

Breaking Silos: A Field Experiment on Relational Conflict Management in Cross-Functional Teams

Smaranda Boros¹  · Lore van Gorp² ·
Brecht Cardoen¹ · Robert Boute¹

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Abstract In this paper we investigate how effective conflict management in conflict asymmetry situations impacts the quality of cross-functional management teams' performance. During a 5-day business simulation, we explore the consequences of the relational conflicts and conflict asymmetry experienced by team members. We use two different measures of conflict asymmetry: the traditional group conflict asymmetry measurement of Jehn (Adm Sci Q 40:256–282, 1995) and a social networks method. We find that when some team members evoke more conflict than others, this affects the evolution of team dynamics (and ultimately the performance of the team) even more than high levels of conflict altogether; however, group emotional awareness can mitigate this negative effect and improve the team performance through the appropriate use of conflict management strategies. Since group emotional awareness can be fostered and trained within teams, this is of practical value to improve the performance of cross-functional management teams.

Keywords Relational conflict asymmetry · Conflict management strategies · Cross-functional teams · Group emotional awareness · Integration management · Social networks · Field experiment

Abbreviations

CMS Conflict management styles
GEA Group emotional awareness

✉ Smaranda Boros
smaranda.boros@vlerick.com

¹ Vlerick Business School, Avenue du Boulevard 21, Manhattan Tower, 1210 Brussels, Belgium

² Ghent University, Ghent, Belgium

1 Introduction

Effective management requires a cross-functional effort: it requires integrations between the organizational units such as sales, marketing, supply chain, manufacturing, R&D, HRM, finance, etc. However, rallying the different functional silos within an organization around a specific problem is easier said than done. From the start, structuring an organization in different departments that act as silos and have divergent aims (i.e., keeping customers happy vs. keeping costs under control) builds in tensions in the very design of the organization. These structural tensions are usually played out in the decision making teams at the top of the company (Chen et al. 2005).

Due to the different views on a problem they have from their departments, departmental managers often engage in task-related controversies during these meetings (Boute and Rangarajan 2012; Pagell 2004). On its own, *task conflict* (disagreements about the content of the task due to different viewpoints, opinions and ideas—Jehn 1995) has the potential to increase the quality of decision making in teams (De Dreu and Weingart 2003; De Wit et al. 2012), since it encourages teams to analyze problems more in depth and leads as such to a more complex representation of reality (Curşeu et al. 2012b). However, continued disagreements may trigger animosity among team members (Mooney et al. 2007) and lead to personality clashes in a team. This leads to *relationship conflict*, defined as interpersonal incompatibilities and frictions among the group members resulting in tension, annoyance and animosity (Jehn 1995). Relationship conflicts are very likely to occur in top management teams since discussions in the boardroom seldom start with a clean slate and even task conflicts tend to escalate in time. When relationship conflict erupts, emotional clashes and tensions cloud the task-related effort, leading to biased information processing and rigidity in decision-making (De Wit et al. 2013), since members spend time on interpersonal aspects of the group rather than on technical details of tasks (Parayitam and Dooley 2009).

Even more damaging than the eruption and escalation of relationship conflict are the asymmetrical perception of its existence, known as conflict *asymmetry*. Conflict asymmetry refers to the degree to which group members differ in their perception of how much conflict there is in their group (Jehn et al. 2010, 2012), and affects the teamwork shared mental model and subsequently the coordination processes between the team. What is worse, asymmetrical conflict is even more difficult to handle than high levels of conflict (Jehn et al. 2010; Rispens et al. 2011), because the various team members have a different perception on what is happening. Some might even feel marginalized in the team (Cronin and Weingart 2007) and hence will not engage in appropriate conflict management strategies (CMS). This in turn will spark a negative spiraling down of the dynamics based on misattributions (Cronin and Weingart 2007; Simons and Peterson 2000) of intentions (i.e., not wanting to solve the conflict as opposed to not realizing there is one).

So what could block this spiraling of negative affectivity? So far, group emotional awareness (GEA) has been proven to stop the escalation of task to relationship conflict (Curşeu et al. 2012a; Yang and Mossholder 2004), as well as to abate the negative effects of relationship conflict on team effectiveness (Ayoko et al. 2008; Rapisarda 2002). Perceiving and understanding the affective states of the group and its members (i.e., having GEA as a team) should also prove helpful in dealing with conflict asym-

metry, since it helps team members to recognize the misattributions that occur during relational conflict and prevent further escalation of the negative affect associated with relational conflict and choose more wisely their conflict resolution strategies (Ayoko et al. 2008; Elfenbein et al. 2007; Jordan and Troth 2004).

In this paper we uncover the strategies that management teams can use to reduce the impact of relational conflict asymmetry on team processes, once relational conflict has erupted, and build an explanatory model to understand how group emotional awareness (GEA) permits group members to approach conflict in more constructive ways and use adaptive conflict resolution strategies, which in turn may lead to better team coordination and team performance (Zhang et al. 2011), and ultimately improve the effectiveness of the organization.

There already is a ripe literature on contingency models of conflict, conflict management and team performance (De Dreu and Beersma 2005; Greer et al. 2008; Peterson and Behfar 2003; Zhang et al. 2011). However, up to date most of these studies share three limitations: (1) the ratio of longitudinal to cross-sectional designs is still too small to prove moderating relations, (2) they analyze groups as modular entities (represented by the average of all members' opinions, no matter how different they are or what weight one member or another might have in the group), and (3) there still is an extensive focus on undergraduate student teams working on projects, instead of on managerial decision-making teams or simulations of that environment.

In this study, we set out to answer our research question by means of a design that addresses the above-mentioned shortcomings. We use a field experiment in the form of a 5-day business simulation to replicate the built-in structural tensions in an organization, with MBA and Master in General Management students at a European Business School at the end of their degree program. The objective of the business simulation for the participants is to apply the techniques and concepts learnt throughout the program in the different functional fields and to transform them into a fully integrated and coherent business policy, as many functional decisions impact on each other. We collected our data according to a cross-lagged design (throughout the 5 days of the business simulation) to see the evolution of conflict in time, from the moment the management teams are formed (time 1) until the assessment of the organization's final performance (time 5). We use a social networks perspective to look at the conflicts that were experienced between the various group members, including asymmetry in their perceptions. The impact of the team's decisions and actions on the performance of the company is assessed through an algorithm built into the simulation itself and the academic course holder.

We contribute to the theoretical advancement of group conflict and cross-functional management teams in two ways. First, this research provides a test of an integrated model of conflict which tackles the cognitive (conflict asymmetry), affective (group emotional awareness) and behavioral (conflict management strategies and coordination processes) dimensions of the process. The development of this model answers the call made by De Wit et al. (2012) in the most recent meta-analysis of conflict in teams to advance understanding into what happens within a team when internal conflicts occur, how these dynamics evolve within the team over time, and how exactly they may eventually affect group outcomes (positively or negatively). Therefore, we look not only at relational conflict levels and asymmetry and their impact on team

coordination, but we also analyze what teams do to effectively manage conflict, i.e., which conflict resolution strategies they choose depending on the existing conflict asymmetry in the team.

A second contribution is our configural approach of conflict, as urged by Jehn, Rispens and Thatcher's recent advances into conflict research (Jehn et al. 2010, 2012). We look at conflict asymmetry and hence the configural properties of group conflict because functional diversity triggers not just higher levels of conflict, but also different perceptions and experiences of the team conflict by different team members. We advance the study of conflict asymmetry in teams by proposing a new, network-based measure of conflict asymmetry in teams which focuses on 'personal and direct experiences' of conflict in the team instead of a general assessment of the level of conflict there is in a group. The argument for introducing this measure is that it allows to highlight not only differences in perception, but also breaks the general evaluation of conflict into specific conflicts with various team members. Our study proceeds to test in parallel the predictive value for subsequent team dynamics of this measure and the existing measure of Jehn et al. (2010), and draw new insights on the advantages and disadvantages each measure brings for the study of conflict asymmetry in teams.

2 Dealing with Relational Conflict

2.1 Different Conflict Management Strategies (CMS)

Conflict is a reality in virtually any team (Jehn 1995, 1997), but its impact on the team very much depends upon how it is managed (Chen et al. 2005; Zhang et al. 2011). The manner in which conflict is managed determines the quality of the group decision, the reciprocal understanding between team members and ease of coordination to reach the goal and, subsequently, the impact on the effectiveness of the organization (Behfar et al. 2008). Drawing upon Deutsch's (1973) theory of cooperation and competition, two orthogonal dimensions circumscribe the focus of any interaction aimed at managing conflict: 'concern for self' and 'concern for others'. Along these dimensions, four main conflict management strategies (CMS) emerge: collaborating (/integrating or cooperating)—high concern for self and for others; contending (/dominating)—high concern for self, low for others; avoiding—low concern for self, low for others, and accommodating—low concern for self and low for others. In previous empirical research on the use of conflict management strategies *at team level*, three out of these four strategies have been consistently validated throughout studies: the collaborating, contending and avoiding conflict management strategies (Chen et al. 2008; Rahim 2002).

