

An Integrative Solution to the Conflict over Conflict

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Dissertation submitted in partial fulfillment of
the requirements for the degree of Doctor
of Philosophy in the Department of
Business Administration in the Graduate School
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The value of task-related conflict to team effectiveness continues to generate controversy in organizational studies. I argue that this debate reflects as much differences in the conceptualization of conflict by scholars from separate traditions as it does variation in empirical settings and methods. The model proposed in this research is a more general framework for the study of team conflict that clarifies, accommodates, and reconciles to a large degree the divergent findings of prior research. It suggests that recent pessimism about the value of team conflict is overstated, and it offers a number of promising paths through which task-related conflict may improve team performance and satisfaction. Chapter 1 reviews the history of this debate and introduces the model of team conflict. Chapter 2 documents a test of the model's propositions in a correlational study of 223 MBA teams conducting a decision-making exercise. Chapter 3 features an experimental test of the model with a forecasting task completed by 60 3-person groups. And Chapter 4 revisits the conflict over conflict in light of the studies presented herein.

DEDICATION

To this man's best friend, Captain, who started this journey with me but sadly passed away only months before its end.

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CHAPTER 1

Conflict is a pervasive feature of organizational life. A classic estimate is that management spends about 20% of their time dealing with workplace conflict (Thomas & Schmidt, 1976). In a more recent survey (CPP Inc., 2008), 85% of employees reported experiencing workplace conflict to some degree, with 29% doing so on a frequent or constant basis. In the United States, the average employee spends 2.8 hours per week dealing with conflict. Similar rates are found in other countries—0.9 hours per week in the Netherlands, 1.9 in Brazil, and 3.3 in Germany and Ireland, for example. Worldwide, 1 in 10 employees spends at least 6 hours per week on conflict.

These conflicts have consequences beyond consuming the time of executives, managers, and employees. Fifty-seven percent of the survey respondents reported feeling de-motivated, angry, or stressed as a result of conflict, and 24% saw nothing positive come from it. At the same time, however, 22% of employees reported feeling more confident, energized, or excited following conflict, and nearly 60% said conflict improved decision making, team performance, and innovation. Managers by and large report both positive and negative experiences with conflict (Baron, 1991). Academic research corroborates these mixed findings. In their influential meta-analysis, for instance, De Dreu and Weingart (2003) showed that the effects of task-related conflict are contingent upon the type of task and amount of person-related conflict.

Not surprising then, the value of organizational conflict remains controversial. In a recent exchange, Tjosvold (2008: 20) argued that the “available evidence has clearly demonstrated that cooperative management of conflict has both short-term and long-term significant benefits for both organizations and individuals across a *wide* [emphasis added]

range of situations.” De Dreu (2008: 6) on the other hand disagreed, concluding that “the positive functions of conflict are found only under an exceedingly *narrow* [emphasis added] set of circumstances” and that the “negative functions easily outweigh the positive functions.” This lack of consensus after decades of research on the proper role of conflict is discouraging, particularly given its relevance to the modern manager and organizational teams (Cohen & Bailey, 1997; CPP Inc., 2008; Mintzberg, 1990; Thomas & Schmidt, 1976).

The dominant reaction to this debate has been to look for middle-ground, empirically driven solutions. Some authors, for instance, have suggested that moderate but not low or high levels of conflict improve team performance (e.g., Brown, 1983; De Dreu, 2006; Jehn, 1995). Others have indicated that the effects of conflict are contingent on multiple factors, including the outcome measured, the type of task, time, intragroup trust, emotions, conflict management strategies, and so forth (e.g., De Dreu & Weingart, 2003; Jehn & Bendersky, 2003). These contributions are important, but they have come at the expense of theoretical parsimony.

In contrast to this approach, I argue that divergent assessments about the value of conflict are due in large part to conceptual differences over its meaning and proper operationalization. Thus in response to Mannix’s (2003) call for a “return to theorizing” in the study of conflict, I introduce a model of conflict which clarifies and integrates these prior conceptualizations and reconciles to a large degree their divergent empirical findings. The model is of conflict within groups and teams in organizational settings (used interchangeably), which are defined as a collection of interdependent individuals who share responsibility for tasks and who are identified by themselves and others as an

intact social entity (Cohen & Bailey, 1997: 241). As such, the model does not address intergroup conflicts (except within cross-functional teams) or conflicts between organizations or sociopolitical entities.

This paper is organized as follows. In the first part I review and critique current definitions of the *conflict* construct. This provides important background for clarifying the theoretical differences implicit in past conflict research and for the alternative conception of conflict I propose. I next introduce a new model of team conflict and discuss the contribution it makes to reconciling and integrating previous research on the value of conflict. I conclude with the model's limitations and its implications for future study and practice.

DEFINING CONFLICT

Scholars have lamented for some time the absence of a widely shared definition of conflict (e.g., Bernard, 1957; Fink, 1968; Schmidt & Kochan, 1972; Thomas, 1992). Mack and Snyder (1957: 212) called it a “rubber concept....it seems to cover everything from war to choices between ice-cream sodas or sundaes.” This inconsistency is problematic because it precludes the fair comparison and integration of disparate research traditions.

Even within organizational studies, definitions of conflict vary in their generality. Broad definitions by nature include a wide range of phenomena. Follett (1942: 30), for instance, defined conflict “as the appearance of difference, difference of opinions, of interests. For that is what conflict means—difference.” Deutsch's (1973: 10) commonly cited definition is another example of the generalist approach: “Conflict exists whenever

incompatible activities occur.” Broad conceptions of conflict may model it as a process (Thomas, 1976, 1992). The most familiar of these is Pondy’s (1967) stage model, which identifies latent, perceived, felt, and manifest conflicts as sequences in a single conflict episode. Narrow definitions of conflict, in contrast, tend to restrict it to a subset of these stages. Many focus only on manifest conflict behavior. Schmidt and Kochan (1972: 363), for example, argued against broad definitions and limited conflict to “overt behavior arising out of a process in which one unit seeks the advancement of its own interests in its relationship with others.” Coser (1956: 8) similarly emphasized behavior in his definition of social conflict as “a struggle over values and claims to scarce status, power and resources in which the aims of the opponents are to neutralize, injure or eliminate their rivals.”

Recent organizational scholarship has favored a generalist approach to conflict (Thomas, 1992). Representative definitions of the construct include those by Jehn and Bendersky (2003: 189), who conceived it broadly as “perceived incompatibilities or discrepant views among the parties involved”; Barki and Hartwick (2004: 234), who wrote that conflict is “a dynamic process that occurs between interdependent parties as they experience negative emotional reactions to perceived disagreements and interference with the attainment of their goals”; and De Dreu and Gelfand (2008: 8), who described it as “a process that begins when an individual or group perceives differences and opposition between itself and another individual or group about interests and resources, beliefs, values, or practices that matter to them.”

A common element in these definitions is the requirement for *perception* or *awareness* of differences by the involved parties, which according to several authors is a

necessary condition for conflict (e.g., Baron, 1990; Thomas, 1992; Wall & Callister, 1995). This emphasis on subjective, perceptual experience reflects a decidedly psychological view of conflict (Bernard, 1951), and it raises an issue critical to the model of conflict proposed herein: Is conflict a state, an interaction, or both?

As a “state of affairs” (Fink, 1968: 435), conflict represents a pattern of incompatibility among group members’ preferences, beliefs, personalities, and so forth. As such, it is configural property of groups (Klein & Kozlowski, 2000). Moreover, conflict as a state reflects *objective* rather than *perceived* incompatibilities (Bernard, 1951; Dahrendorf, 1958). As an illustration, imagine two hiring managers with different preferences for a job candidate. Presuming only one candidate can be hired, they have a conflict—their preferences are objectively incompatible. If the managers are unaware of their conflict, it remains latent but is a conflict nevertheless (Dahrendorf, 1958; Pondy, 1967). Interaction under this conception is a means of managing or solving a conflict, not an example of it (Fink, 1968: 434).

This more sociological view of conflict is not represented in the current conception of it by organizational scholars. Rather, conflict is viewed as an interaction triggered by the perception of incompatibility and manifest in affective and behavioral responses. To operationalize this, applied researchers typically measure team members’ perceptions of conflict during a recent event or decision, demonstrate restricted within-unit variance in these perceptions (i.e., high inter-rater agreement or consistency), and then average the perceptions across individuals for a team-level score. This implies that conflict is a shared, not configural, property of groups reflective of their common experience (Klein & Kozlowski, 2000). Thus in this conception, only if the hiring

managers in the aforementioned example become aware of their different preferences does conflict exist between them. Of course this introduces an ambiguity: If some group members perceive conflict while others do not, is there team conflict? At what level? In cases where team members have asymmetric perceptions of conflict (cf. Jehn & Chatman, 2000), treating it as shared property of groups may be unreasonable.

The distinction between perceived and objective conflict has not been missed by conflict researchers (see Simons & Peterson, 2000; Sitkin & Bies, 1993; Van de Vliert & De Dreu, 1994), but it has been largely ignored or deemed irrelevant. It is not a mere methodological issue—that is, whether perceived conflict is a valid and reliable indicator of objective conflict. Although this is often assumed implicitly by applied researchers (because measuring objective incompatibility in field settings may not be possible) and is an important empirical question, several conflict theorists have insisted that objective and perceived conflicts are distinct constructs which may in fact be orthogonal (e.g., Bernard, 1957; Deutsch, 1973; Fink, 1968; Pondy, 1967). This is not to say that objective conflicts are more “real” than perceived conflicts. Rather than debate their ontology, a more fruitful approach is to appreciate the importance of both objective and perceived differences in the analysis of conflict.

Table 1: The relationship between objective and perceived conflict

Objective incompatibility	Perceived conflict	
	Low	High
High	Latent/Unperceived	Veridical
Low	Veridical	False/Misperceived

Notes. Adapted from Bernard (1957), Deutsch (1973), and Pondy (1967)

The utility of treating objective and perceived conflicts as unique constructs is illustrated in Table 1, in which both are dichotomized into *Low* and *High* levels for simplicity. In the running example, the different preferences for a job candidate held by the two hiring managers are objectively incompatible—only one candidate can be hired. If they accurately learn their preferences differ, their perceptions of conflict are veridical (*High-High* quadrant); if, however, there is a lack of communication between the managers, each may mistakenly conclude they share a preference for the same candidate, and their objective differences would remain latent and unperceived (*High-Low* quadrant). Conversely, if the hiring managers share the same preference and accurately learn this, their perceptions are veridical (*Low-Low* quadrant); if misperception leads them to believe otherwise, they would experience false or misperceived conflicts (*Low-High* quadrant).

Conceptually this typology helps address questions that have puzzled conflict researchers. Why, for example, has task-related conflict had such variable effects on team performance? The current consensus is that its effect is highly contextual, dependent on the type of team, task, level of relationship conflict, and so forth (De Dreu & Weingart,

2003; Jehn & Bendersky, 2003). Table 1 offers another explanation. Because conflict in field settings is assessed by asking members retrospectively about task-related differences within their team, their perceptions will not always be veridical. For whatever reason, teams with objective conflicts may fail to report them, and teams without objective conflicts may report false conflicts. As a result, there may be very little correspondence between conflict as a state (objective conflict) and conflict as an interaction (perceived conflict) (Fink, 1968). If performance is primarily a positive function of *objective* task-related conflicts (as I propose in the model herein), perceived conflict will be positively related to performance when perceptions are veridical and negatively related when not.

In sum, the argument that awareness or perception is a necessary condition for conflict is problematic. However methodologically difficult it may be to measure objective conflict in applied settings, this does not justify its absence from theoretical models. To the extent that objective and perceived conflicts have unique antecedents and consequences for team effectiveness, excluding either through a narrow conception of conflict leaves us with an incomplete understanding.

Therefore, in order to clarify and reconcile the competing claims over conflict's value, an even broader conception of conflict than seen at present in organizational studies is offered:

Conflict is a process initiated by objective or perceived incompatibility between interdependent social entities.

This definition continues the generalist, value-neutral approach of current scholarship by conceiving conflict as a multi-stage process that begins when incompatibility exists between interdependent parties (Pondy, 1967). It expands this approach by allowing

conflict to be modeled independently as both a state and an interaction. Both are important in any analysis of conflict (Bernard, 1957; Deutsch, 1973) and hence to the model of team conflict presented next.

AN INTEGRATIVE MODEL OF TEAM CONFLICT

De Dreu and Gelfand (2008) classified the sources or causes of conflicts within organizations into three categories: scarce resources and conflicts of interests, value and relationship conflicts, and socio-cognitive conflicts. The current model is concerned with the latter two, which have also been called relationship, interpersonal, or affective conflicts and task, substantive, or cognitive conflicts, respectively (Amason, 1996; Bell, 1974; Guetzkow & Gyr, 1954; Jehn, 1994, 1995; Pelled, 1996; Pinkley, 1990; Torrance, 1957). Competition for resources and conflicts of interests are features more of intergroup than intragroup conflicts, though even the most cohesive teams are likely to operate under a mix of shared and unshared goals. Moreover, models of interest-based conflicts are firmly established in the bargaining and negotiation literatures (see Cyert & March, 1963; Fisher & Ury, 1991; Schelling, 1963; Walton & McKersie, 1965). In contrast, the study of interpersonal and task-oriented conflicts in groups has received less attention.

The model is grounded in a team-effectiveness framework, which typically stipulates three classes of variables: inputs, processes or mediators, and outcomes (Gladstein, 1984; Hackman & Morris, 1975; Ilgen, Hollenbeck, Johnson, & Jundt, 2005). Inputs refer to those variables that describe individual group members, the group as a whole, and the organizational context. Inputs both shape and are shaped by the

interactions that mediate their relationship with team and individual outcomes. The latter includes task performance and psychosocial outcomes like team viability and personal satisfaction (Hackman, 1987). Thomas (1976, 1992) used a similar framework in his general model of conflict which predicted outcomes as a function of both structural conditions and conflict processes.

The model's constructs and proposed relationships are illustrated in Figure 1.

Conflict Constructs

Conflict is modeled as both a team-level input and a team process. As the former, it refers to a state of objective incompatibility among group members. When these objective conflicts are task-related (e.g., incompatible hiring preferences, revenue projections, marketing proposals, etc.), they are called *substantive conflicts*.¹ Substantive means “having separate and independent existence” (Oxford, 2001: 835), which underscores that these conflicts exist whether perceived or not; its root in “substance” also serves as a reminder that these conflicts are focused on content- or task-related issues, not personal ones. One objection that may be raised about substantive conflict is whether it is distinct from cognitive or informational diversity introduced in prior research (cf. Jehn, Northcraft, & Neale, 1999; Kilduff, Angelmar, & Mehra, 2000; Olson, Parayitam, & Bao, 2007). Both, after all, are configural properties of groups related to cognition. Diversity variables, however, describe a property that varies between groups

¹ Guetzkow and Gyr (1954) and Pelled (1996) used *substantive conflict* to describe perceived task-related differences manifest during team interaction. Almost universally, their term has been replaced in the literature by *task conflict* (Jehn, 1994), which is defined the same. In contrast to their use, substantive conflict here refers to conflict as a *state of objective*, not perceived, task-related differences.

but is relatively stable within groups. In contrast, because groups execute tasks ranging from the mundane to the complex, substantive conflict describes a property that varies both between and within groups, depending on the task. Thus instead of being isomorphic with substantive conflict, cognitive diversity is better thought of as an antecedent to it. Differences in functional or educational backgrounds affect domain expertise, the information available and attended to by team members, and the interpretation of that information, all of which lead to different perceptions of reality (Cronin & Weingart, 2007; Dearborn & Simon, 1958; Dougherty, 1992; Pelled, 1996; Pelled & Adler, 1994). These differences in members' perceptions and judgment policies for all but the most unambiguous tasks are likely to lead to substantive conflict (Brehmer, 1976; March & Simon, 1958).

As a team process, conflict refers to perceived incompatibility among group members emerging through interaction. There are two types of perceived conflict in the literature—*task conflict* and *relationship conflict* (Jehn, 1995).² Task conflict refers to perceived differences over task-related preferences, beliefs, or understandings. Relationship conflict refers to perceived differences over person-related issues such as personalities, work styles, or values. Although perceptions of task and relationship conflict reflect a team's interaction, the model does not assume that these perceptions are shared by team members. For present purposes, both the unit of measurement and unit of

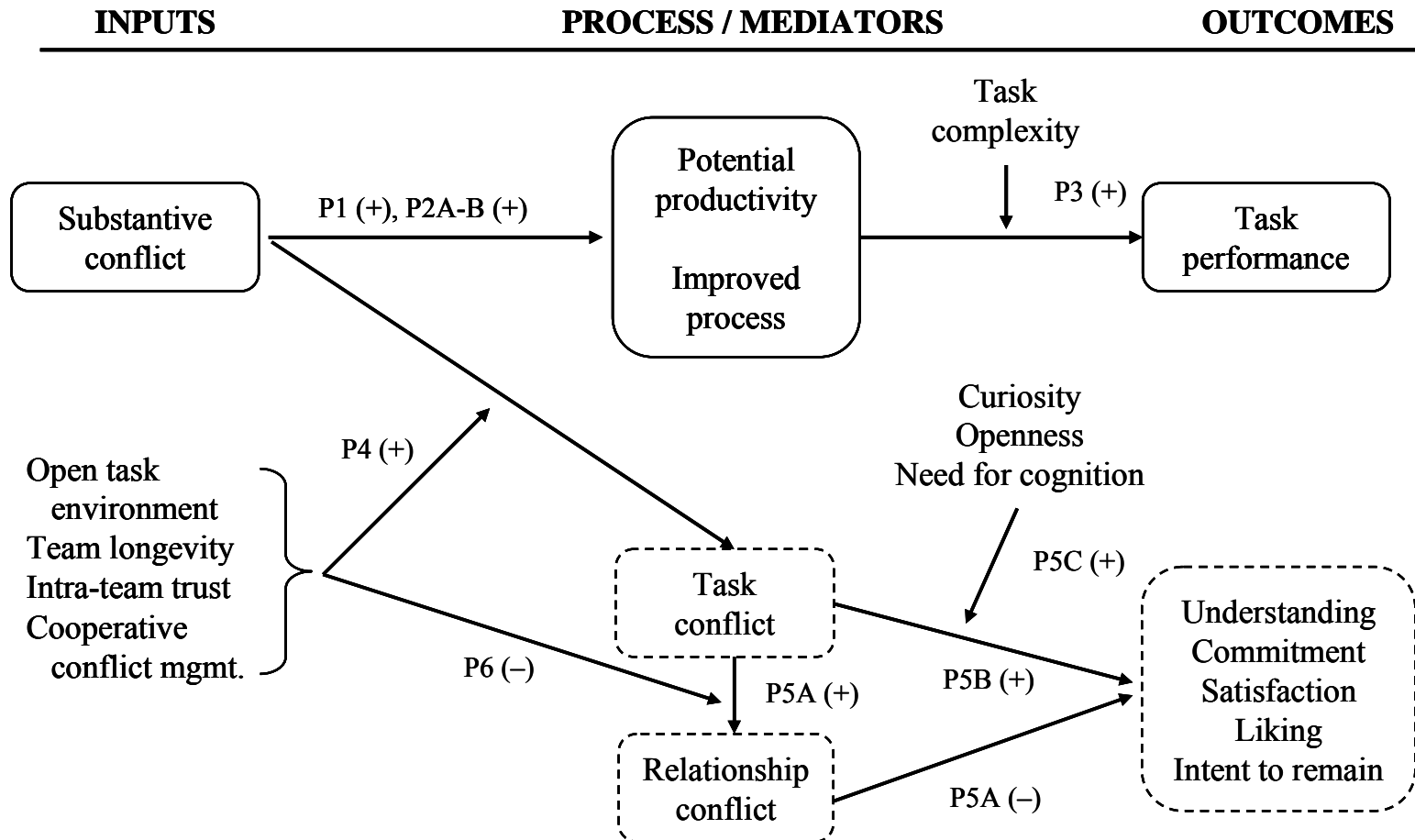
² Jehn (1997) identified *process conflict* as a third type. Process conflict refers to perceived differences over methods, particularly roles and resource allocations. The current model subsumes process conflict within task conflict. Moreover, researchers often use task and relationship conflict loosely, introducing ambiguity about whether the constructs refer to objective or perceived conflicts. Despite this, the terms are generally considered measures of perceived, not objective, incompatibility, as discussed in the prior section. For consistency, the present model continues this interpretation.

analysis is the individual (Klein & Kozlowski, 2000). This allows other variables to be introduced into the model which affect conflict perceptions (e.g., individual-level covariates like personality or gender). Moreover, mean levels of task and relationship conflict can still be examined for hypotheses posed at the group level of analysis (as can variation in group members' perceptions).

In the remainder of this section, I review the logic and evidence in support of the relationships proposed in Figure 1.

Substantive Conflict and Performance

Because substantive conflict is largely unobservable in natural environments, investigations of its effects generally take place in laboratory settings. One way researchers manipulate substantive conflict is with programmed or structured-conflict techniques such as devil's advocacy and dialectical inquiry. In his meta-analysis of experiments examining these techniques, Schwenk (1990) concluded that they lead to higher quality decisions and lower judgment errors. The controversy induced by arguments of advocacy and opposition challenges important assumptions and induces members to critically reevaluate their own beliefs (Schweiger, Sandberg, & Ragan, 1986; Schweiger, Sandberg, & Rechner, 1989).



Note. Dashed boxes indicate individual-level constructs.

Figure 1: An Integrative Model of Team Conflict

By stimulating divergent thought and attention, substantive conflict also enhances the cognitive flexibility necessary for creative problem solving (Hoffman, Harburg, & Maier, 1962; Kurtzberg & Amabile, 2000; Nemeth, 1986; Schulz-Hardt, Mojzisch, & Vogelgesang, 2008). Surprisingly, this appears true even if no single team member's judgment is correct. In one study (Schulz-Hardt, Brodbeck, Mojzisch, Kerschreiter, & Frey, 2006), teams with homogeneous, incorrect pre-discussion preferences (i.e., low in substantive conflict) were less likely to solve a hidden-profile problem than teams with one incorrect dissenter or teams with fully conflicting yet incorrect preferences (i.e., high in substantive conflict). The improvement by these teams was mediated primarily by greater discussion intensity in teams with substantive conflict.

Finally, research in social judgment theory has documented the benefits of substantive conflict on individual as well as group performance (Brehmer, 1976; Hammond, 1973). In this paradigm, people are trained to use multiple probabilistic cues to make judgments about a criterion (e.g., a firm's price-to-earnings ratio as a function of other financial cues). Substantive conflict (referred to as cognitive conflict in this paradigm) is manipulated by training people similarly or dissimilarly on the cues. On average, an individual's final judgments are more accurate when paired with another person whose judgment policy conflicts with his or her own, particularly when the normative judgment policy falls between the two (Cosier & Rose, 1977; Rose, Menasco, & Curry, 1982).

In sum, this literature suggests that task performance is an increasing function of substantive conflict.

Proposition 1. Increases in substantive conflict will increase team task performance.

Mediators of the Substantive Conflict–Performance Relationship

The model proposes two mechanisms through which substantive conflict affects performance: increasing a team's potential productivity and improving its task process (cf. Steiner, 1972). Because it reflects heterogeneity in task-specific cognitions across group members, substantive conflict elevates potential productivity by increasing the chance that the group collectively possesses the “correct” answer, information, or insight for the judgment at hand; or, at the very least, that group members will have different biases. If the two hiring managers discussed earlier are both in human resources, they are likely to have redundant and incomplete information about the right person for a job compared with one manager from human resources and one from the relevant operational group. Substantive conflict is more likely in the second team, but together they can make the more informed judgment.

Proposition 2A. Substantive conflict increases task performance by increasing a team's potential productivity.

Whether groups are successful in realizing that higher potential depends on their task process. And the process is critical: It is not unusual for interacting groups to underperform their nominal or statistical equivalents in which individual outputs are simply aggregated into a group product (Gigone & Hastie, 1997; Hastie, 1986; Hill, 1982; McGrath, 1984). Interacting groups are prone to several well-documented pathologies including conformity, polarization, and groupthink (Asch, 1951; Janis, 1982;

Moscovici & Zavalloni, 1969). Substantive conflict reduces this risk. It alerts others to environmental uncertainty, increases attention and arousal, leads to the exchange of information and the reevaluation of assumptions, and stimulates divergent, integrative thinking (Tjosvold, 1985). In short, substantive conflict undermines any presumption of consensus, which in the main will improve the quality of team outputs.

Proposition 2B. Substantive conflict increases task performance by improving a team's task process.

The Moderating Role of Task

A team's specific task is likely to affect the conflict–performance relationship (De Dreu & Weingart, 2003; Jehn, 1995; Jehn & Bendersky, 2003). In general, conceptual tasks like decision making benefit more from conflict than do behavioral tasks like production (McGrath, 1984). The current model explains this by the mediating mechanisms proposed in 2A and 2B. The effects of higher potential productivity or an improved process are unlikely to benefit performance on routine, straightforward tasks like assembly or reporting (though the routines themselves will benefit from periodic reviews featuring substantive conflict). These variables will, however, help teams performing non-routine, complex tasks such as strategic planning or product innovation. In some cases, higher potential will be primarily responsible for the superior performance. In forecasting, for example, even statistical judgments formed from aggregating conflicting opinions tend to be more accurate than those formed from similar opinions because the former “cancels out” individual biases and errors (Hogarth, 1978). In other cases, performance will benefit more from the improved task process. Especially

in situations where domain expertise is important, a more deliberative process is likely to improve the identification and normative use of members' knowledge (Gladstein, 1984; Hackman & Morris, 1975).

Proposition 3. The positive effects of higher potential productivity and an improved process on performance will be stronger for teams with more complex tasks.

Substantive Conflict and Task Conflict

In contrast to the experimental investigations of substantive conflict, the study of task conflict takes place in natural settings using intact teams ranging from MBAs to top corporate executives. This is done through retrospective surveys capturing team members' responses to questions about task and relationship conflict in their teams. Implicit in much of this research is the assumption that task conflict is a veridical measure of substantive conflict.

Table 1 indicates that teams may fail to recognize their substantive conflicts or may misperceive conflicts which objectively do not exist. There is ample social-psychological evidence to support both scenarios. Teams may fail to perceive their substantive conflicts because situational factors discourage open dissent. Advisors to President Kennedy, for example, refrained from openly expressing their reservations about landing Cuban exiles at the Bay of Pigs (Janis, 1982; McCauley, 1989). In these situations, teams may operate under a false assumption of consensus (Ross, Greene, & House, 1977) or unanimity despite their latent disagreements. Conversely, teams may misperceive substantive conflict where little exists. A clear lesson from the negotiation

literature is that by focusing on positions, people fail to see interests they share (Fisher & Ury, 1991). People also exaggerate their differences with their disputants, who are characterized as more extreme in their beliefs than justified (Chambers, Baron, & Inman, 2006; Robinson, Keltner, Ward, & Ross, 1995). In a study of manufacturing organizations, for instance, Nauta and Sanders (2001) found that members of different functional areas underestimated the extent to which other functions shared goals (e.g., efficiency, customer service, etc.) important to their own area. Thus although it is likely (and desirable) that engineers and marketers on a newly formed, cross-functional team have different perspectives, each may misperceive the extent of those differences.

Indirectly then, the empirical evidence suggests a weak association between substantive conflict and task conflict—the former seems neither a necessary nor sufficient condition for the latter. The model includes two contextual factors expected to improve this relationship. The first is an open task environment (Amason & Sapienza, 1997; Jehn, 1995, 1997; Lovelace, Shapiro, & Weingart, 2001). Members of teams which countenance disagreement, debate, and confrontation will have more information available about each other's actual task-related beliefs, information, or interests than teams which discourage such behavior. This should lead to a more faithful understanding of their substantive conflicts (Tjosvold, 1985). The second factor is group longevity. Particularly in teams with flat hierarchical structures and shared objectives, interpersonal contact over time will increase attention to individuating information, inform expectancies about others, and reduce reliance on stereotypes that lead to misperception (Kunda, 1999; Pelled, 1996; Pelled & Adler, 1994).

Proposition 4. The relationship between substantive and task conflict will be stronger in teams with an open task environment and greater longevity.

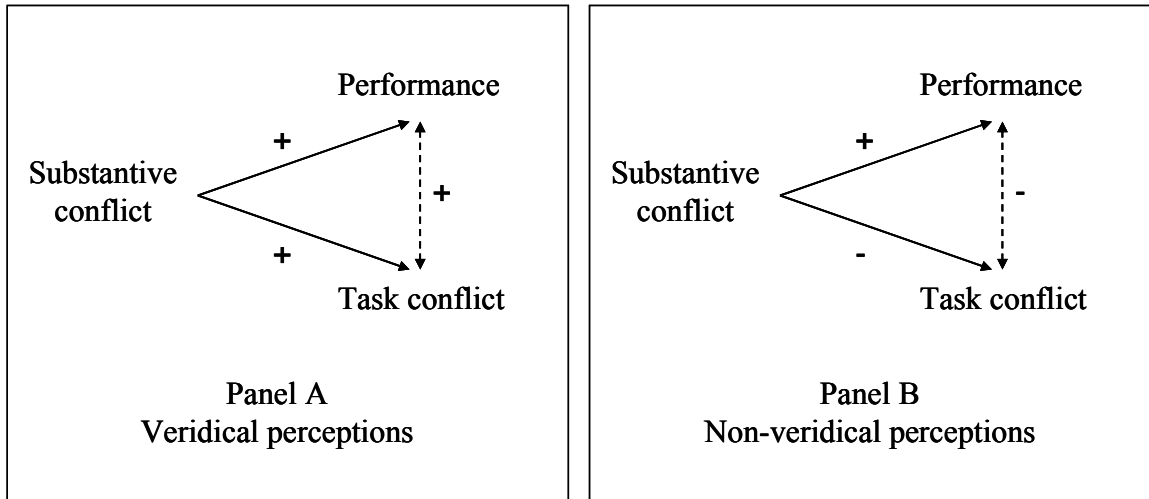
Task Conflict and Performance

One should not conclude that the value of task-related conflict has appeared only in highly controlled laboratory settings. Case studies of conflict have credited it for improving the strategic decision making of governments and business (e.g., Eisenhardt, Kahwajy, & Bourgeois, 1997; Janis, 1982). Task conflict has also had a salutary impact on team performance in several field studies (e.g., Amason, 1996; De Dreu, 2006; Jehn, 1994; Jehn, 1995; Olson et al., 2007; Pelled, Eisenhardt, & Xin, 1999). Nonetheless, the cumulative evidence suggests that task conflict is associated with lower team performance. In their meta-analysis of 25 studies conducted from 1994 to 2001, De Dreu and Weingart (2003) reported a corrected correlation between the two of $-.23$. In their analysis of potential moderators, the largest positive correlation was only $.04$. These results led one set of authors to conclude, “the emerging consensus is that task conflict is generally unhelpful for teams” (Ilgen et al., 2005: 529).

This conclusion can be challenged on multiple grounds. First, causality may be in the opposite direction. Studies of task conflict and performance are correlational and based on retrospective accounts, so teams who performed poorly may have reported more task conflict ex post than teams who performed well. Second, the association between task conflict and performance may be nonlinear (De Dreu, 2006; Jehn, 1995). If so, then meta-analysis of Pearson correlations, which assume linearity between variables, will be misleading. Finally, the negative effects of task conflict may stem from relationship

conflict instead. Because the two are positively correlated ($\rho = .52$; De Dreu & Weingart, 2003), the unique effect of task conflict on performance should be assessed controlling for this confound (e.g., by using partial correlations or regression coefficients). For instance, both Amason (1996) and Jehn (1994) found negative zero-order correlations between task conflict and performance but positive partial effects controlling for relationship conflict.

Nevertheless, there is more evidence on balance for a negative than positive association between task conflict and performance. What explains this? De Dreu and Weingart (2003) suggested that task conflict interferes with rather than enhances information processing, reducing cognitive flexibility and subsequent performance. The perception of conflict during team interaction also may be interpreted as a sign of dysfunction or uncertainty; because conflict has a pejorative connotation in common usage, people may not associate it with success (Baron, 1991). This may reduce the confidence of team members and lead to pessimistic assessments of performance.



Notes. Dashed lines indicate spurious associations

Figure 2: A spurious association between task conflict and performance?

A third explanation implied by the model proposed here is that the association between task conflict and performance is spurious. Consider the two cases illustrated in Figure 2, which are derived from the typology of conflict in Table 1. Teams in Panel A have veridical perceptions of their substantive conflicts—teams with high levels report conflict and teams with low levels do not. Because substantive conflict is positively associated with both performance and task conflict, the two will also have a positive yet spurious association. Conversely, teams in Panel B have non-veridical perceptions of their substantive conflicts—teams with high levels fail to report them and teams with low levels report false conflicts. Because in this case substantive conflict is associated positively with performance but negatively with task conflict, the two will have a negative yet spurious association. In sum, the association between task conflict and team performance depends on the accuracy of team members' perceptions. For teams with veridical perceptions of substantive conflict, the association between task conflict and

performance will be positive; for teams with non-veridical perceptions, the association will be negative.

Proposition 5. Task conflict will be more positively associated with performance in teams with veridical perceptions of their substantive conflicts than in teams with non-veridical perceptions.

Task Conflict and Psychosocial Outcomes

Even if task conflict is an unreliable or spurious predictor of performance, it is an important predictor of social and psychological outcomes in teams (Deutsch, 1973; Thomas, 1976). These include outcomes related to the task (e.g., understanding and commitment; Amason, 1996; Olson et al., 2007) and to the team (e.g., relationship conflict, satisfaction, and intent to remain with the team; Amason, 1996; Bayazit & Mannix, 2003; Hackman, 1987; Jehn 1994, 1995). Those scholars less sanguine about the value of task conflict argue that its limited performance benefits are outweighed by its negative impact on some of these outcomes (e.g., De Dreu, 2008). Again, the empirical evidence seems compellingly to support this conclusion. De Dreu and Weingart (2003), for instance, reported corrected correlations of .52 between task conflict and relationship conflict and of -.32 between task conflict and satisfaction.

Caution is justified once more for these conclusions. The causality may run the other way: dissatisfied people may provoke conflict or at least report higher levels of it ex post; those who dislike others may be deliberately disagreeable about task-related issues. The unique effects of task conflict again should control for its association with relationship conflict. And the correlations among these self-reported constructs may be

inflated by shared method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) and aggregation bias (Robinson, 1950).

The current model proposes that task conflict affects psychosocial outcomes both directly and through its influence on relationship conflict. Consider first the indirect path—that task conflict leads to relationship conflict which in turn reduces commitment, satisfaction, and so on. Evidence indicates that people often take disagreements personally or misattribute them to interpersonal differences (Baron, 1984, 1990; Torrance, 1957). Thus what starts out as an honest difference of opinion often escalates into relationship conflict (Mooney, Holahan, & Amason, 2007; Simons & Peterson, 2000); this is the conventional explanation for the high correlation between the two. The evidence is also quite strong about the deleterious effects of relationship conflict on task commitment and understanding (Amason, 1996; Olson et al., 2007), satisfaction (Amason, 1996; De Dreu & Weingart, 2003; Jehn, 1994, 1995), liking (Jehn, 1995), and intent to remain (Bayazit & Mannix, 2003; Jehn, 1995). Thus task conflict is expected to undermine these outcomes insofar as it leads to relationship conflict.

Proposition 5A. The negative effect of task conflict on task- and team-related psychosocial outcomes will be mediated by its positive association with relationship conflict.

The model predicts that controlling for its association with relationship conflict, the direct effect of task conflict on the remaining psychosocial outcomes will be *positive*. Several studies have demonstrated this very effect (e.g., Amason, 1996; Bayazit & Mannix, 2003; Jehn, 1994; Tjosvold, 1985). Jehn and Chatman (2000) also reported that

people appreciated task conflict if not accompanied by relationship conflict. One reason is the greater opportunity in teams experiencing task conflict for people to participate and voice their opinions, which increases understanding and satisfaction (Cooper & Wood, 1974; Miller & Monge, 1986; Tjosvold, 1985). Another is that task conflict is stimulating. As cited in the introduction, more than 1 in 5 respondents to a recent survey said they felt excited, energized, and more confident following conflict (CPP Inc., 2008). Deutsch (1973: 9) suggested that “conflict is often part of the process of testing and assessing oneself and, as such, may be highly enjoyable as one experiences the pleasure of the full and active use of one’s capacities.” Granted, these effects are likely to be stronger for some than for others (underscoring the usefulness of an individual-level of analysis for these variables). Some people dislike conflict of any sort. This was illustrated by an interviewee in a study by Jehn (1995: 271) who said, “even though [task conflict] seems to help make a decision, it is still uncomfortable. I don’t know if I like working in a group where there is so much arguing.” For others, however, particularly those high in curiosity (Berlyne, 1966), intellect or openness to experience (Goldberg, 1990; McCrae & Costa, 1987), or the need for cognition (Cacioppo & Petty, 1982), task conflict provides a rewarding opportunity for problem-solving and creativity.

Proposition 5B. The direct effect of task conflict on task- and team-related psychosocial outcomes will be positive.

Proposition 5C. The positive effect of task conflict on task- and team-related psychosocial outcomes will be stronger for those high in curiosity, openness to experience, or the need for cognition.

Moderators of the Task Conflict–Relationship Conflict Association

Because its association with relationship conflict is believed to undermine the potential benefits of task conflict, researchers have looked for ways to decouple the two. Cooperative versus competitive conflict management, for instance, leads to less relationship conflict (Bell, 1974; DeChurch, Hamilton, & Haas, 2007). Trust also plays a key role (Peterson & Behfar, 2003; Simons & Peterson, 2000; Tidd, McIntyre, & Friedman, 2004). Because members are less likely to make interpersonal attributions for their task-related differences, teams with high trust will experience less relationship conflict than teams with low trust.

This should also be true of teams with open decision making and longevity. An environment which encourages open disagreement and dissent is a strong situation, which makes it less likely that team members will blame dispositional factors for their differences (Ross & Nisbett, 1991). Moreover, informed expectations of each other, fewer stereotypes, and greater trust are features of teams with longevity, which also reduces the risk of relationship conflict.

Proposition 6. Cooperative conflict management, intragroup trust, an open task environment, and team longevity will weaken the association between task and relationship conflict.

DISCUSSION

The proposed model improves our understanding of team conflict in valuable ways. It identifies conceptual differences over the meaning of conflict, not variation in empirical settings and practices, as the fundamental reason for continuing debate about its

value to organizations. By conceptualizing conflict as both a state and interaction, it adds a sociological perspective to the dominant, psychological view. The result is a novel framework for thinking about conflict in teams that (a) clarifies a considerable body of research equivocal about its value and (b) ultimately shows these mixed findings to be complementary rather than irreconcilable.

How so? Apart from the occasional case study (e.g., Janis, 1982), the study of group conflict has been pursued in two settings. In the laboratory, researchers manipulate objective task-related differences between persons—conflict as a state—by instruction, selection, information distribution, or training. Their concern has been with task performance, and on balance their results support a positive relationship between the two. In the field, researchers measure perceived task-related differences in teams—conflict as an interaction—and correlate it with team outcomes. Although it has proven an uncertain predictor of performance, task conflict does reliably affect psychological and social outcomes. By allowing conflict to be modeled as both a state and interaction, this conceptual framework integrates both empirical traditions that together provide a more complete understanding of team conflict.

Beyond this integration, the model offers alternative explanations for some of their findings (e.g., that task conflict reduces performance) and challenges others directly. Most noteworthy, the conclusion that task conflict reduces satisfaction (De Dreu & Weingart, 2003) may be unjustified once relationship conflict is controlled for. Absent it, task conflict can be a desirable element of a team's process because it offers a stage for

people to voice their opinions and participate in decision making, which will be particularly satisfying to those who enjoy debate and problem solving.

Another contribution is more thorough explication of *how* substantive conflict is translated into performance. Two mechanisms, greater potential productivity and an improved task process, are proposed to mediate the substantive conflict–performance relationship (the effects of which will vary by task). Collectively, these variables constitute a more precise framework for the study of substantive conflict, task type, and team performance. Consider, for example, the evidence for nonlinearity in the relationship between conflict and performance (De Dreu, 2006; Jehn, 1995). Low levels of substantive conflict may reduce performance because the team’s potential productivity is limited by like-minded thinking. High levels of substantive conflict may reduce performance because the team’s process becomes dysfunctional or inflexible (De Dreu & Weingart, 2003). Alternatively, even if there was no process loss, nonlinear effects may emerge if there are diminishing returns to substantive conflict on potential productivity.

Finally, the model is explicitly multilevel (cf. Korsgaard, Jeong, Mahony, & Pitariu, 2008). Although certain variables such as substantive conflict and task performance are inherently group-level constructs, the model does not assume the same of perceived conflicts and other psychosocial outcomes measured at the individual level. Considering the poor theoretical justification for this assumption, recent work indicating that conflict perceptions are often unshared by group members (e.g., Jehn & Chatman, 2000), and the richness and modern ease of multilevel analyses, the proposed model is a

more flexible framework for addressing same- and cross-level questions (Klein & Kozlowski, 2000).

Limitations

As with any theory, the model has its limitations. The most important is its assumption that team members have mutually shared incentives or goals. This clearly will vary from team to team. Members of cross-functional project teams, for instance, are likely to share an interest in project success but also to promote the parochial interests of their respective functional areas (Pelled & Adler, 1994). Although conflicts of interests may allow for integrative, value-creating solutions (Fisher & Ury, 1991; Walton & McKersie, 1965), they often lead to competitive behavior which overwhelms the benefits of substantive conflict (Cosier & Rose, 1977; Tjosvold, 1985). Thus the model applies best to those teams working with a shared, mutual consensus on their purpose and objectives.

The model also leaves unanswered the nature of the team task process engendered by substantive conflict. It has variously been called task conflict (Jehn, 1994, 1995), debate (Simons, Pelled, & Smith, 1999), dissent (De Dreu & West, 2001), disagreement (Lovelace et al., 2001), and information-elaboration (van Knippenberg, De Dreu, & Homan, 2004). Lack of clarity on the differences among these constructs makes it difficult to compare studies and offer prescriptions to teams about desirable practices. How, as an example, does information elaboration differ from task conflict or debate? Do the constructs have different effects on performance and other outcomes? What does it mean, for example, for a team to follow the recommendation of Ilgen et al. (2005) to

avoid task conflict but engage in healthy debate? Distinguishing among these constructs is clearly an important next step for researchers.

Implications for Research

To answer these questions, researchers must develop more refined measures of these processes. Extant instruments for measuring conflict often include items which ask about both the source of conflict (i.e., interests, beliefs, or relationships) and emotional or behavioral reactions to it within the same scale. These are separate dimensions of conflict which are better assessed with separate scales (Barki & Hartwick, 2004; Jehn, Greer, Levine, & Szulanski, 2008; Pinkley, 1990). Qualitative work on how people discriminate among differences of opinion, debates over those differences, and other interactions resembling task conflict would be a productive step towards creating more refined measures of team task process.

Methods for the study of substantive conflict are well established for experimental settings where heterogeneity in beliefs can be manipulated by the investigator. But this always raises the question of how generalizable the findings are to organizational populations and environments. To measure substantive conflicts in the field, it is insufficient to ask people about task conflict in their teams. As discussed, there is no a priori reason to assume that these retrospective perceptions will be veridical. Nor is diversity a reliable proxy for substantive conflict, particularly for teams who have been together for awhile and think quite similarly. Ideally, researchers would be able to elicit members' independent task-related beliefs prior to the start of a project or decision. Short of that, retrospective measures should differentiate between substantive conflicts team

members bring to an interaction and the interaction itself. Olson, Parayitam, and Bao (2007) illustrated this approach by asking top-management teams about the level of agreement within the group over strategic goals separately from their perceptions of task conflict during interaction.

Regardless of progress on that front, the crucial test of this model will likely require a laboratory study which both manipulates substantive conflict and measures task conflict with a standard intragroup conflict scale from the field (cf. De Dreu & Weingart, 2003). An obvious and important question to be answered by this study is how strong the association is between substantive and task conflict. Under what conditions are conflict perceptions veridical or not? Does task conflict turn out to be a spurious predictor of performance, or does it have an impact apart from its reflection of substantive conflict?

Implications for Practice

How does this new model affect the common managerial prescription to encourage task conflict while minimizing relationship conflict (Eisenhardt et al., 1997)? When it comes to performance, what matters is substantive conflict—objective task-related differences that elevate teams' potential and discourage premature consensus. This can be achieved organically by assembling teams with diverse cognitive backgrounds (Jehn et al., 1999; Olson et al., 2007; Pelled, 1996; Pelled & Adler, 1994; Pelled et al., 1999) or artificially with programmed conflict such as devil's advocacy (Schwenk, 1990). (For performance, recent research indicates that authentic conflict is preferable to programmed conflict; see Nemeth, Brown, & Rogers, 2001; Schulz-Hardt, Jochims, & Frey, 2002.) When it comes to commitment, interpersonal relationships, and

satisfaction, what matters is task conflict—perceived task-related differences surfacing during team interaction. Managers can influence both the accuracy of these perceptions and their effects by creating an open, trusting task environment and by keeping teams intact to the extent possible. By doing so, they reduce the chance that such perceptions turn personal and raise the overall satisfaction and commitment of their employees.

CONCLUSION

Debate over the value of conflict to team effectiveness derives as much from differences in the conceptualization of conflict by scholars as from variation in empirical settings and methods. The model proposed herein is a more general framework for the study of team conflict that clarifies, accommodates, and reconciles to a large degree the divergent findings of prior research. It suggests that recent pessimism about the value of team conflict is overstated, and it offers a number of promising paths through which task-related conflict may improve team performance and satisfaction.

CHAPTER 2

In the next two chapters I test a number of the predictions made by the integrative model of team conflict outlined above. This chapter reports the results of a correlational study of MBA teams completing the Desert Survival Situation™ decision-making exercise (Human Synergistics Inc., 2007), and the next chapter reports the findings of an experimental study of 3-person groups engaged in a business forecasting task. The studies are novel in that they include both measures of substantive conflict (measured in the correlational study, manipulated in the experiment) and measures of task conflict employed commonly in the field. Both also incorporate multilevel analysis to test relationships at the individual and team levels.

STUDY 1

An initial study of intact MBA teams examined the following relationships: (a) the effect of substantive conflict on team task performance; (b) the effect of substantive conflict on the mediating task process of teams; (c) the association between substantive and task conflict; and (d) the associations between task conflict and task performance, relationship conflict, and individual satisfaction.

METHODS

Sample

First-year MBAs at a private university in the U.S. completed the Desert Survival Situation™ decision-making exercise to fulfill a course requirement. Data were collected over three years from 2006-2008. There were 78 teams comprising 368 people in 2006,

73 teams comprising 412 people in 2007, and 72 teams comprising 413 people in 2008. Thus the total sample was 223 teams comprising 1,193 people. Team size ranged from 3 to 7, with a median size of 6 people for the entire sample. Administrators unaffiliated with this research assigned people to their teams at matriculation to maximize similarity in demographic and experiential diversity across teams, who remained intact throughout the course. Because this was their first course, students were relatively unfamiliar with their fellow team members prior to the exercise.

Task and Procedure

The Desert Survival Situation™ is a common classroom exercise in group decision making. The task is to rank 15 items (e.g., a map, water, a pistol, etc.) in order of importance to the team's survival in the desert following a plane crash. These rankings are subsequently compared with those of an expert in desert survival to develop objective measures of performance (in this case, judgment accuracy).

In all years, students electronically submitted their independent, individual rankings prior to meeting with their teams. Days later, the students met as teams and submitted their team's consensus ranking of the items. No instructions were provided about the process to follow when deciding upon their team's ranking. Course instructors provided feedback on the performance of each individual and their teams at a later date.

In 2007 only (73 teams), after the teams submitted their consensus ranking, team members individually and privately answered eight questions about task and relationship conflict during the exercise and their overall satisfaction with the experience.

Measures

Substantive conflict. As proposed in the model, substantive conflict captures objective differences in team members' task-related beliefs. For this task, one way to measure this is by correlating members' individual, pre-discussion rankings. For example, if two people ranked the 15 items identically (i.e., perfect agreement), the correlation of their ranks would be 1.0 and there would be no substantive conflict; if they ranked the items in opposite order (i.e., perfect disagreement), the correlation would be -1.0 and there would be maximal substantive conflict. To measure the team's overall level of substantive conflict, each person's ranking can be correlated with every other's in the group and the average of these pairwise correlations taken. However, because the number of rankings affects the minimum value possible of this average pairwise correlation (Siegel & Castellan, 1988), direct comparisons of this statistic across groups differing in size are problematic. Kendall's non-parametric coefficient of concordance solves this with a linear transformation of the average pairwise correlation to the common interval [0, 1]. Because higher values of the coefficient indicate greater *concordance* among the rankings, it was reverse-scaled for this study so that 0 and 1 represented minimal and maximal substantive conflict, respectively.

Team performance. Team performance was evaluated by comparing each team's consensus ranking to the expert's ranking of the 15 items. Several comparisons are possible, including MAD (the mean absolute deviation between the ranks for each item); Kendall's tau, which reflects the number of item-pairs ranked similarly or dissimilarly by the team and expert; and the Spearman correlation (r_s) between the rankings. These are

highly correlated measures of performance, and each has its virtues and vices. For this study, r_s was used because of its familiarity, ease of interpretation, and near-normal distribution in the sample of 223 teams. Thus team performance could range from -1.0 to 1.0, indicating complete disagreement and agreement with the expert, respectively.

Expert influence. The model of team conflict proposes that substantive conflict improves performance in part because it enhances a team's task process. For this task, the specific process examined is the weighting of members' expertise in the group (Gladstein, 1984; Hackman & Morris, 1975). Groups who are better at identifying their most knowledgeable member(s) on this task should perform better as a result. Substantive conflict is predicted to facilitate the identification of these experts in the group. To measure expertise, I correlated each person's individual, pre-discussion ranking with the expert's ranking. Members were then ranked within each team for expertise based on this correlation (i.e., the person whose rank correlated highest with the expert's was ranked 1st in expertise, the person with the next highest correlation ranked 2nd, etc.). To measure influence, I correlated each person's individual, pre-discussion ranking with the team's final consensus ranking. Members were then ranked within each team for influence based on this correlation (i.e., the person whose rank correlated highest with the team's was ranked 1st in expertise, the person with the next highest correlation ranked 2nd, etc.). Finally, I calculated the Spearman correlation between these two sets of rankings (expertise and influence) for each team. High correlations indicated similar rankings of expertise and influence, and low correlations indicated dissimilar rankings of expertise and influence. For instance, if four team members were ranked by expertise 1, 2, 3, and 4

and by influence 2, 1, 3, 4, respectively, then the correlation between expertise and influence in this team would be .80. If, instead, the same team members were ranked by influence 4, 3, 1, 2, then the correlation between expertise and influence would be -.80. On average, teams with similar rankings of expertise and influence were expected to outperform teams with dissimilar rankings.

Task and relationship conflict. These were assessed with three items each from Jehn's revised intragroup conflict scale (Jehn, 1995; Pearson, Ensley, & Amason, 2002). For task conflict, the items were: "How many disagreements over the rankings were there among your team?" (TC1); "How many differences in your rankings did your team have to work through?" (TC2); and "How many differences of opinion about the rankings were there in your team?" (TC3). For relationship conflict, the items were: "How much personal friction was there in your team as you worked through the rankings?" (RC1); "How much tension was there in your team as you worked through the rankings?" (RC2); and "How much anger was there among members of the team on this exercise?" (RC3). Responses were made on a 7-point Likert scale anchored by *None* and *A great deal*.

Satisfaction. Individual satisfaction was assessed with two items on the same 7-point scale: "How satisfied were you working with your team on this task?" (SAT1); and "How much would you like to work with this team in the future?" (SAT2).

Controls. Two variables with the potential to confound interpretation of the predicted effects were included as controls. *Team size* ranged from 3 to 7 members and was treated as an ordered categorical variable. *Team expertise* was the mean level of expertise across team members. This was calculated by correlating the individual

rankings of each team member with the expert's and averaging these correlations. It and its quadratic term were included because for this task there is a nonlinear relationship between expertise and substantive conflict. Teams with very high or very low levels of mean expertise by necessity also have low dispersion in expertise. This means their individual rankings are similar—that is, high in concordance and low in substantive conflict.

Analysis

For the full sample of 223 teams, ordinary-least-squares (OLS) regression was used to test the predicted relationships among substantive conflict, expert influence, and task performance. For the sub-sample of 73 teams, multilevel confirmatory factor analysis (MLCFA; Muthen, 1994) was used to assess the proposed 3-factor measurement model, followed by hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002) to test the predicted relationships among substantive conflict, task and relationship conflict, and satisfaction. The OLS regression and HLM were executed with Stata 9.2 (StataCorp., 2007) and the MLCFA with Mplus 5.2 (Muthen & Muthen, 1998-2008).

Table 2: Descriptive statistics for the conflict and satisfaction scales (Study 1)

Item	Mean	SD	Pearson correlations							
			TC1	TC2	TC3	RC1	RC2	RC3	SAT1	SAT2
TC1	4.02	1.48	(.36)							
TC2	4.62	1.35	.52	(.16)						
TC3	4.23	1.37	.61	.58	(.20)					
RC1	2.13	1.18	.44	.23	.35	(.23)				
RC2	2.09	1.25	.41	.24	.34	.65	(.31)			
RC3	1.28	0.66	.25	.14	.22	.51	.51	(.10)		
SAT1	5.76	1.24	-.31	-.12	-.22	-.40	-.45	-.32	(.20)	
SAT2	6.26	1.07	-.07	.04	-.01	-.27	-.33	-.36	.63	(.09)

Notes. $N = 408-411$. ICC(1) values are on the diagonals in parentheses.

RESULTS

Measurement Model

Descriptive statistics for the items measuring individual-level perceptions of conflict and satisfaction are presented in Table 2. All intraclass correlations, shown on the diagonals, were significantly greater than zero at an alpha level of .01. Thus MLCFA with robust standard errors was used to account for correlated responses within teams (factor structures were assumed to not differ at the within- and between-levels of analysis). Fit indices for the 3-factor, oblique model were reasonable ($\chi^2(17) = 66.373, p < .01$; Comparative-Fit Index = .947; Tucker-Lewis Index = .912; Root Mean Square Error of Approximation = .084 [90% CI: .063 – .106]; Standardized Root Mean Square Residual = .052). The model's parameters are summarized in Table 3.

The eight questionnaire items were considered a successful measure of the three constructs. Responses to the indicators of each construct were averaged for each person. The estimated reliabilities of these scores (Cronbach's alpha) were .80, .77, and .76 for task conflict, relationship conflict, and satisfaction, respectively; intraclass correlations (ICC[1]s) were .30, .32, and .18, respectively.

Table 3: Multilevel CFA of conflict and satisfaction scales (Study 1)

Factor/Item	Loading	<i>SE</i>	<i>z</i>	Uniqueness
Task conflict				
TC1	0.783	0.036	21.644	.386
TC2	0.678	0.044	15.383	.540
TC3	0.804	0.037	21.782	.353
Relationship conflict				
RC1	0.796	0.041	19.400	.367
RC2	0.822	0.038	21.475	.324
RC3	0.622	0.062	9.985	.613
Satisfaction				
SAT1	0.915	0.080	11.475	.162
SAT2	0.684	0.079	8.604	.533

Notes. $N = 408$ - 411 individuals nested in 73 teams. Factor correlations were $.545$ ($z = 10.914$) between task and relationship conflict, $-.281$ ($z = 2.885$) between task conflict and satisfaction, and $-.574$ ($z = 7.228$) between relationship conflict and satisfaction. $\chi^2(28) = 955.517$ for the null model.

Preliminary Analysis

Table 4 presents descriptive statistics for the team-level variables. In univariate inspections, the variables measuring substantive conflict, expert influence, average relationship conflict, and average satisfaction were skewed substantially enough to reject normality at a 10% significance level. There were no outliers for any variable. In bivariate analyses, preliminary support for many of the model's predictions was evident. Performance was positively correlated with substantive conflict, greater expert influence, and higher mean expertise. Substantive conflict was positively correlated with greater expert influence. Task conflict was associated with relationship conflict and lower satisfaction at levels comparable in past research (cf. De Dreu & Weingart, 2003). It was not significantly associated with either substantive conflict or performance; implications of this are left for the discussion.

Hypotheses

Conflict and performance. The model predicts a positive relationship between substantive conflict and task performance. From Table 4, the zero-order correlation between the two was .24 ($p < .001$). Controlling for team size and expertise, the partial effect of substantive conflict on performance was also positive and significant, explaining an additional 4% of variance ($F(1, 215) = 12.85, p < .001$; model 2, Table 5). A standard deviation increase in substantive conflict increased the accuracy of the team's consensus ranking by .22 standard deviations. These results supported the proposed relationship.

Table 5: Effect of substantive conflict on task performance (Study 1)

Independent Variable	Accuracy of team's consensus ranking		
	(1)	(2)	(3)
3-person teams	.019 (0.30)	.052 (0.84)	-.054 (1.10)
4-person teams	-.093 (1.58)	-.040 (0.69)	-.007 (0.15)
5-person teams	-.102 (1.71)	-.073 (1.24)	-.095 (2.04)
7-person teams	.107 (1.86)	.119 (2.11)	.074 (1.65)
Mean expertise	.525 (9.11)	.506 (8.97)	.451 (10.06)
(Mean expertise) ²	.082 (1.33)	.137 (2.21)	.120 (2.44)
Substantive conflict		.219 (3.58)	.083 (1.67)
Expert influence			.531 (11.46)
Δ in R^2	.31	.04	.24
<i>F</i> -test	$F(6, 216) = 15.8$	$F(1, 215) = 12.9$	$F(1, 214) = 131.3$

Notes. $N = 223$. 6-person teams are the omitted category. Standardized regression coefficients are reported with *t*-values in parentheses. *t*-values greater than 1.65, 1.97, and 2.60 are significant at alpha levels of .10, .05, and .01, respectively.

The model identifies two mechanisms through which this effect occurs: an increase in potential productivity and an improved task process. This study focused on the latter, proposing that substantive conflict facilitates the search for expertise in the group. Presumably, groups who are better able to identify their experts will also weigh their judgments more heavily, which should improve performance. This mediation by expert influence was examined using the procedure outlined by Baron and Kenny (1986). The first requirement is to establish a significant association between the independent variable (substantive conflict) and the dependent variable (task performance). As described in the preceding paragraph, this requirement was met. The second requirement

is to establish a significant association between the independent variable and the mediating variable (expert influence). From Table 4, the correlation between substantive conflict and expert influence was $.22$ ($p < .001$). Substantive conflict was also a significant predictor of expert influence controlling for team size and expertise ($\beta = .26$, $t(215) = 3.61$, $p < .001$). This satisfied the second requirement. The final step is to establish a significantly smaller association between the independent and dependent variables with the mediating variable included. This result is presented in Table 5, model 3. Not surprising, expert influence explained significant variance in task performance beyond the other predictors ($\Delta R^2 = .24$, $p < .001$). The effect of substantive conflict on performance was reduced but still significant at an alpha of 10%. A Sobel test revealed a significant difference between the unstandardized coefficients for substantive conflict in models 2 and 3 ($\Delta b = .327$, $SE = .095$, $Z = 3.45$, $p < .001$). Overall, greater expert influence explained about 62% of the total effect of substantive conflict on performance. In sum, this provided support for partial mediation—teams with greater substantive conflict outperformed teams with less in part because they were better at identifying their experts and weighting them appropriately.

Task conflict and psychosocial outcomes. The final set of predictions involved the associations among task conflict, relationship conflict, and satisfaction. As in prior work (cf. De Dreu & Weingart, 2003), task conflict was positively associated with relationship conflict ($r(73) = .67$, $p < .001$) and negatively associated with satisfaction ($r(73) = -.53$, $p < .001$). However, because these were correlations of team-level averages, they overstated these effects at the individual level (Robinson, 1950), which

were .25 and .05 (adjusted for group averages), respectively. The model proposes, moreover, that the effect of task conflict on satisfaction is confounded in part by its association with relationship conflict.

Because of these issues, hierarchical linear modeling was used to examine simultaneously these associations at the individual and team levels. Three regressions were run. In the first (model 1), satisfaction (SAT) was regressed only on task conflict (TC). The level-1 and level-2 equations were as follows:

$$(1.1) \quad \text{SAT}_{ij} = \beta_{0j} + \beta_1 \text{TC}_{ij} + r_{ij}$$

$$(1.2) \quad \beta_{0j} = \gamma_{00} + \gamma_{01} \mathbf{TC}_j + u_{0j},$$

where i indexed individuals nested in group j , and bold lettering (e.g., \mathbf{TC}_j) indicated the mean level of the variable per team. In this specification, only the intercepts (β_{0j}) were modeled as random variables; slopes were assumed fixed and equivalent across teams. Thus equation 1.1 modeled within-team variation in satisfaction as a function of individuals' reported task conflict, and equation 1.2 modeled between-team variation in satisfaction (i.e., variation in intercepts) as a function of the group's average level of task conflict. The second regression (model 2) examined the zero-order association between task and relationship conflict, with the following specification:

$$(2.1) \quad \text{RC}_{ij} = \beta_{0j} + \beta_1 \text{TC}_{ij} + r_{ij}$$

$$(2.2) \quad \beta_{0j} = \gamma_{00} + \gamma_{01} \mathbf{TC}_j + u_{0j}.$$

Within-team variation in relationship conflict was modeled as a function of individuals' reported task conflict (equation 2.1), and between-team variation in relationship conflict was modeled as a function of the group's average level of task conflict (equation 2.2). In

the final regression (model 3), satisfaction was regressed on both task conflict and relationship conflict, with the following specification:

$$(3.1) \quad SAT_{ij} = \beta_{0j} + \beta_1 TC_{ij} + \beta_2 RC_{ij} + r_{ij}$$

$$(3.2) \quad \beta_{0j} = \gamma_{00} + \gamma_{01} \mathbf{TC}_j + \gamma_{02} \mathbf{RC}_j + u_{0j}.$$

Within-team variation in satisfaction was modeled as a function of individuals' reported task and relationship conflict (equation 3.1), and between-team variation in satisfaction was modeled as a function of the group's average levels of task and relationship conflict (equation 3.2). Thus the unique effects of task conflict on satisfaction controlling for relationship conflict could be assessed at the individual and team levels, respectively.

The results are summarized in Table 6. They reveal important differences at the team and individual levels of analysis. Between teams, increases in the average level of task conflict (Mean TC) predicted both lower average satisfaction (model 1) and higher average relationship conflict (model 2), which was consistent with the correlations presented in Table 4. When satisfaction was regressed on average levels of task and relationship conflict (Mean RC), only the effect of relationship conflict remained significant (model 3). The unique effect of Mean TC on satisfaction did not differ from zero and was significantly less than its effect in model 1 ($\chi^2(1) = 15.85, p < .001$). In other words, holding the average level of relationship conflict constant, teams with higher task conflict were no less satisfied than teams with low task conflict.

A different pattern emerged at the individual level of analysis. Within teams, increases in task conflict (TC) did not predict lower satisfaction (model 1) but did predict greater relationship conflict (model 2). In model 3, the unique effect of task conflict on

satisfaction controlling for relationship conflict (RC) was actually positive (model 3) and greater than its effect in model 1 ($\chi^2(1) = 2.74, p < .10$). Again, holding relationship conflict constant, individuals reporting more task conflict also reported higher satisfaction.

Table 6: Effects of task conflict on relationship conflict and satisfaction (Study 1)

	Dependent Variable		
	SAT (1)	RC (2)	SAT (3)
Fixed effects			
Intercept	6.01 (.060)**	1.83 (.052)**	6.01 (.049)**
TC ^a	0.05 (.052)	0.18 (.038)**	0.13 (.050)**
Mean TC	-0.39 (.077)**	0.50 (.066)**	-0.06 (.084)
RC ^a			-0.46 (.069)**
Mean RC			-0.67 (.112)**
Variance components			
Intercept (σ^2_{u0})	.105 (.045)*	.107 (.033)*	.034 (.031)*
Residual (σ^2_r)	.885 (.068)*	.491 (.038)*	.785 (.060)*
Log restricted-likelihood	-580.73	-471.06	-547.88

Notes. $N = 411$ individuals nested in 73 teams. TC is task conflict, RC is relationship conflict, and SAT is satisfaction. Models were fit using maximum restricted likelihood estimation. Regression coefficients are reported with standard errors in parentheses.

^aCentered by group mean. * $p < .05$, ** $p < .01$.

DISCUSSION

The predictions of the model of team conflict tested in this study were largely supported. In a study of 223 intact MBA teams comprising nearly 1,200 people, substantive conflict increased team performance on a complex decision-making task. Although direct evidence about teams' processes was unavailable, the results suggested that substantive conflict improved the identification and weighting of the more knowledgeable team members. Yet teams with greater substantive conflict did not by and large report greater task conflict. What did drive perceptions of task conflict remains unanswered. As in prior studies, task conflict was associated positively with relationship conflict and negatively with satisfaction at the group level. But when satisfaction was modeled as a function of both task and relationship conflict, teams reporting high levels of task conflict were no less satisfied than those reporting low levels, and individuals reporting high levels were *more* satisfied than those reporting low levels.

This initial study makes valuable contributions to the literature on team conflict. Foremost, it is the first study to integrate and compare the effects of conflict as a state (substantive conflict) and as an interaction (task conflict). In an important finding, the two proved only weakly related to each other ($r(73) = .19$). What are the implications of this? For one, it provides strong initial evidence for the discriminant validity of the two constructs, a central assumption of the model proposed in chapter 1. Second, it sheds light on the failure to find a robust positive association between task conflict and performance in past research, which has led some authors to conclude that task conflict is

at best ineffective (e.g., De Dreu, 2008; De Dreu & Weingart, 2003; Ilgen et al., 2005). The model proposed here argues that performance is a function of substantive, not task conflict. Any correlation between task conflict and performance, moreover, may in part be spurious (see Figure 2). Perceptions of conflict may correlate with performance when they accurately reflect objective task-related differences. In cases where they do not—namely, when the correlation between substantive and task conflict is weak or negative, as in this study—the association between task conflict and performance will also be poor. A third implication is that future research on team conflict in field settings must revisit its assumptions and methods. Task conflict may or may not be an accurate barometer of objective task-related differences. This may not matter if the interest is in the effect of task conflict on psychosocial outcomes like satisfaction. It will matter, however, for theories of task performance, in which case researchers must be more explicit about how perceptions of conflict affect performance apart from any information they transmit about objective task differences.

The study also provides initial support for the mechanisms by which substantive conflict improves task performance. In this decision-making task, the focus was on an improved task process as the mediator, and the results indicated that teams with higher substantive conflict were better at weighting the judgments of more knowledgeable team members. The inference is that substantive conflict alerted team members to the uncertainty among them and stimulated a search for expertise in the group. Ideally, future research should include measures of interaction that inquire directly about the search for expert influence in the group. Future research should also be directed at the relative

contribution of higher potential productivity and improved task process across different types of team tasks.

The study also underscores the importance of multilevel analysis in the study of team conflict. Most research aggregates perceptions of conflict and other psychological variables to the team level, justified by various indices of agreement. This not only raises problematic issues of construct validity (see chapter 1), it also leads to inflated estimates of effect sizes at the person-level (Robinson, 1950). This was true of the current results. Although teams with higher average levels of task conflict were less satisfied, within-team variation in task conflict was unrelated to individual satisfaction.¹ Task conflict, furthermore, explained about 45% of the variance in relationship conflict at the team level but only about 6% at the individual level. Most intriguing, the analysis indicated that holding relationship conflict constant, individuals found the experience of working through perceived task-related differences satisfying. Had this association been examined only at the team level, this possibility would have been missed.

Limitations

The obvious limitation of this study is its correlational, cross-sectional nature. Conclusions about causality are on firmer ground with performance—substantive conflict and expertise was measured prior to teams' interaction and submission of a consensus

¹ This will also be true if there is high intragroup agreement in the level of task conflict or satisfaction. When there is restricted within-team variation in either or both variables, there will be insufficient power to detect covariation between them. Because between-team differences were a large contributor to overall variation in task conflict compared with within-team differences ($ICC[1] = .30$), this explanation cannot be ruled out as an alternative in the current results.

judgment. Yet it remains possible that a third variable accounted for both substantive conflict and performance. As for perceived conflicts and satisfaction, causality cannot be assessed. It is common to argue that task conflict causes relationship conflict because people take disagreements personally or misattribute them to interpersonal differences (Amason, 1996; Mooney et al., 2007; Simons & Peterson, 2000; Torrance, 1957). The fact that this study featured teams with short histories together, and were assumed to have few pre-existing interpersonal conflicts, provides some support that task conflict led to relationship conflict and not vice versa. Establishing this more convincingly, however, will take further research. Similarly, it is also entirely possible that individuals less satisfied by the experience reported higher retrospective accounts of conflict than those more satisfied.

A second limitation shared by other research on intragroup conflict is the impact of common method variance. Task conflict, relationship conflict, and satisfaction were assessed by the same people, at the same time, and on the same scale. These conditions are likely to produce spuriously inflated correlations among the constructs (Podsakoff et al., 2003). Future research would benefit from the use of different instruments for each construct, administered at different times and to different team members. For sufficiently large samples, confirmatory factor analysis can be used to model and test the impact of method variance directly (Podsakoff et al., 2003).

CONCLUSION

A study of 223 MBA teams performing a complex decision-making task supported many of the predictions of the integrative model of team conflict proposed in

chapter 1. On the whole, the results justify renewed optimism about the role that conflict can play in improving team effectiveness. They thus stand in contrast to recent verdicts that decidedly disparage that role.

As a correlational and cross-sectional study, however, the causal propositions made in the model could not be adequately tested. The study also failed to address a number of other propositions: How does higher potential productivity mediate the relationship between substantive conflict and performance? What predicts whether perceptions of conflict will be veridical? Do personality differences affect the degree to which people find task conflict satisfying or unsatisfying? These issues are addressed by the laboratory study of team conflict presented in next.

CHAPTER 3

In this chapter I build upon the results of the correlational study presented above. As discussed, one limitation of that study was its inability to make strong conclusions about causality. An omitted variable may have been responsible for both increases in substantive conflict and task performance, leading to a spurious correlation between them. Task conflict may have been driven by pre-existing interpersonal differences rather than by the substantive conflict associated with the task. And the strong associations among perceptions of conflict and satisfaction may have been due in part to common method bias.

Study 2 addressed these limitations with a laboratory experiment. Undergraduates in 3-person groups were randomly assigned to one of four experimental conditions—a high versus low conflict condition crossed with an open versus closed task process. Their task was to make a series of sales forecasts for a fictional company. Thus whether the results in chapter 2 were similar for a different population (undergraduates vs. MBAs), type of group (ad hoc vs. intact), and task (forecasting vs. problem-solving) could be evaluated. The design eliminated the natural variation in group size and expertise that arose in the prior study, and it featured a number of techniques aimed at reducing common method bias.

STUDY 2

The following relationships proposed in the model of team conflict were examined in this study: the effect of substantive conflict on team task performance, and the role of potential productivity as a mediator of that relationship; the effect of an open

task environment on the accuracy of conflict perceptions; and the associations among task conflict and multiple psychosocial outcomes, and the degree to which differences in epistemic motivation affect these relationships. As in the first study, a multilevel approach is taken to examine these relationships at both the individual and team levels.

METHOD

Sample

One hundred and eighty undergraduates ($M_{\text{age}} = 21.5$, $SD = 2.9$; 97 female) at a southeastern U.S. university participated in the experiment for a guaranteed payment of \$10 and a bonus based on individual ($M = \$2.30$, $SD = \$0.54$) and team performance ($M = \2.76, $SD = \$0.42$). Participants were run as 3-person groups ($N = 60$) which were randomly assigned to conditions. Diversity of age, gender, ethnicity, and academic major varied naturally within groups.

Procedure

Groups were run serially in one computer-equipped room of the institution's behavioral laboratory. An hour was allotted for each group, though nearly all took less time than this. Once in the room, group members were seated randomly at one of three computer terminals and started simultaneously following the administrator's instructions. There were four phases to the exercise. In Phase 1, group members worked independently to answer questions measuring individual personality traits. Group members also worked independently in Phase 2, in which they were first trained on a judgment task and then made a series of criterion judgments (details of this phase, which differed by condition,

are presented below.) Following this, the administrator re-entered the room to provide instructions about Phase 3, in which members worked as a group. They were instructed to review their initial individual judgments made in Phase 2 with each other and then to submit a collective judgment for the group. In Phase 4, group members worked independently again to answer questions about their team's process, perceptions of conflict, satisfaction, and other variables. Once complete, they were paid their participation fee and performance bonuses. Instructions for Phases 2 and 3 are provided in Appendix A.

Task and Design

Groups were randomly assigned to one of four between-subject condition ($n = 15$) formed by crossing substantive conflict (high vs. low) with task process (open vs. closed). The task and design were greatly influenced by the cognitive-conflict paradigm of social judgment theory (Brehmer, 1976; Hammond, 1973). In this paradigm, individuals are trained to make decisions based on cues which are probabilistically related to a criterion. They are subsequently placed in groups (dyads in most studies) and required to make predictions of the criterion jointly. Investigators manipulate the level of substantive conflict between individuals through the training. For instance, one person may be trained to believe that Cue A is strongly related to the criterion and Cue B has little relation, while his or her partner is trained to believe the opposite. As a result, the individuals will have conflicting beliefs about the correct criterion value.

The present study modified that paradigm in several respects. The team's task was to make 24 forecasts of changes in the monthly sales of a fictional company (e.g., +1.0%,

-0.3%, etc.). Four cues were available to make these forecasts: monthly point changes in the S&P 500 index, the firm's monthly cash flow, monthly changes in the firm's website traffic, and the firm's number of patents. Although the names of the criterion and cues were authentic, their specific values and covariance structures were simulated (see Tables 7 and 8). This task environment was chosen for two primary reasons. First, it was unfamiliar to the participants, which minimized the opportunity for pre-existing knowledge to interfere with the training or credibility of the exercise. Second, it maps well onto organizational functions. Cash flow is relevant to those in finance and accounting, website traffic to those in sales and marketing, and patents to those in research and development.

Substantive conflict. The manipulation of substantive conflict was designed to mimic belief heterogeneity in real-world organizational teams. When team members come from similar educational or functional backgrounds, they are likely to think similarly about issues, attend to similar information, and have correlated beliefs (Beyer et al., 1997; Dearborn & Simon, 1958; Walsh, 1988). Conversely, team members from dissimilar backgrounds are likely to have conflicting perspectives, information, and beliefs. Organizational teams also feature a mix of information shared among members and information unshared and distributed. To manipulate substantive conflict, I thus chose to manipulate the distribution of cues among group members. Groups in the high-conflict condition resembled a cross-functional team: one person was trained to predict monthly changes in sales based on the S&P 500 index and cash flow ("the accountant"), the second based on the S&P 500 index and website traffic ("the marketer"), and the third

based on the S&P 500 index and patents (“the engineer”) (assignment to these roles was random). For these groups, there was one shared cue (the S&P 500 index) and three unshared cues. Groups in the low-conflict condition resembled a functional team of engineers: all three members were trained to predict monthly changes in sales based on the S&P 500 index and patents. For these groups, both cues were shared by all members.

Training on the judgment task took place in Phase 2 and comprised 48 trials. On each trial, participants saw the values of their two cues on the computer screen and were asked for their prediction of changes in monthly sales. After confirming their prediction, they were provided with immediate feedback—the actual value of the criterion and their error—which they could review for 15 seconds before automatically moving to the next trial. Participants worked independently during this phase and were *not* told that other group members might be trained differently. The training was designed to generate similar judgment policies and predictions for low-conflict groups and dissimilar judgment policies and predictions for high-conflict groups. Moreover, it attempted to keep expertise constant across team members regardless of condition. Table 7 summarizes the training task environment.

Table 7: Training task environment (Study 2)

Variable	Mean	SD	Pearson correlations			
			1	2	3	4
1. Percent change in sales (criterion)	1.67	3.65	1.00			
2. Change in S&P 500 index (points)	13.96	11.73	.44	1.00		
3. Cash flow (\$ million)	10.56	5.55	.90	.35	1.00	
4. Change in website traffic (1,000s)	62.69	53.72	.90	.58	.76	1.00
5. Number of patents	3.33	1.69	.90	.40	.75	.69

Role	Cue				R^2
	S&P 500 index	Cash flow	Website traffic	Patents	
Accountant	.15	.85			.84
Marketer	-.12		.97		.82
Engineer	.11			.85	.82
All	-.07	.30	.44	.39	.99

Notes. Training consisted of 48 trials. