV on DV (via M_1 and M_2 in serial)	β	Boot *SE*	CI	
			LL	UL
DV: Task conflict	−.02	0.01	−0.04	−0.01
DV: Relationship conflict	−.02	0.01	−0.04	−0.01
DV: Process conflict	−.03	0.01	−0.04	−0.02

Note. Degree of freedom: df_1 = 1.00, df_2 = 203.00; number of bootstrap resamples = 5,000; IV: TL; M_1: taskwork mental model; M_2: TE; DV: team conflict (task, process, or relationship). TE = team efficacy; TL = transformational leadership; CI = confidence interval; LL = lower limit; UL = upper limit; IV = independent variable; DV = dependent variable.

For process conflict, the total effects for the model revealed a non-significant association between transformational leadership and process conflict. However, the direct effects of transformational leadership on process conflict revealed a positive association. Furthermore, when teamwork TMM similarity and team efficacy were included in the model, the positive association became negative via indirect effects, suggesting partial mediation. Furthermore, the omission of 0 in the bias-corrected bootstrap CIs indicates a significant mediation at the $p < .05$ level (two-tailed). This finding suggests that, while transformational leadership is significant and directly associated

with process conflict, this association is also mediated in the context of TMM (teamwork) similarity and team efficacy resulting in partial mediation. Collectively, these results indicate that team efficacy and teamwork TMM similarity mediate the link between transformational leadership and conflict (task, relationship, and process; see Table 2).

Team Efficacy and Taskwork (TMM) Similarity as Mediator

For the mediating effects of taskwork TMM similarity and team efficacy in the link between transformational leadership and conflict, analyses using bootstrapping revealed no significant total effect of transformational leadership on task conflict. However, when TMM (taskwork) similarity and team efficacy were controlled for, a direct positive association between transformational leadership and task conflict was found. Similarly, when we included TMM (taskwork) similarity and team efficacy in the regression model, indirect effects were implied, suggesting that these factors partially mediate the association between transformational leadership and task conflict, while also changing the valence of the association. The exclusion of the zero value in the bootstrap CI suggested that taskwork TMM similarity and team efficacy significantly and partially mediated the link between transformational leadership and task conflict ($p < .05$). This finding means that, despite a significant and direct transformational leadership and task conflict association, this association is also mediated in the context of taskwork TMM similarity and team efficacy, resulting in partial mediation.

For relationship conflict, the results suggest a non-significant association with transformational leadership, even when the effects of TMM (taskwork) similarity and team efficacy were controlled. Furthermore, bootstrap results showed that, with 95% CI, there was a significant indirect effect of transformational leadership on relationship conflict via taskwork TMM similarity and team efficacy. Consequently, the association between transformational leadership and relationship conflict is fully mediated by TMM (taskwork) similarity and team efficacy: That is, the negative association only exists via these two mediators. Furthermore, the omission of 0 in the bias-bootstrap CIs indicates significant mediation at the $p < .05$ level (two-tailed).

Likewise, the total effect of transformational leadership on process conflict was non-significant and when taskwork TMM similarity and team efficacy were controlled for, no significant direct effect emerged. However, when taskwork TMM similarity and team efficacy were included in the model, a negative association was found via indirect effects. The exclusion of zero value in the bootstrap CI further indicates a significant mediation ($p < .05$). These findings suggest that the link between transformational

leadership and process conflict is fully mediated by taskwork TMM similarity and team efficacy. Altogether, the above results show that both teamwork and taskwork TMM similarity and team efficacy mediated the link between transformational leadership and conflict (task, relationship, and process), supporting Hypotheses 4a and 4b.

Discussion

In the current study, we argued that transformational leadership behaviors influence the development of TMM similarity, while TMM similarity and team efficacy are mediators of the connection between transformational leadership and intra-team conflict. We found that transformational leadership is important for the development of both TMM (teamwork and taskwork) similarity and that these, in turn, are positively linked with team efficacy. Also, teams that reported higher levels of teamwork and taskwork TMM similarity also reported increased team efficacy, whereas teams with higher levels of team efficacy also reported lower levels of conflict (task, relationship, and process).

Leadership and TMM Similarity

Burke, Stagl, Klein, and colleagues (2006) argue that a major responsibility of the team leader is to facilitate for team members an accurate shared understanding of their operating environment (i.e., TMMs) and how, as a team, they need to respond. While we are aware that leaders' briefings are associated with TMM similarity (Marks et al., 2000), the literature is silent on the role of transformational leadership in the development of TMM similarity. Our results extend previous research in significant ways. First, the positive relationship between transformational leadership and TMM similarity is by itself a significant contribution, extending Marks and colleagues' (2000) work to show that, beyond leaders' briefings, transformational leadership is a major input in the development of TMM similarity.

Second, our findings suggest that transformational leadership behaviors are key drivers in fostering TMM similarity. Ayoko and Callan (2010) document that teams with leaders who have high levels of inspiration and communication of vision are directly associated with lower levels of intra-team bullying. Perhaps the leaders' ability to clarify and communicate their team's goals/missions and support team members may be important in assisting team members in making sense of critical factors related to task performance, team interactions, and processes, especially for the development of similar TMMs.

TMM Similarity and Team Efficacy

Our results provide evidence for a direct and positive relationship between teamwork and taskwork TMM similarity and team efficacy, suggesting that team member characteristics (e.g., similar TMMs) are useful for team efficacy. There is evidence that increased TMM similarity is associated with higher levels of collective efficacy (Mathieu et al., 2010). The work of Mathieu and his colleagues (2010) is the only work we know so far that has tested the link between TMMs and team efficacy. Their study demonstrates that the taskwork mental model has a significant but positive relationship with team efficacy. Our result for the relationship between taskwork mental model similarity and team efficacy was attuned with those of Mathieu and colleagues (2010), but our finding on the connection between teamwork mental model similarity and team efficacy was different. While Mathieu and colleagues did not find any significant association between teamwork mental model and team efficacy, the results of the current study showed a positive association between teamwork mental model similarity and team efficacy. Although we were surprised by this difference, we speculate that this finding could well be a result of the different cultural settings of the samples (i.e., South East Asia defense force vs. the U.S. Navy). Clearly, differences in cultural settings in relation to the link between TMM similarity and team efficacy deserve future investigation.

TMM Similarity and Team Efficacy as Mediators

Although research suggests that team efficacy is important for team effectiveness (Mathieu et al., 2010), to our knowledge, our study is one of the first to investigate this path in the context of TMM similarity. Cronin and Weingart (2007) argue that team members have varying perceptions about tasks because of representation gaps, which can potentially increase conflict, especially by inhibiting coordination and information processing. Our results suggest that increased TMM similarity and team efficacy can assist in reducing team members' dissimilarity in shared representation on given aspects of work (the representation gap) that may often trigger conflict. Thus, we shed new light on how teams may minimize conflict.

Scholars (e.g., Ayoko et al., 2003) report that teams with poor skills and varying perceptions about team interactions are prone to conflict. In addition, Alper and colleagues (2000) show that a cooperative rather than a competitive approach leads to conflict efficacy—the team members' perception that they have the ability to manage the conflict arising in their team. Our findings that team efficacy is negatively related to all dimensions of conflict (task,

relationship, and process) may help explain why a cooperative (rather than a competitive) approach to conflict was related to conflict efficacy. In particular, we speculate that teams able to develop conflict efficacy may have had TMM similarity and high levels of team efficacy that might have assisted them to engage in conflict with a cooperative approach. Our results, therefore, extend conflict research and demonstrate that increased team efficacy may be a useful variable in minimizing or managing intra-team conflict.

Finally, and as previously established, we are aware of Mathieu and associates' (2010) work as the only study that has so far tested the mediating effects of collective efficacy on the link between teamwork and taskwork TMM similarity and team effectiveness. Our finding that teamwork and taskwork TMM similarity and team efficacy mediated the link between transformational leadership and conflict has extended the work of Mathieu and associates (2010) by demonstrating that TMM similarity and team efficacy have a capacity to absorb the effects of transformational leadership on intra-team conflict.

Practical Implications

Our study illustrates the importance of transformational leadership in developing TMM similarity—an outcome of great interest for managers, particularly in their search for increased team performance and effectiveness. In this regard, training for team members has been the most investigated team intervention to enhance the development of TMM similarity (Mohammed et al., 2010). However, the current research indicates that, beyond team training, team leaders' transformational behaviors have a critical role to play in the development of TMM similarity. Thus, managers who wish to enhance the prevailing levels of TMM similarity in their teams should take a look at their team leadership behaviors.

Second, managers and team leaders who would like to increase their team's efficacy will need to monitor the degree of their TMM similarity. Specifically, such leaders can monitor the extent of their team's TMM similarity by developing their own mental model around work (Zaccaro et al., 2001) and sharing their mental model with their team through constant communication. Third, by helping team members to understand teams' goals and objectives and especially how each member's work or role fits into the teams' goals and objectives (Zaccaro et al., 2001), team leaders will be able to increase their team members' TMM similarity and eventually their team efficacy. Fourth, our study sheds more light on the impact of team efficacy on conflict. Given our results, it is now clear that conflict can be minimized by increasing levels of team efficacy.

Limitations and Directions for Future Research

Our study is cross-sectional and our sample size could be larger. Thus, our results should be generalized with caution. For example, teams with high levels of efficacy at the beginning of the team's existence may be less likely to engage in process conflict that is useful at the start of the project (Goncalo, Polman, & Maslach, 2010). Future research should explore a longitudinal or multi-method design with a larger team sample size. This approach could yield more precise and intricate details of the team dynamics for TMM similarity, team efficacy, and intra-team conflict.

In addition, given the military setting for data collection, all the participants were young males and may not represent teams in the private sector. Nevertheless, the military environment (as with business organizations) is one that is complex, dynamic, and involves real-time decisions with consequences. Moreover, those who participated in our research are similar in age and gender. Thus, the influence of gender and age on our results is not immediately known. Future research should examine the role of gender and age mix in business organizations.

Finally, and to reiterate, thus far, there is yet to be a consistent or dominant single approach to measure TMM similarity (Mohammed et al., 2010; Webber et al., 2000). Webber and colleagues (2000) further argue that the development and use of multiple measures may be required. In the present study, we aggregated data to the team level of analysis. While aggregated mental models tend to be weighted evenly, even though some members may exert more influence than others (Cooke, Gorman, & Winner, 2007), our findings suggest that data aggregation is a useful way of studying TMM similarity. Future research should test the multi-level effects of TMM similarity as scholars determine the best way of assessing TMMs.

Conclusion

Our study has contributed to the growing research that deepens understanding of the antecedents and consequences of TMM similarity. In addition, we examined the mediating role of TMM similarity and team efficacy in the relationship between transformational leadership and intra-team conflict. On the whole, our findings highlight the significant role of transformational leadership behaviors for the development of TMM similarity. They also provide evidence for TMM similarity as critical for increased team efficacy. Likewise, the current study demonstrates the important effect of team efficacy on teams' experience of conflict. Our results should facilitate increased team leaders' success in their bid to develop TMM similarity and team efficacy, while minimizing intra-team conflict, for team effectiveness.

Authors' Note

Declaration of Conflicting Interests

Funding

References

Alper, S., Tjosvold, D., & Law, K. S. (2000). Conflict management, efficacy, and performance in organizational teams. *Personnel Psychology*, *53*, 625-642.

Ayoko, O. B., & Callan, V. J. (2010). Teams' reactions to conflict and teams' task and social outcomes: The moderating role of transformational and emotional leadership. *European Management Journal*, *28*, 220-235.

Ayoko, O. B., Callan, V. J., & Härtel. C. E. J. (2003). Intragroup conflict, emotional reactions to bullying and counterproductive behaviors. *International Journal of Organizational Analysis*, *11*, 283-301.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, *37*, 122-147.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive view*. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: W.H. Freeman.

Bandura, A., & Cervone, D. (1983). Self-evaluative and self-efficacy mechanisms governing the motivational effects of goal systems. *Journal of Personality and Social Psychology*, *45*, 1017-1028.

Bass, B. M., & Avolio, B. J. (1990). The implications of transactional and transformational leadership for individual, team and organizational development. *Research in Organizational Change and Development*, *4*, 231-272.

Bass, B. M., & Avolio, B. J. (Eds.). (1994). *Improving organizational effectiveness through transformational leadership*. Thousand Oaks, CA: SAGE.

Bass, B. M., Avolio, B. J., Jung, D. I., & Berson, Y. (2003). Predicting unit performance by assessing transformational and transactional leadership. *Journal of Applied Psychology*, *88*, 207-218.

Bliese, P. (2000). Within-group agreement, non-independence, and reliability: Implications for data aggregation and analysis. In K. Klein & S. W. Kozlowski (Eds.), *Multilevel theory, research and methods in organizations* (pp. 349-381). San Francisco, CA: Jossey-Bass.

Brown, M. E., & Treviño, L. K. (2009). Leader-follower values congruence: Are socialized charismatic leaders better able to achieve it? *Journal of Applied Psychology*, *94*, 478-490.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136-162). Newbury Park, CA: SAGE.

Burke, C. S., Stagl, K. C., Klein, C., Goodwin, G. F., Salas, E., & Halpin, S. M. (2006). What type of leadership behaviors are functional in teams? A meta-analysis. *Leadership Quarterly*, *17*, 288-307.

Burke, C. S., Stagl, K. C., Salas, E., Pierce, L., & Kendall, D. (2006). Understanding team adaptation: A conceptual analysis and model. *Journal of Applied Psychology*, *91*, 1189-1207.

Cannon-Bowers, J. A., Salas, E., & Converse, S. (1990,August). *Cognitive psychology and team training: Shared mental models in complex systems*. Paper presented at the annual meeting of the Society of Industrial and Organizational Psychology, Miami, FL.

Cannon-Bowers, J. A., Salas, E., & Converse, S. (1993). Shared mental models in expert team decision making. In N. J. Castellan Jr. (Ed.), *Current issues in individual and group decision making* (pp. 221-246). Hillsdale, NJ: Lawrence Erlbaum.

Carson, J. B., Tesluk, P. E., & Marrone, J. A. (2007). Shared leadership in teams: An investigation of antecedents, conditions and performance. *Academy of Management Journal*, *50*, 1217-1234.

Charbonnier-Voirin, A., Akremi, A. E., & Vandenberghe, C. (2010). A multilevel model of transformational leadership and adaptive performance and the moderating role of climate for innovation. *Group & Organization Management*, *35*, 699-726.

Chen, M. (2006). Understanding the benefits and detriments of conflict on team creativity process. *Creativity and Innovation Management*, *15*, 105-116.

Cohen, A., Doveh, E., & Eick, U. (2001). Statistical properties of the $r_{WG(J)}$ index of agreement. *Psychological Methods*, *6*, 297-310.

Cole, E., & Critchton, N. (2006).The culture of trauma in relation to human factor. *Journal of Clinical Nursing*, *15*, 1257-1266.

Cooke, N. J., Gorman, J., & Winner, J. (2007). Team cognition. In F. T. Durso (Ed.), *Handbook of applied cognition* (pp. 239-268). Hoboken, NJ: John Wiley.

Cronin, M. A., & Weingart, L. R. (2007) Representation gaps, information processing and conflict in functionally diverse teams. *Academy of Management Review*, *32*, 761-773.

DeChurch, L. A., & Mesmer-Magnus, J. R. (2010a). The cognitive underpinnings of effective team work: A meta-analysis. *Journal of Applied Psychology*, *95*, 32-53.

DeChurch, L. A., & Mesmer-Magnus, J. R. (2010b). Measuring shared team mental models: A meta-analysis. *Group Dynamics: Theory, Research, and Practice*, *14*, 1-14.

Dvir, T., Eden, D., Avolio, B. J., & Shamir, B. (2002). Impact of transformational leadership on follower development and performance: A field experiment. *Academy of Management Journal*, *45*, 735-744.

Fu, P. P., & Yukl, G. (2000). Perceived effectiveness of influence tactics in the United States and China. *Leadership Quarterly*, *11*, 251-266.

Glick, W. (1985). Conceptualizing and measuring organizational and psychological climate: Pitfalls in multilevel research. *Academy of Management Review*, *10*, 601-616.

Goncalo, J. A., Polman, E., & Maslach, C. (2010). Can confidence come too soon? Collective efficacy, conflict and group performance over time. *Organizational Behavior and Human Decision Processes*, *113*, 13-24.

Greer, L., Jehn, K., & Mannix, E. (2008). Conflict transformation: A longitudinal investigation of the relationships between different types of intragroup conflict and the moderating role of conflict resolution. *Small Group Research*, *39*, 278-302. doi:10.1177/1046496408317793

Gurtner, A., Tschan, F., Semmer, N. K., & Nägele, C. (2007). Getting groups to develop good strategies: Effects of reflexivity interventions on team process team performance and shared mental models. *Organizational Behavior and Human Decision Processes*, *102*, 127-142. doi:10.1016/j.obhdp.2006.05.002

Hayes, A. F. (2013). *Introduction to mediation, moderation and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press.

Hevey, D., Perti, M., Thomas, K., Maher, L., Craig, A., & Chuinneagain, S. N. (2010). Consideration of future consequences scale: Confirmatory factor analysis. *Personality and Individual Differences*, *48*, 654-657.

Howell, J. M., & Hall-Merenda, K. E. (1999). The ties that bind: The impact of leader-member exchange, transformation and transactional leadership and distance on predicting follower performance. *Journal of Applied Psychology*, *84*, 680-694.

Hu, L.T., & Bentler, P. M. (1999). Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1-55.

James, L. R., Demaree, R. G., & Wolf, G. (1993). rwg: an assessment of within-group agreement. *Journal of Applied Psychology*, *78*, 306-309.

Jehn, K.A. (1995). A multimethod examination of the benefits and detriments of intragroup conflict. *Administrative Science Quarterly*, *40*, 256-82.

Jehn, K. A. (1997). A qualitative analysis of conflict types and dimensions in organizational groups. *Administrative Science Quarterly*, *42*, 530-557.

Jehn, K. A., & Mannix, E. A. (2001). The dynamic nature of conflict: A longitudinal study of intragroup conflict and group performance. *Academy of Management Journal*, *44*, 238-251.

Jehn, K.A., Greer, L., Levine, S. and Szulanski, G. (2008). The effects of conflict types, dimensions, and emergent states on group outcomes. *Group Decision and Negotiation*, *17*, 465-95.

Jex, S. M., & Thomas, J. L. (2003). Relations between stressors and group perceptions: Main and mediating effects. *Work & Stress*, *17*, 158-170.

Judge, T. A., & Piccolo, R. F. (2004). Transformational and transactional leadership: A meta-analytic test of their relative validity. *Journal of Applied Psychology*, *89*, 755-768.

Jung, D. I., & Sosik, J.J. (2002). Transformational leadership in workgroups: The role of empowerment, cohesiveness, and collective efficacy on perceived group performance. *Small Group Research*, *33*, 313-336.

Klein, K. J., & Kozlowski, S. W. J. (2000). *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions*. San Francisco, CA: Jossey-Bass.

Klimoski, R., & Mohammed, S. (1994). Team mental model: Construct or metaphor? *Journal of Management*, *20*, 403-437.

Korsgaard, M. A., Jeong, S. S., Mahony, D. M., & Pitariu, A. H. (2008). A multi-level view of intragroup conflict. *Journal of Management*, *34*, 1222-1252.

Kozlowski, S., & Ilgen, D. (2006) Enhancing the effectiveness of workgroups and teams. *Psychological Science in the Public Interest*, *7*, 77-124.

Künzle, B., Kolbe, M., & Grote, G. (2010). Ensuring patient safety through effective leadership behavior: A literature review. *Safety Science*, *48*, 1-17.

Lim, B., & Klein, K. (2006). Team mental models and team performance: A field study of the effects of team mental model similarity and accuracy. *Journal of Organizational Behavior*, *27*, 403-418.

Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. *Academy of Management Review*, *26*, 356-376.

Marks, M. A., Sabella, M. J., Burke, C. S., & Zaccaro, S. J. (2002). The impact of cross-training on team effectiveness. *Journal of Applied Psychology*, *87*, 3-13.

Marks, M. A., Zaccaro, S. J., & Mathieu, J. E. (2000). Performance implications of leader briefings and team-interaction training for team adaptation to novel environments. *Journal of Applied Psychology*, *85*, 971-986.

Mathieu, J. E., Heffner, T. S., Goodwin, G. F., & Salas, E. (2000). The influence of shared mental models on team process and performance. *Journal of Applied Psychology*, *85*, 273-283. doi:10.1037/0021-9010.85.2.273

Mathieu, J. E., Heffner, T. S., Goodwin, G. F., Cannon-Bowers, J. A., & Salas, E. (2005). Scaling the quality of teammates' mental models: Equifinality and normative comparisons. *Journal of Organizational Behavior*, *26*, 37-56.

Mathieu, J. E., Rapp, T. L., Maynard, M. T., & Mangos, P. M. (2010). Interactive effects of team and task shared mental modes as related to air traffic controllers' collective efficacy and effectiveness. *Human Performance*, *23*, 22-40.

Maynard, M. T., & Gilson, L. L. (2014). The role shared mental model development in understanding virtual team effectiveness. *Group & Organization Management*, *39*, 3-32.

McIntyre, H. H., & Foti, R. J. (2013). The impact of shared leadership on teamwork mental models and performance in self-directed teams. *Group Processes & Intergroup Relations*, *16*, 46-57.

Mitchell, R. (1986). Team building by disclosure of internal frames of reference. *Journal of Applied Behavioral Science*, *22*, 15-28.

Mohammed, S., Ferzandi, L., & Hamilton, K. (2010). Metaphor no more: A 15 year review of the team mental model construct. *Journal of Management*, *36*, 876-910.

Morgeson, F. P. (2005). The external leadership of self-managing teams: Intervening in the context of novel and disruptive events. *Journal of Applied Psychology*, *90*, 497-508.

Peterson, E., Mitchell, T. R., Thompson, L., & Burr, R. (2000). Collective efficacy and aspects of shared mental models as predictors of performance over time. *Group Processes & Intergroup Relations*, *3*, 296-316.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*, 879-891.

Rentsch, J. R., & Klimoski, R. J. (2001). Why do "great minds" think alike? Antecedents of team member schema agreement. *Journal of Organizational Behavior*, *22*, 107-120.

Rentsch, J. R., Small, E. E., & Hanges, P. J. (2008). Cognitions in organizations and teams: What is the meaning of cognitive similarity? In B. Smith (Ed.), *People make the place* (pp. 129-157). Mahwah, NJ: Lawrence Erlbaum.

Riggs, M., Warka, J., Babasa, B., Betancourt, R., & Hooker, S. (1994). Development and validation of Self-Efficacy and Outcome Expectancy Scales for job-related applications. *Educational and Psychological Measurement*, *54*, 793-802.

Rouse, R., & Morris, N. (1986). On looking into the black box: Prospects and limits in the search for mental models. *Psychological Bulletin*, *100*, 349-363.

Schaubroeck, J., Lam, S. S. K., & Cha, S. E. (2007). Embracing transformational leadership: Team values and the impact of leader behavior on team performance. *Journal of Applied Psychology*, *92*, 1020-1030.

Srivastava, A., Bartol, K. M., & Locke, E. A. (2006). Empowering leadership in management teams: Effects on knowledge sharing, efficacy and performance. *Academy of Management Journal*, *49*, 1239-1251.

Taggar, S., & Ellis, R. (2007). The role of leaders in shaping formal team norms. *Leadership Quarterly*, *18*, 105-120.

Webber, S. S., Chen, G., Payne, S. C., Marsh, S. M., & Zaccaro, S. J. (2000). Enhancing team mental model measurement with performance appraisal practices. *Organizational Research Methods*, *3*, 307-322. doi:10.1177/109442810034001

Wu, J. B., Tsui, A. S., & Kinicki, A. J. (2010). Consequences of differentiated leadership in groups. *Academy of Management Journal*, *53*, 90-106.

Zaccaro, S. J., & Klimoski, R. (2002). The interface of leadership and team processes. *Group & Organization Management*, *27*, 4-13.

Zaccaro, S. J., Rittman, A. L., & Marks, M. A. (2001). Team leadership. *Leadership Quarterly*, *12*, 451-483.

Zaccaro, S.J., Blair, V., Peterson, C., & Zazanis, M. (1995). "Collective Efficacy" in James E. Maddux (Ed) *Self-Efficacy, Adaptation, and Adjustment: Theory, Research, and Application* (pp 305-328). NY: Plenum Press.

Zellars, K. L., Hochwarter, W. A., Perrewé, P. L., Miles, A. K., & Kiewitz, C. (2001). Beyond self-efficacy: Interactive effects of role conflict and perceived collective efficacy. *Journal of Managerial Issues*, *13*, 483-499.

Zhang, X., Cao, Q., & Tjosvold, D. (2011). Linking transformational leadership and team performance: A conflict management approach. *Journal of Management Studies*, *48*, 1586-1611.

Author Biographies

Oluremi B. Ayoko (PhD, University of Queensland) is a Senior Lecturer at the University of Queensland Business School. Oluremi (Remi) teaches conflict management, leading and managing people and human resource management. Her research focused on conflict, emotions, team leadership, diversity and the physical work environment including employee territoriality. Among others, Remi has published widely in Applied Psychology: An International Review, Small Group Research and International Journal of Conflict Management. She has recently co-edited a Handbook of Conflict Management Research published by Edward Edgar Publishing. Remi is on the editorial boards of Negotiation and Conflict Management Research and the International Journal of Conflict Management. Email: r.ayoko@business.uq.edu.au.

Eunice L. Chua was a postgraduate student at the University of Queensland Business School. Her research interests include conflict, mental models and leadership.