The *collaborating* strategy is characterized by openness and a concern both for one's goals as well as the others', resulting in an integration of interests of all team members (Rahim 2002; Weingart et al. 2008). When using this strategy, people tend to exchange information and look for alternatives. They are willing to examine the existing differences and to find effective solutions that are acceptable to both parties. Previous research within top management decision-making teams demonstrated that this cooperative approach develops productive conflict handling that results in better

team performance in general (Jordan and Troth 2002, 2004; Zárraga and Bonache 2005) and especially top management team effectiveness (Chen et al. 2005). Furthermore, a collaborating CMS approach allows team members to voice their perspective and be heard, which could diffuse the emotionality of the situation. By tackling the true needs of team members, it provides a more satisfying solution and reduces the likelihood that the dispute will recur (Ury et al. 1989; Weingart et al. 2008).

People who are using the *contending* strategy are oriented to achieving their own goals or objectives and as a result ignore the expectations or the needs of the other party. The emphasis is on competing interests and a win-lose paradigm: if I win something, you must lose something (Chen et al. 2008). Therefore, this strategy is characterized by tough, close-minded discussions and attempts to forcing behavior to win one's position. These interactions then often result in deadlocks, decreased trust in each other and the team's potential to solve conflicts and heightened negative emotions which keep escalating (Chen et al. 2008; De Dreu and van Vianen 2001), leading also to conflict escalation (Weingart et al. 2008).

The *avoiding* strategy has been associated with withdrawal or sidestepping situations. People who are using this strategy work under the assumption that issues should not be openly discussed and dealt with, and consequently fail to satisfy their own concern as well as the concerns of the other party (Boroş et al. 2010; Rahim 2002). Other authors link the avoiding CMS with experiencing conflict as a threat (as opposed to as a challenge), which makes them 'freeze' and be less likely to express or consider the opinions of others (De Wit et al. 2011; Rempel and Fisher 1997). In teams and organizations, avoiding CMS is generally deemed as counter-productive, since it increases negative emotions in the team (Desivilya and Yagil 2005), reduces participation and consequently also group innovativeness (Anderson and West 1998) and it makes groups more conformist altogether, giving way to groupthink phenomena in decision-making teams (Chen et al. 2005). At the same time, some studies are in favor of the avoidance strategy because on the short term, avoiding conflict doesn't waste the group's limited resources in managing conflict and focusing on disagreements, but instead use these resources to solve the problem at hand (De Dreu and van Vianen 2001). However, this momentary advantage is lost in teams that need to work together longer on complex tasks, because unsolved conflicts only deteriorate the group atmosphere and involve the teams in a downward negative affective spiral.

In general, contending and avoiding approaches have been proven to undermine productive conflict, top management team effectiveness, and organizational innovation (Chen et al. 2005). Other studies (Jordan and Troth 2004; Kuhn and Poole 2000) argue that conflict resolved through contention or avoidance has negative consequences for ongoing working relationships, makes coordination more difficult, and consequently affects work performance.

To summarize, conflict management strategies impact team effectiveness through coordination processes in the following ways: *A collaborating conflict management strategy has a positive impact on team effectiveness due to improved coordination within the team, while a contending or avoiding conflict management strategy has a negative impact on team effectiveness due to impaired coordination within the team.*

2.2 Conflict Asymmetry

Recent studies on conflict (Jehn et al. 2010, 2012) note that the asymmetrical perception of relational conflict proves more detrimental than the level of conflict itself. Conflict asymmetry is defined as the degree to which group members differ in their perception of how much conflict there is in their group (Jehn et al. 2010, 2012). Conflict asymmetry proved detrimental for team performance and creativity above and beyond the base level of conflict in the group. Equivalently, teams perceiving high but symmetric conflict performed better than teams with asymmetric ones (Jehn et al. 2010) because asymmetrical conflict increases negative moods in the group and impairs the social processes needed to perform well (primarily communication and coordination processes). As Jehn and her collaborators note: “in groups with asymmetric perceptions it is hard to resolve a conflict when the group members cannot even agree if one exists or not” (Jehn et al. 2012: p. 142). As such, conflict asymmetry causes more uncertainty and distress (Jehn et al. 2010) and induces overwhelming communication problems which inhibit the formation of a common understanding of the situation. When groups share such common understanding of a situation, group interactions are more predictable (Hinsz et al. 1997) and team members are better able to effectively cooperate toward a group goal because of enhanced social integration (Dineen et al. 2007; Ford and Sullivan 2004). In sum, conflict asymmetry impairs primarily the formation of a common understanding of the situation and through that, weakens integration and coordination in the team. This will ultimately impact performance, since team coordination is a capital predictor of team performance (Zhang et al. 2011). In other words, extant evidence suggests that *relational conflict asymmetry negatively impacts team performance through impaired coordination in the team*.

Asymmetrical perceptions of conflict inhibit members’ involvement in group processes (Jehn et al. 2010), because those who perceive higher levels of conflict will have a difficult time seeing others as cooperative and responding effectively to them. Therefore, *in groups with asymmetrical perceptions of conflict, collaborating conflict management strategies are most difficult to achieve, and more often than not, members end up avoiding discussing their conflict altogether*. If high conflict perceivers try to tackle a conflictual situation that isn’t even perceived as such by others (hence receive an inadequate response from their peers), chances are they will make negative attributions about motivation of their counterparts, which can then lead to an escalation of the negative affectivity felt towards the group. Through this negative spiral, conflict is perpetuated and enhanced (Jehn et al. 2012; Simons and Peterson 2000). *Groups with high conflict asymmetry, unlike groups with just high levels of conflict, are less likely to use contending strategies*—again, because confrontation is difficult when not everyone sees the problem and has an interest in tackling it (even in a contending strategy). Therefore, we predict that:

Hypothesis 1 Groups with high conflict asymmetry will most likely not use a (a) collaborating or (b) contending CMS, but instead use predominantly an (c) avoiding CMS.

2.3 Group Emotional Awareness (GEA)

So what could mitigate the negative impact of relational conflict asymmetry on the choice of conflict management strategies, and subsequently on coordination and team performance in top management teams? Since the primary mechanism of conflict asymmetry affecting subsequent group dynamics consists of negative misattributions team members make of each other's intentions (Simons and Peterson 2000; Cronin and Weingart 2007), it isn't unreasonable to assume that teams that pay more attention to their members' emotional dynamics will be more prone to stop these dynamics in time. The mitigating effect of group emotional awareness has been supported in the relation between task and relationship conflict (Curşeu et al. 2012a; Yang and Mossholder 2004), as well as in tempering the negative consequences for team performance of relationship conflict (Ayoko et al. 2008; Elfenbein et al. 2007; Rapisarda 2002).

Emotional awareness refers to the ability to detect, decipher and identify emotions in oneself and the others, as well as understand their cause, how they evolve and the relationships between them (Salovey and Mayer 1990). This attribute characterizes both individuals as well as teams as a whole. Group emotional awareness is thus a group's ability to detect, recognize and understand the moods, affective climate and group emotions that occur during the group's activity (Boroş and Curşeu 2011). GEA is a collective state because it goes beyond the sum of its members own emotional awareness, and because its object is the systemic affective dynamics of the group as a whole, rather than the emotional states of its individual members. So far, GEA has been defined both in term of group norms (i.e., the ability of a team to generate a shared set of norms that shape how members perceive and understand their own emotions and to those exhibited by other members and individuals outside of the team—Druskat and Druskat 2006; Druskat and Wolff 2001) or as a function (i.e., average, minimum or maximum) of team member's individual emotional intelligence (see Elfenbein 2006, for a review). Based on previous experimental evidence (Boroş and Curşeu 2011, 2013), we define group emotional awareness as *an emergent state* that develops in time and depends both on the group members' individual emotional abilities and the interactions that take place within the group and the norms they shape.

Group emotional awareness permits team members to recognize in time the downward emotional spirals triggered by controversies and disagreements, and act to prevent their potential damage (Yang and Mossholder 2004). Therefore, teams that develop group emotional awareness generally report less conflict, increased cohesion and performance (Rapisarda 2002). Group emotional awareness on its own is in fact a good predictor of team performance. In a field study of public service interns working full-time in randomly assigned teams, the teams' emotion recognition ability (the first component of GEA) measured at the time of team formation accounted for 28.1 % of the variance in team performance ratings nearly a year later (Elfenbein et al. 2007). Furthermore, when conflict occurs, these teams are more successful in comprehending the emotions arising from it (Ayoko et al. 2008), and hence not giving way to the misattributions that lead to the escalation of conflict (Simons and Peterson 2000). In other words, group emotional awareness is bound to be beneficial for team performance because it can help prevent negative emotionality and process losses in teams (Boroş and Curşeu 2013; Curşeu et al. 2012a).

Group emotional awareness also permits group members to approach conflict in more constructive ways and use adaptive conflict resolution strategies. Previous research (Bell and Song 2005) already showed that group emotions impact the selection of conflict resolution strategies, by mediating the role of cognitive appraisal on conflict. Individuals scoring high on emotional intelligence also prefer integrative and compromising conflict management strategies (Shih and Susanto 2010). Drawing from this empirical evidence, we hypothesize that:

Hypothesis 2 (a): Teams with higher levels of group emotional awareness will be more likely to adopt collaborating conflict management strategy compared with teams with lower levels of group emotional awareness.

On the other hand, teams that are unable to recognize, understand or control the affective dynamics of the group would engage primarily in a fight or flight reaction to relational conflict and its negative emotionality (Jordan and Troth 2004). Therefore, these teams would develop especially contending or avoiding conflict management strategies. We argue that:

Hypothesis 2 (b): Teams with lower levels of emotional awareness will be more likely to adopt a contending or (c) avoiding conflict management strategy compared with teams with higher levels of group emotional awareness.

Group emotional awareness will have not only a direct impact on conflict management strategies, but also a moderating role in the relation between conflict asymmetry and CMS. Based on the mechanisms described above, we consider the interaction effect to be primarily felt on the collaborating and avoiding strategy. More specifically, we propose that:

Hypothesis 3 (a): Group emotional awareness will moderate the impact of conflict asymmetry on collaborating CMS in such a way that teams with high GEA will cancel out the negative impact of conflict asymmetry on the use of a collaborating CMS, independent of the level of conflict in the group.

Hypothesis 3 (c): High conflict asymmetry should be conducive to the use of avoiding strategies in teams with low group emotional awareness compared to teams with high group emotional awareness, independent of the level of conflict in the group.

We consider that existing evidence (Behfar et al. 2008; Boroş et al. 2010; Jordan and Troth 2004) suggests that the contending conflict management strategy is primarily influenced by the level (rather than asymmetry) of relational conflict in the team and directly by group emotional awareness. Therefore, we expect *group emotional awareness to have only a direct effect and not a moderating role in the relation between conflict asymmetry and contending conflict management strategy (Hypothesis 3b)*.

Figure 1 depicts in an integrative model the hypotheses and mechanisms we drew from theoretical reviews and previous empirical evidence.

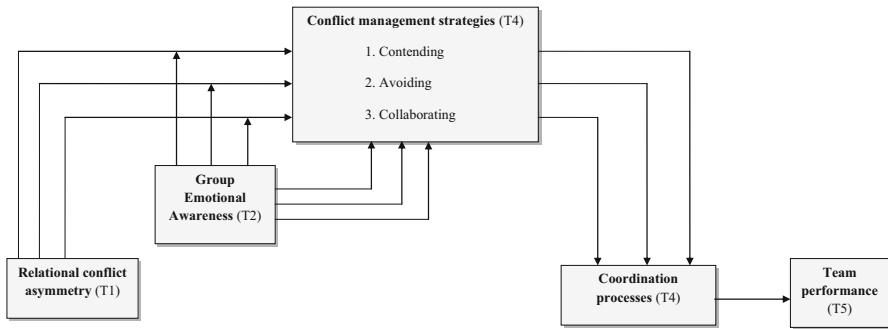


Fig. 1 A moderated mediation model of relational conflict asymmetry, group emotional awareness, conflict management strategies, coordination processes and team performance, controlling for the initial level of relational conflict [measured at different points in time between Time 1 (T1) and Time 5 (T5)]

3 A Network Measure of Relational Conflict

As described in the previous section, assessing levels of conflict is insufficient, due to the possibility of divergent perceptions of team members regarding the same reality—the actual levels of conflict experienced by the team. Therefore, Jehn et al. (2010, 2012, 2015) stated the need to assess conflict asymmetry, defined as the degree to which group members differ in their perception of how much conflict there is in their group. They define conflict asymmetry as a configural group property and measure it as dispersion, or variation, of members' perceptions regarding the overall conflict in the group (Jehn et al. 2010).

However, we contend there are different views to operationalize conflict asymmetry: team members can assess the perceived overall conflict levels in the group or the dyadic conflicts between each two members; they can be limited to assess only directly experienced conflict within the team or perceived conflict between other team members.

The overall assessment of conflict “measures conflict as an aggregated and abstract construct without capturing actual identifiable conflict between specific team members” (Neuman 2012: p. 2). In doing so, this measure (which we shall henceforth call the traditional measure of conflict asymmetry, since it is the one proposed by Jehn and collaborators and has been thus far the only one used in conflict asymmetry studies) assesses each group member's perception of the overall group-level conflict. This general assessment has its pluses and minuses. On the one hand, with this evaluation a group member can give her opinion on the perceived levels of conflict in the team as a whole, irrespective of and beyond her personal conflicts. On the other hand, because of including assessments of perceived conflict between other team members, this measure incurs an extra degree of subjectivity, namely that of the projected conflict between other team members, which might have a lesser impact on the conflict-related behaviour of the evaluator herself.

An different way to measure asymmetry could assess all the dyadic conflicts in a team and provide a composite score based on these evaluations. Such an assessment would include not only the direct conflict experienced by member i with each of the

remaining group members j_1, j_2, j_3, \dots , but also i 's assessment of the experienced conflict between each pair of the j 's in the group. However, such a measure poses two problems: on the one hand, an assessment of other people's conflicts (dyadic or general) would imply the same subjectivity that the traditional method incurs, with the added disadvantage of the length of time and mental effort the assessment of all dyads' conflict brings along.

Therefore, we introduce an alternative, more straightforward network measure of conflict asymmetry, which focuses on 'personal and direct experiences' of conflict in the team instead of a general assessment of the level of conflict there is in a group. The argument for introducing this measure is that it allows to highlight not only differences in perception, but also breaks the general evaluation of conflict into specific conflicts with team members (the directly experienced conflict of i with j_1, j_2, j_3, \dots). This measure does not directly indicate however i 's perception of the experienced conflict between the j 's in the team. We base this choice on the fact that Jehn et al. (2010) originally also discussed conflict asymmetry in the light of the differences existing between the perceptions of 'all parties involved in a conflict' (Jehn et al. 2010: 597). Furthermore, in line with Neuman (2012), we believe that a team member's assessment of general conflict levels in a team will stem from and depend on his assessment of having experienced conflict with other team members individually, as well as the extent or intensity of the experienced conflict.

Therefore, in our study, we test both measures (Jehn's overall assessment of conflict and a directly experienced conflict network measure) and assess their predictive capabilities for subsequent group dynamics and group outcomes.

For the first measure we look at group conflict asymmetry as the dispersion, or variation of members' conflict perceptions (Jehn et al. 2010). We use Jehn's (1995) intragroup relational conflict scale and calculate group conflict asymmetry as the standard deviation among team members' conflict score x_i , i.e. $\sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}}$ with n the number of team members. For this measure, group asymmetry is minimized to 0 when all team members report exactly the same level of conflict in the group ($x_i = \bar{x}$). Maximum group asymmetry is reached when half of the team members report that there is no conflict at all ($x_i = 1$) while the others indicate very extensive conflict ($x_i = 5$).

Second, we assess conflict asymmetry through a network measure of direct conflict. For this, we asked each group member to rate the level of conflict they experience with each of the other group members. Unlike the group conflict asymmetry measure (Jehn et al. 2010), a network measure does not ask about general perception of conflict experienced in the team, but asks for specific information of conflict with each team member. Since the perception of conflict is not necessarily reciprocal, i.e. you can perceive a moderate level of conflict with someone and at the same time that person can experience only very little conflict with you, the network measure offers two scores for each individual: *outdegree* centrality and *indegree* centrality. Subsequently, because there are two types of conflict scores, we can calculate two types of conflict asymmetry with the network measure (i.e., outdegree and indegree conflict asymmetry).

A team member's normalized *outdegree centrality* (δ_i) is the mean of the conflict scores he/she perceives with the other team members. Let n represent the number of

team members and x_{ij} denote the conflict score member i assigns to member j , then $\delta_i = \frac{\sum_{j:j \neq i}^n x_{ij}}{n-1}$. As not all teams are of the exact same size, we normalize by dividing the centrality score by $n - 1$ (cf. Prell 2012). Since respondents were asked to rate the level of conflict they experienced with each other team member on a 5-point scale (min 1 and max 5), the minimum normalized outdegree centrality score of a team member is 1 and the maximum 5.

The definition of outdegree centrality enables a straightforward move towards outdegree conflict asymmetry. In line with Jehn's view (1995), we also use a standard deviation calculation to measure outdegree conflict asymmetry, i.e. the extent to which group members differ in their perceptions of how much conflict there is in the group: $\sqrt{\frac{\sum_{i=1}^n (\delta_i - \bar{\delta})^2}{n-1}}$. High outdegree conflict asymmetry occurs when some of the team members perceive no or only very little conflict with their fellow team members (i.e., have a low normalized outdegree centrality score), and others perceive high levels of conflict with their fellow team members (i.e., have a high normalized outdegree centrality score). In contrast, a low outdegree conflict asymmetry occurs when there are almost no differences between the team members' normalized outdegree centrality scores.

A team members' normalized indegree centrality (γ_i) is the mean of the conflict scores he/she receives from the other team members: $\gamma_i = \frac{\sum_{j:j \neq i}^n x_{ji}}{n-1}$. A member's normalized indegree centrality score is also bounded between 1 and 5. Clearly, the sum of all member's normalized outdegree centrality scores equals the sum of all normalized indegree centrality scores ($\sum_{i=1}^n \delta_i = \sum_{i=1}^n \gamma_i$).

Indegree conflict asymmetry refers to dispersion in level of conflict that the team as a whole (measured as the sum of all individual team members' perceptions) experiences with each team member individually: $\sqrt{\frac{\sum_{i=1}^n (\gamma_i - \bar{\gamma})^2}{n-1}}$. High indegree conflict asymmetry occurs when some of the team members have a low normalized indegree centrality score, i.e. their fellow team members don't experience any or only very little conflict with them, and others have a high normalized indegree centrality score, i.e. their fellow team members experience a lot of conflict with them. A low indegree conflict asymmetry occurs when there are almost no differences between the team members' normalized indegree centrality scores. As such, indegree conflict asymmetry allows observing a second dimension of group conflict heterogeneity: it is possible that some team members are experienced as more conflict evoking than others.

To summarize, the network measure provides two indicators of conflict asymmetry: one that focuses on the dispersion of perceptions of conflict levels between team members (i.e., outdegree asymmetry) and one that focuses on the dispersion of conflict levels experienced towards each member of the group (i.e., indegree asymmetry). The outdegree asymmetry reflects thus conflict asymmetry in a similar vein to Jehn's (2010, 2012, 2015) conceptualization (i.e., degree to which group members differ in their perception of how much conflict there is in their group). In terms of measurement, the outdegree asymmetry differs from Jehn's method of measuring conflict asymmetry in the level of analysis the respondents must focus on when assessing conflict: Jehn focuses the respondents on a group-level assessment (the targeted unit is the group as

an entity), while the outdegree indicator is based on individual-level assessments of conflict (the target unit is each member of the group).

The second indicator based on the network measure, namely indegree asymmetry, refers however to a different type of conflict asymmetry, i.e., different levels of conflict experienced towards each member of the team. In line with other studies that used dyadic-based network analysis to predict group dynamics (Curşeu et al. 2010), we contend that the indegree measure, while more restricted in its assessment, will have better predictive validity than the outdegree or Jehn's measure, because it avoids the consistency or mean tendency bias of the latter (i.e., when filling in a scale, we tend to be consistent in our answers, and answer with a mean tendency bias—slightly lowering the estimates for high levels of conflict and increasing the lower ones).

In this research we set out to test the predictive power of each of these three conflict asymmetry indicators (the broader-encompassing, more general indicator of group conflict asymmetry (Jehn's measure) and the more narrow and punctual, network-based outdegree and indegree asymmetry) in explaining the evolution and resolution of conflict in cross-functional decision-making teams. For ease of following the arguments put forward in this paper, Box 1 presents in a compact form the definitions of the main concepts used throughout the paper:

4 The IMEx Business Simulation

4.1 Overview of the IMEx Business Simulation

We gathered data by means of a field experiment during an Integrated Management Exercise, IMEx. IMEx is a cross-functional, integrated, highly monitored and realistic business simulation developed by a European Business School and installed at the end of different MBA and executive programs to assess participants' capabilities on the level of management integration. The participants are grouped into management teams of five to seven students covering different managerial roles (CEO, CFO, COO, etc.). Each team leads a manufacturing company in a highly competitive (oligopoly) toy industry.

The *cross-functional* nature of IMEx originates from the many decisions to be taken in different management domains, such as strategy, purchasing, production, logistics, marketing, sales, HRM, management control, finance, innovation and R&D. IMEx incorporates relations and dependencies between these decisions and therefore provides the incentive to management teams to overcome the silo mentality. We refer to "Appendix" for a high-level overview of the decisions built into the IMEx business simulation.

IMEx is an *integrated* business simulation for mainly two reasons. First, the focus is not limited to cognitive skills and computerized web-based inputs, but extended to personal skills and human interactions. These interactions do not only take place within the team when taking decisions or setting up an effective decision making structure, but also between the team and its major stakeholders or potential partners such as the board of directors, raw material suppliers, labor union representatives or financial institution which they meet in real-time. Second, IMEx integrates companies within a

Box 1 Summary of the main concepts used in the paper

Intragroup conflict the process emerging from perceived incompatibilities or differences among group members (De Dreu and Weingart 2003)

Task conflicts disagreements among group members about the content and outcomes of the task being performed, due to different viewpoints, opinions and ideas (Jehn 1995)

Relationship conflicts disagreements among group members about interpersonal issues, such as personality differences or differences in norms and values; these interpersonal incompatibilities and frictions among the group members result in tension, annoyance and animosity (Jehn 1995)

Conflict asymmetry the degree to which group members differ in their perception of how much conflict there is in their group (Jehn et al. 2010)

Conflict management strategy set of actions and interactions aimed at managing conflict, reducing its negative consequences and enhancing the possible positive outcomes (Rahim 2002)

Collaborating conflict management strategy characterized by openness and a concern both for one's goals as well as the others', resulting in an integration of interests of all team members (Rahim 2002)

Contending conflict management strategy focus on achieving one's own goals or objectives and as a result ignore the expectations or the needs of the other party. The emphasis is on competing interests and a win-lose paradigm (Rahim 2002)

Avoiding conflict management strategy associated with withdrawal or sidestepping situations. People who are using this strategy work under the assumption that issues should not be openly discussed and dealt with (Rahim 2002)

Emotional awareness the ability to detect, decipher and identify emotions in oneself and the others, as well as understand their cause, how they evolve and the relationships between them (Salovey and Mayer 1990)

Group emotional awareness: a group's ability to detect, recognize and understand the moods, affective climate and group emotions that occur during the group's activity (Boroş and Curşeu 2011). Its object is the systemic affective dynamics of the group as a whole, rather than the emotional states of its individual members

Group affective states a consistent and homogeneous affective reaction within a group, distinct from individual emotions and moods (George 1990); an affective state formed at group level through the interactions of team members; such interaction can paradoxically serve to both intensify and regulate individual emotional responses (Barsade and Gibson 2012)

Outdegree centrality score for conflict the mean of the conflict scores a team member perceives with the other team members (Prell 2012)

Outdegree conflict asymmetry some of the team members perceive no or only very little conflict with their fellow team members (i.e., have a low outdegree centrality score), and others perceive high levels of conflict with their fellow team members (i.e., have a high outdegree centrality score)

Indegree centrality score for conflict the mean of the conflict scores a team member receives from the other team members (Prell 2012)

Indegree conflict asymmetry some of the team members have a low normalized indegree centrality score (i.e. their fellow team members don't experience any or only very little conflict with them) and others have a high normalized indegree centrality score (i.e. their fellow team members experience a lot of conflict with them)

single industry in which a minimum of four and a maximum of eight teams are set up to compete against each other. This implies that the performance of a company does not only depend on its own actions, but also on the actions and behavior of the direct competitors as all of them act in a joint market place. Having peers as competitors and tracking their peers' behavior increases the pressure to perform and creates a highly

competitive atmosphere. Especially this second layer of integration adds a level of complexity that is difficult to capture using a traditional project-based approach (see, e.g. Tekleab et al. 2009) or business applications in which companies have little context or sector-specific features in common (see, e.g. Hoogendoorn et al. 2013) and thus increases the external validity of our study.

Management teams are asked by the board of directors to lead their company for twelve consecutive quarters, which in real time boils down to twelve periods of about 3 h (spread over 5 days). Contrary to student projects, IMEx takes place under stringent time limits and puts pressure on the joint decision making. In the first period all companies share the same starting position and market conditions. At the end of every period, companies have access to personalized reports and monitoring including bottom-line financial performance, operational performance, social performance, environmental performance or other market information they might have acquired. We differentiate from other research approaches in the way we can access the context of decision making. Without losing business complexity, by using IMEx we secure a high level of decision making monitoring and its eventual impact on firm performance. As of the early 80s, IMEx is designed and further developed over the years by faculty to illustrate that more integration between the functional departments leads to an improved (financial) business performance.

The cross-functional dependencies, the high level of integration and both the load and lack of information and feedback makes that there is no single strategy or policy leading towards performance. As such, companies act in a world of uncertainty (e.g. strikes, market declines, first mover advantage of competitors, etc.) which adds to the realism of the business simulation.

4.2 From Business Simulation to Field Experiment

Design To explore the proposed moderated mediation model in an integrative manner, we designed a field experiment with a longitudinal survey design. Participants were split in work teams, each team representing a company. Each company had several different managerial roles and participants had to assume a specific managerial role in the simulation (i.e., marketing/production/financial manager. . .). The instruction they received was: ‘You have been appointed as the new management team of IMEx company, for at least the next 3 years. You will compete in an oligopolistic market against other toy-producing companies. In total, 12 periods are played, each covering a quarter. Each period, you will have to make decisions based on the results of previous periods and your forecast of the future. At the start of every period, you will have to make a planning and send it through for implementation via the simulation software. After the end of each quarter, you will receive a management report with many details of the performance of your company. Be aware that the IMEx environment is competitive and interactive. You will battle for profit or market share, and you will discover more and more as you move through the 12 periods. The company consists of seven departments: the production department, the purchasing department, the HR department, The R&D department, the financial department, the marketing and sales department, and the general administration department.’ Following this instruction,

each department's responsibilities and activities were then described, as well as all the rules to play.

Social categorization research has systematically proven that mere categorization in different classes (i.e., the roles participants assume as representative of various departments) is conducive to intergroup conflicts (Tajfel and Turner 1979). The same outcome is evidenced in field studies in organizations, namely that departmental managers often engage in conflicts during board meetings (Boute and Rangarajan 2012; Hoyle 2004; Pagell 2004). Therefore, we consider that creating these different roles in the simulation, we create pre-conditions for conflict to emerge in each team's interactions. Furthermore, previous research (Boute and Rangarajan 2012) suggests these conflicts are asymmetrical, since traditionally, some departments hold conflictual positions with respect to only certain others (e.g., production vs. sales as opposed to production vs. HR). Therefore, we expect our manipulation to be conducive not only to conflict, but to conflict asymmetries within the teams.

We had five measurement points in time spread throughout the 5 days the simulation runs. Two elements of preventing common-method variance are built into the design: longitudinal data gathering and multiple sources of data (participants filled in the longitudinal survey, while the teams' final performance was assessed by the course holder on an algorithm described below). The third strength of our design, next to the longitudinal approach and the use of multiple data sources, relies in the use of a social network perspective in order to look at the multi-level processes. As mentioned, the cornerstone of understanding the evolution and impact of conflict in top management teams is to look at the interplay in time between individual actors and group processes.

Manipulation Check To check our quasi-experimental manipulation, we employed two manipulation checks. The most *basic measure* of our manipulation check was simply to ask each member to write down what managerial role (HR, sales, production etc.) each other team member had (there was consensus in teams in this respect, team members knew what roles the others are playing, hence what info they have). We thus ensured that they recognize each other in their roles within this setting.

A second measure designed for manipulation check (as a *reverted measure*) consisted of three items from Hinds and Mortensen's *shared context scale* (Hinds and Mortensen 2005), which participants had to fill in after the first day on the attempts to coordinate work in the team. The items ask about the frequency of having experienced (1) incompatibility between different members' tools and work processes, (2) team members having different priorities, and (3) differences in the information held by team members. Since there is no control group in our design, we looked at the correlation between this scale (which assesses differences triggered by the different information each team member processed and the different interests that came along with their functional role) and mean relational conflict and conflict asymmetry. Both mean relational conflict ($-.64, p < .001$), as well as Jehn's measure of asymmetry ($-.28, p < .10$) and in-degree conflict asymmetry ($-.46, p < .01$), though not out-degree ($-.18, p > .10$) had significant negative correlations with these items of manipulation check.

Data Collection using IMEx took place during the Management Integration Courses in 2013 at the level of Master in General Management, Master in Financial Management, Full-time MBA, and Executive MBA of a leading business school in Europe. In line with Hoogendoorn et al. (2013) and Apesteguia et al. (2012), our experiment includes degree certificate participants to configure management teams, but we do not include undergraduates. In total 54 teams participated in the IMEx business simulation. All 54 teams were invited to participate in the research and 41 of them engaged as a team to take part (75.93%). Only one out of the 41 teams failed to meet the requirements, i.e. less than 60% of the team members had a valid score on each variable. This team was subsequently excluded from the analyses, resulting in a sample of 40 teams. ANOVA results show that there is no significant difference between the IMEx grades, i.e. the dependent variable, from the teams that are included in the analyses ($N = 40$) and the teams that preferred not to participate or did not meet the requirements of group engagement ($N = 13 + 1$) ($p = .318$).

Each member of the participating teams needed to fill out individually a short survey at five different moments in time along the business simulation's 12 periods. Data were gathered during breaks between two consecutive IMEx periods. By collecting data during the breaks and by distributing the surveys on paper it was also possible to keep track of the response rates and remind participants on their engagement in case of forgetfulness.

Data were collected at individual level ($N = 241$) and aggregated afterwards to team level ($N = 40$). The average group size was six and teams ranged in size from 5 to 7. Respondents were primarily men (68.9%) and the average age was 30, ranging from 22 to 52. Their functional background was diverse, including Business & Economics, Technology & Engineering, Exact Sciences, Law, Language & Arts, Medicine & Pharmacy, etc.

Although we gathered all data on individual level, the model we want to test also includes group level constructs. In order to test the statistical adequacy of aggregating the data, we calculated for each variable the inter-member reliability (ICC_1 and ICC_2) and the within-group agreement index (r_{wg}) (LeBreton and Senter 2008).

Measures The *conflict management strategies* (measured at time 2) were evaluated using a questionnaire proposed by De Dreu and van Vianen (2001). The avoiding, contending and collaborating strategies are evaluated using 3 items for each strategy all on a five-point Likert scale (1 'Strongly disagree'–5 'Strongly agree'). The general question was as follows: 'In my team, we usually deal with conflict by...'. and examples of the items are respectively 'acting as if nothing has happened', 'putting pressure on others to accept one's ideas' and 'discussing the issues, to work out mutually acceptable decisions'. The Cronbach's alpha indicates no problem regarding internal consistency for avoiding (.76) nor for contending (.71) or collaborating (.61). We also calculated ICC_1 , ICC_2 and r_{wg} for these three measurements; avoiding ($ICC_1 = .17$, $ICC_2 = .54$ and median $r_{wg} = .86$), contending ($ICC_1 = .26$, $ICC_2 = .68$ and median $r_{wg} = .88$) and collaborating ($ICC_1 = .05$, $ICC_2 = .25$ and median $r_{wg} = .92$). Although the ICC_2 of collaborating is low, given its high median r_{wg} score, we can aggregate this measure at group level.

For *coordination* (measured at time 4) we used a five-item scale published by Eby et al. (1999) and measured on a five-step Likert scale (1 'Never'–5 'Very often'). A sample item is 'The group members have synchronized their actions in order to reach the group goals'. Also for this scale the Cronbach's alpha (.76) indicates internal consistency. The $ICC_1 = .33$, $ICC_2 = .74$ and $r_{wg} = .95$ justifies aggregation to the group level.

We controlled for the level of *relational conflict*. This was measured with network instruments at time 1 and with a validated scale (Jehn 1995) at time 2. Four items from the intragroup relational conflict scale (Jehn 1995) were used to measure *level of relational conflict at time 2*. Individual members were asked about their experience of relationship conflict in the group (e.g., 'How much tension was there among the members of your team?'). Answers were recorded on the individual level following a five-point Likert scale (1 'Never'–5 'Very much') and group means were further used for the analyses. The Cronbach's alpha for the scale was .85. The values of the aggregation tests $ICC_1 = .37$, $ICC_2 = .78$ and $r_{wg} = .96$ provide support to aggregate this variable to the team level.

At time 1 the *level of relational conflict* was measured by a network instrument featuring the following question: 'Thinking of today, to which degree did you disagree with this person about non-work things (social or personal things)?'. Team members were asked to rate each team member on a scale from 1 'Not at all' to 5 'To a great extent'. The item is based on one of the items from the scale of Jehn (1995) 'To what extent were the disagreements in your team related to the task?' but rephrased in such a way that it captures relationship conflict and a separate rating for each team member. To avoid respondent fatigue it is common to use only one item in network measures (Borgatti et al. 2013). Each team got a personalized questionnaire in which the names of the team members were already filled out. They were not supposed to rate themselves and in case they did these ratings were not taken into account.

Recall that we calculate conflict asymmetry, both for the traditional measurement and the network measurement, as the standard deviation among team members' conflict scores. This is in line with Jehn et al. (2010) and their computation of group conflict asymmetry.

For *group emotional awareness* (measured at time 2), we used an instrument described by Boruş and Curşeu (2011) based on Druskat and Wolff's (2001) conceptualization of group emotional awareness. The scale consists of eight items, measured on a five-step Likert scale (1 'Never'–5 'Very often') and with a Cronbach's alpha of .70. Examples of items are: 'We could tell how everyone felt by listening to the tone of our voices.', and 'Most of the time, we had a good sense of how each group member felt, even if they did not express it in words.' Analyses confirmed the statistical adequacy of aggregating this data to team level ($ICC_1 = .17$, $ICC_2 = .55$ and median $r_{wg} = .94$).

The team's *final performance* was rated on a scale from 1 to 20 by the course holder of IMEx. The rating exhibits high internal validity as it is a composite measure of (1) the company in its industry on a financial, environmental and social perspective (i.e., triple bottom line), (2) strategy coherence and deployment into the functional policies, (3) sustainability and future outlook for the company, (4) quality and content of presentations and Q&A to the board of directors, (5) negotiation quality regarding banker and suppliers, (6) creativity, (7) time management and (8) all reporting, including

marketing plan, break-even analysis, strategic plan, investment plans, due diligence, etc.

5 Results

Based on our theoretical reflections (summarized in Fig. 1), we proposed that the conflict management strategies used in a team impact the team's coordination processes and subsequently its effectiveness. The use of proper conflict management strategies can counteract the typical negative impact of conflict asymmetry on team performance, as mediated by coordination processes. This happens because the conflict management strategy used depend both on the relational conflict asymmetry experienced at the beginning of the process in the team (H1) but also on the extent to which the group has developed group emotional awareness (H2). It is the moderating effect of group emotional awareness that allows for the prevention of the usual downward spiral of relational conflict asymmetry and its negative impact on performance (H3). We explore and test these propositions via structural equation modeling in a comprehensive model that builds on this multiple moderated mediation. We tested our model with three proposed measures of conflict asymmetry: the indegree and outdegree centrality network measures and the traditional group conflict asymmetry measure.

Before discussing the fit indices of the models, Table 1 introduces the correlation matrix for all the variables we used.

Our three hypothesized path models were tested with the analysis software AMOS version 19 using Structural Equation Modeling. The chi-square value provides a statistical test for global model fit and shows that neither model is significantly different from the data: the model based on indegree centrality $\chi^2(11) = 8.24, p = .69$; based on outdegree centrality $\chi^2(11) = 8.20, p = .69$; and based on group conflict asymmetry $\chi^2(11) = 4.20, p = .96$. Further, two categories of fit indices can be distinguished: (1) absolute fit indices, which illustrate how well the data are reproduced by the theoretical model, and (2) incremental fit indices, which compare the tested model with the baseline model (Widman and Thomson 2003). We have focused on the Root Mean Square Error of Approximation (RMSEA) as an absolute fit index and we use the Tucker–Lewis Index (TLI), the Normed Fit Index (NFI), and the Comparative Fit Index (CFI) as incremental fit indices. We controlled in all three models for the level of relationship conflict in the first stages of teamwork and covaried the error between collaborating conflict management strategy and coordination processes (based on theoretical considerations and data from the correlation matrix). For the first model, with conflict asymmetry based on indegree centrality, TLI = 1.03, CFI = 1.00, NFI = .97 and RMSEA = .00. Same indices were obtained for the second model (conflict asymmetry based on outdegree centrality). For the third model, with conflict asymmetry measured as group asymmetry with Jehn's (1995) intragroup relational conflict scale, TLI = 1.07, CFI = 1.00, NFI = .98 and RMSEA = .00. All values of the fit indices point to an excellent model fit for all three models, and the comparison of the chi square values shows no significant differences between the fit of the models. However, a closer look at the predictions of the variables within the models (presented

Table 1 Correlation table of the variables tested in the model

	Means	SD	Relationship conflict				Emotional awareness		Conflict management		Coordination		Perform.
			Level		Indegree	Outdegree	Collaborating	Avoiding	Contending	Avoiding			
			Indegree	Outdegree							Asymm.	Time 2	
<i>Relationship conflict</i>													
Level indegree T1 (network measure)	1.554	0.338	-	-	-	-	-	-	-	-	-	-	
Level outdegree T1 (network measure)	1.565	0.337	0.985**	-	-	-	-	-	-	-	-	-	
Indegree asymmetry T1	0.174	0.088	0.569**	0.593**	-	-	-	-	-	-	-	-	
Outdegree asymmetry T1	0.728	0.315	0.599**	0.623**	0.763**	-	-	-	-	-	-	-	
Level (Jehn's measure, T2)	1.506	0.391	0.019	0.069	0.205	-	-	-	-	-	-	-	
Conflict asymmetry (Jehn, T2)	0.412	0.189	0.076	0.068	0.093	0.178	0.636**	-	-	-	-	-	
<i>Emotional awareness</i>	3.601	0.262	-0.256	-0.249	-0.151	-0.202	-0.028	-0.149	-	-	-	-	
<i>Conflict management</i>													
Collaborating	3.912	0.290	-0.088	-0.116	-0.263	-0.326*	-0.305 ^{ms}	-0.205	0.482**	-	-	-	
Contending	2.043	0.320	0.047	0.088	0.284 ^{ms}	0.147	0.568**	0.272 ^{ms}	-0.465**	-0.334*	-	-	
Avoiding	2.013	0.250	-0.065	-0.092	-0.021	0.049	0.145	0.133	0.001	-0.034	0.089	-	
Coordination	3.878	0.366	-0.230	-0.253	-0.414**	-0.365*	-0.320*	-0.256	0.525**	0.331*	-0.464**	-0.233	
Performance	14.745	1.532	-0.047	-0.018	-0.182	-0.141	-0.157	-0.043	0.004	0.107	-0.055	0.297 ^{ms}	

** $p < 0.01$; * $p < 0.05$; ^{ms} $p < 0.10$

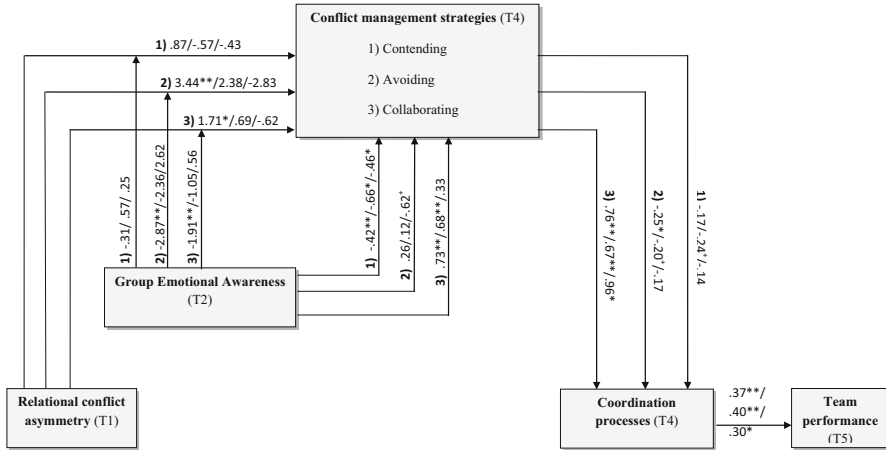


Fig. 2 Results for testing the moderated mediation model based on three conflict asymmetry measures: in-degree centrality/out-degree centrality/group relational conflict asymmetry. The model controls for the level of relational conflict experienced in the early stages of the simulation. Standardized path coefficients are shown ($^+ p < .10$; $* p < .05$; $** p < .01$)

in Fig. 2 and detailed in Table 2) proves the model based on indegree centrality to be more informative for understanding how the process unfolds.

Indegree Asymmetry According to this model, we find that team performance depends on the coordination processes developed by the group ($\beta = .37$; $p = .01$). These coordination processes are enhanced by the use of a collaborative ($\beta = .76$; $p = .01$) and impaired by the avoiding ($\beta = -.25$; $p = .04$) conflict management strategy. The contending strategy has a negative but not significant effect in our sample ($\beta = -.17$; $p = .24$). The collaborating conflict management strategy is influenced by indegree relational conflict asymmetry ($\beta = 1.71$; $p = .02$) and group emotional awareness ($\beta = .73$; $p = .00$) both directly and through their interaction effect ($\beta = -1.91$; $p = .01$). Figure 3a portrays the direction of this interaction effect, in that groups that experience less indegree conflict asymmetry and have more group emotional awareness are most prone to use collaborating conflict resolution strategies. The least probable to use a collaborating conflict management strategy are groups with low emotional awareness, whether they experience indegree asymmetric conflict or not.

Relational indegree conflict asymmetry also has a direct effect ($\beta = 3.44$; $p = .00$) on the avoiding conflict management strategy. Its interaction with GEA is also significant ($\beta = -2.87$; $p = .00$), although GEA does not have a significant direct impact on the avoiding strategy ($\beta = .26$; $p = .12$). The most interesting aspect about this interaction effect is that groups with high indegree conflict asymmetry that have high emotional awareness are least probable to use avoiding strategies, as opposed to groups with the ones with little emotional awareness who are most probable to be more avoidant of conflict (Fig. 3b).

GEA also has a direct significant effect on the contending CMS ($\beta = -.42$; $p = .01$), but it does not moderate ($\beta = -.31$; $p = .67$) the impact of indegree conflict

Table 2 Standardized regression weights of the structural equation model presented in Fig. 2

	Indegree conflict asymmetry		Outdegree conflict asymmetry		Group conflict asymmetry	
	Beta	Sig	Beta	Sig	Beta	Sig
Contending CMS ← Relational conflict asymmetry	.87	.26	-.57	.74	-.43	.73
Contending CMS ← Group emotional awareness	-.42	.01	-.66	.03	-.46	.04
Contending CMS ← GEAxConflict asymmetry	-.31	.67	.57	.73	.25	.83
Avoiding CMS ← Relational conflict asymmetry	3.44	.00	2.38	.24	-2.83	.12
Avoiding CMS ← Group emotional awareness	.26	.12	.12	.73	-.62	.07
Avoiding CMS ← GEAxConflict asymmetry	-2.87	.00	-2.36	.23	2.62	.15
Collaborating CMS ← Relational conflict asymmetry	1.71	.02	.69	.61	-.62	.63
Collaborating CMS ← Group emotional awareness	.73	.00	.68	.01	.33	.18
Collaborating CMS ← GEAxConflict asymmetry	-1.91	.01	-1.05	.43	.56	.66
Coordination ← Contending CMS	-.17	.24	-.24	.06	-.14	.46
Coordination ← Avoiding CMS	-.25	.04	-.20	.07	-.17	.20
Coordination ← Collaborating CMS	.76	.01	.67	.01	.96	.02
Team performance ← Coordination	.37	.01	.40	.01	.30	.05
Coordination ← Level of relational conflict	-.14	.36	-.15	.30	.03	.87
Contending CMS ← Level of relational conflict	-.27	.07	.03	.84	.67	.00
Avoiding CMS ← Level of relational conflict	-.04	.78	.05	.76	.53	.00
Collaborating CMS ← Level of relational conflict	.27	.10	.25	.12	-.16	.26
Team performance ← Level of relational conflict	-.09	.53	-.01	.90	-.23	.14

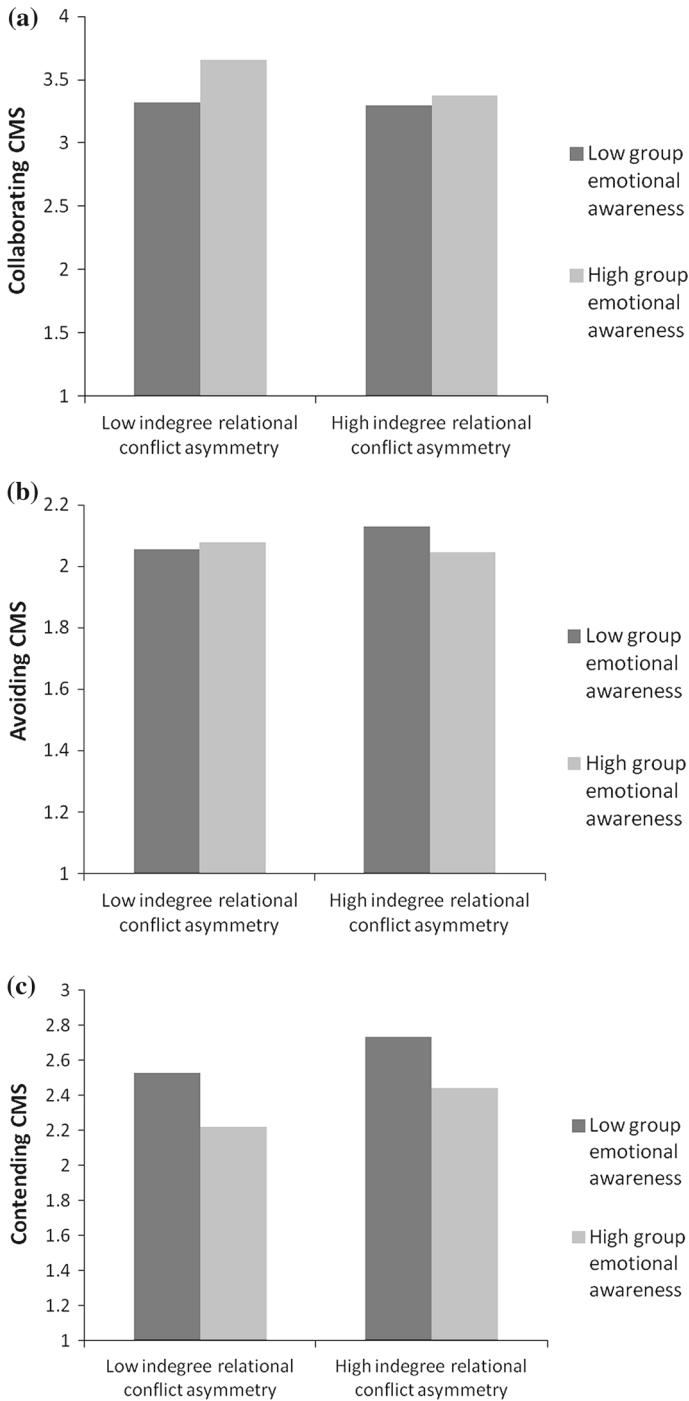


Fig. 3 Interaction effects of group emotional awareness and indegree relational conflict asymmetry on the **a** collaborating, **b** avoiding and **c** contending conflict management strategy

asymmetry ($\beta = .87$; $p = .26$) on choosing this conflict management strategy. The direction of the effects however shows that groups with high indegree conflict asymmetry and low emotional awareness are most prone to engage in contending resolution strategies, as opposed to groups with low indegree conflict asymmetry and high emotional awareness, who are least probable to do so (Fig. 3c).

Outdegree Asymmetry For the conflict asymmetry measured via outdegree centrality, team performance depends on the coordination processes developed by the group ($\beta = .40$; $p = .01$). These coordination processes are enhanced by the use of a collaborative ($\beta = .67$; $p = .01$) and impaired by the contending ($\beta = -.24$; $p = .07$) and avoiding ($\beta = -.20$; $p = .06$) conflict management strategy. Group emotional awareness has a significant direct impact on both the collaborating ($\beta = .68$; $p = .01$) and the contending ($\beta = -.66$; $p = .03$) strategy, but not on the avoiding strategy ($\beta = .12$; $p = .73$). Relational conflict asymmetry measured with outdegree centrality has no significant direct effect on either conflict resolution strategies ($\beta = .69$; $p = .61$ for collaborating, $\beta = 2.38$; $p = .24$ for avoiding and $\beta = -.57$; $p = .74$ for contending). Also, no significant evidence was found for the interaction effect of conflict asymmetry and group emotional awareness on the three conflict management strategies ($\beta = -.1.05$; $p = .43$ for collaborating, $\beta = -2.36$; $p = .23$ for avoiding and $\beta = .57$; $p = .73$ for contending).

Group Asymmetry For conflict asymmetry measured in the traditional way as group conflict asymmetry (following Jehn et al. 2010, 2012), team coordination processes had a significant impact on team performance ($\beta = .30$; $p = .05$). However, we only found evidence for the impact of the collaborating strategy on coordination team processes ($\beta = .96$; $p = .02$). Neither the contending ($\beta = -.14$; $p = .46$) nor the avoiding ($\beta = -.17$; $p = .20$) strategy impacted coordination significantly. Furthermore, the only other significant effects we found were the negative impact of group emotional awareness on the use of contending ($\beta = -.46$; $p = .04$) and avoiding ($\beta = -.62$; $p = .07$), but not collaborating ($\beta = .33$; $p = .18$) conflict management strategies. Relational conflict asymmetry measured with Jehn's scale and assessing conflicts within the group in general terms yielded no significant effects on the used conflict management strategies ($\beta = -.62$; $p = .63$ for collaborating, $\beta = -2.83$; $p = .12$ for avoiding and $\beta = -.43$; $p = .73$ for contending). We also found no significant interaction effect between conflict asymmetry and group emotional awareness on conflict resolution strategies ($\beta = .56$; $p = .66$ for collaborating, $\beta = 2.62$; $p = .15$ for avoiding and $\beta = .25$; $p = .83$ for contending).

As one can notice from these descriptions, the most robust model in terms of its predictive power is the first model, where conflict asymmetry is based on indegree centrality, in other words reflecting the dispersion in the level of conflict the team as a whole experiences with each team member separately.

In the next section we discuss the implications of our findings for methodological advancements in the study of conflict in managerial teams, as well as practical implications and applications of these findings.

6 Discussion

This research sets out to seek a better understanding of how management teams deal with relational conflict originating from repeated controversies between members. The divergent aims and often different views of the same reality easily trigger conflicts and hence necessitate a better understanding of the role of conflict resolution strategies in decision-making processes and general effectiveness. Moreover, additional complexity enters when team members have *different perceptions about the level of relational conflict* existing in the team (i.e. conflict asymmetry), which is even more detrimental to team functioning than absolute levels of conflict (Jehn et al. 2010, 2012). [It is important to note at this point that the quality of insights regarding conflict-related group dynamics depends largely on *how conflict asymmetry is measured* in the first place.] Homogenous perceptions of certain team dynamics allows the team to create norms to deal with that particular dynamic (e.g., relational conflict) or to react in a unitary way towards it. By human nature, we find it easier to deal with predictable situations, even if they are bad, than with unpredictable/uncontrollable ones (Koolhaas et al. 2011). It is currently unclear *how management teams can cope with conflict asymmetry and hence mitigate its negative impact on coordination and, finally, performance*. In this section, we will discuss how our findings help to provide answers to these fundamental questions.

First, our scholarly contribution relates to the methodological advancements in measuring conflict asymmetry (as requested by Jehn et al. 2012). Our results support the assertion that measuring conflict asymmetry with a network approach (i.e., asking each individual about the level of conflict experienced with each other team member) is more predictive of subsequent group dynamics than generic measures of perceived relational conflict (i.e., group-based). The main reason for this is a focus on specific conflicts instead of global evaluations (which have a higher degree of subjectivity) one makes with the group-based asymmetry measure. Assessments of global levels of conflict in the team are based on the subjective experience of conflict with different members and the inferences one makes about the conflict experienced by other members. Asking a person to assess directly the level of conflict experienced with each other member limits their report to their personal experience, and also focuses them on specific conflicts, instead of asking them to make global approximations of the level of experienced conflict. By introducing an overview from all members, the global view is still there, but based on more clearly circumscribed (hence less subjective) assessments.

Furthermore, network measures offer two types of asymmetry indicators: one based on outdegree centrality measures (i.e., the level of conflict someone perceives with all the other team members) and one based on indegree (i.e., the level of conflict the other team members experience with someone). The indegree centrality measure proved to have superior predictive validity than the outdegree or the group measure in explaining how subsequent group processes unfold. Even more importantly, these findings show that it matters to take into account *not only to which degree group members differ in their perceptions of how much conflict there is in the group, but also the degree to which conflict is experienced at the same level towards all team members individually*. Our research confirms that it is more detrimental for a team to experience conflict with only

one or a couple of its members to a high degree (thus creating a situation of disparity), compared to the situation where there is a similar intensity of personal conflict towards all team members.

Second, there is a general consensus in conflict management literature that a collaborating resolution strategy is beneficial and a contending one is detrimental for team processes and effectiveness. There is, however, mixed evidence on the avoidance management strategy: [De Dreu and van Vianen \(2001\)](#) claim that it can be a fruitful strategy (since it frees up the team's time and mental space to work on the task at hand instead of focusing them on the interpersonal issues), while others ([Chen et al. 2005](#); [De Wit et al. 2011](#)) claim that it is counter-productive in resolving team conflict. Our findings nuance this dichotomy by showing that its impact in fact depends on why teams choose this strategy. If they do so because the level of conflict is too high and there is no time to work it out without 'stealing time and focus' from the task, then it is possible that it would be beneficial in the short run (in line with the argument pointed out by [De Dreu and van Vianen 2001](#)). However, if teams use an avoidance strategy because they do not even share the same perception on whether they do or do not experience relational conflicts, then it proves to be detrimental (since it breeds less and less shared representations of the teamwork processes and consequently impairs coordination).

Third, we elaborate on the role of group emotional awareness and its importance for reducing or counteracting the negative consequences of conflict asymmetry for team effectiveness. Our findings show that group emotional awareness can change the negative impact both of relational conflict levels and conflict asymmetry on the choice of conflict management strategies and subsequently on coordination processes. An emotionally aware team is more prone to rely on collaborating conflict management strategies irrespective of the conflict asymmetry experienced. Also, they will be less likely to avoid conflict and to engage in contending resolution strategies. Previous research showed that simply paying attention to the emotional dynamics in a team makes it easier for team members to acknowledge conflict and discuss it openly, without engaging in misattributions of intentions and negative emotional spirals ([Ayoko et al. 2008](#); [Boroş and Curşeu 2013](#)). Group emotional awareness can be built by selecting team members with high emotional awareness themselves, by practicing with team members to recognize each other's emotions ([Elfenbein et al. 2007](#)) or by focusing the team as a whole on norms that facilitate emotional awareness, such as interpersonal understanding and perspective taking ([Druskat and Wolff 2001](#)). Even more, there is empirical evidence that simple experimental interventions to manipulate (i.e., enhance) group emotional awareness norms ([Boroş and Curşeu 2013](#)) or even just measure existing emotion recognition capacities within the team ([Elfenbein et al. 2007](#)) significantly impacts the effectiveness of experienced project teams. Therefore, group emotional awareness can easily be trained in teams, with tremendous benefits for their decision-making effectiveness. We find this to be our most important practical contribution for mitigating the negative impact of relational conflict in management teams.

Along these lines, we argue that interventions aimed at increasing group emotional awareness ([Druskat and Wolff 2001](#)) would have more benefits for decision making teams rather than investing in conflict management trainings. Increased group

emotional awareness not only allows teams to engage in task-related controversies with lesser chances of escalating into relational conflicts (as previously proven by [Ayoko et al. 2008](#); [Curşeu et al. 2012a](#); [Jordan and Troth 2004](#)), but, as our findings suggest, also helps them deal better with relational conflicts once they have erupted. Furthermore, this type of intervention would enhance the team's agency in dealing with conflicts on their own, as opposed to third-party interventions (such as mediation). This way, cross-functional management teams can improve their decision-making processes while still allowing the different opinions in the team to play out.

7 Limitations and Future Research Directions

Our research has demonstrated the mitigating effect of group emotional awareness on relationship conflict asymmetry and its positive impact on group performance. Given the importance group emotional awareness has been shown to have in cross-functional teams, and our suggestion that interventions that foster it might be more effective than conflict management trainings in groups, future research needs to bring more evidence on how group emotional awareness emerges and thus which would be the most effective interventions for fostering it. As discussed in the previous two paragraphs, studies so far have evidenced different ways to build GEA—at this point, research is needed to compare these proposed paths and their effectiveness for team dynamics.

Second, our studies are so far limited to the reality of cross-functional teams. Although functional diversity in itself does not significantly predict team performance outcomes (according to [Webber and Donahue 2001](#) seminal meta-analysis), there is mixed evidence on the performance of cross-functional teams on team performance and innovation. The possible benefits of functional diversity are often hindered, especially in times of crisis and rapid change, by problems in generating consensus ([Bettenhausen 1991](#)). Therefore, these teams need more than regular ones to foster collaborative ways of expressing task disagreement ([Lovelace et al. 2001](#)). Our findings seem all the more relevant for cross-functional teams, given the concepts that our models have worked with. However, at this point the question remains of whether these relations would hold the same, or be more or less strong in the case of different types of teams, where collaborative disagreement is less crucial for the functioning of the team.

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Appendix

Overview of the high-level decision map incorporated into the IMEx business simulation and the time period in which features are allowed to be changed by the management team (for illustration only, non-exhaustive)

= no permission to change during this period
 = permission to change during this period

	Period:	1	2	3	4	5	6	7	8	9	10	11	12
HRM													
Number of Quality Inspectors		<input checked="" type="checkbox"/>											
Task Assignment of Quality Inspectors													
Number of Operators													
Promotion to Foreman / to Flexible Operator		<input checked="" type="checkbox"/>											
Training for Quality Inspectors		<input checked="" type="checkbox"/>											
Training for Operators		<input checked="" type="checkbox"/>											
Training for Foremen		<input checked="" type="checkbox"/>											
Wages for Operators, Foremen & Quality Inspectors		<input checked="" type="checkbox"/>											
Purchasing													
Negotiating New Contracts		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Placing Purchase Orders Supplier 1 & Supplier 2		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Placing Purchase Orders Finished Products (Outsourcing)		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Production													
New Machine Investment		<input checked="" type="checkbox"/>											
Buying and Selling 2nd Hand Machines		<input checked="" type="checkbox"/>											
Refurbishment of Machines													
Number of Shifts													
Percentage Overtime													
Production Quantities													
Production Priorities													
Logistics													
Quantities Shipped to US		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>								
Quality of Shipments Between Markets		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>								
Innovation and R&D													
Name of Products													
Product innovation													
Product development		<input checked="" type="checkbox"/>											
Marketing and Sales													
Price		<input checked="" type="checkbox"/>											
Publicity Expenses		<input checked="" type="checkbox"/>											
Customer Credit		<input checked="" type="checkbox"/>											
Sales Survey		<input checked="" type="checkbox"/>											
Quality Level to be delivered First		<input checked="" type="checkbox"/>											
Finance													
Credit Line (via Bank)		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
New Loans (via Bank)		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Buying & Selling Securities		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Prepayment of Taxes		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Dividends		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Annual Premium		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Participating in Competing Companies		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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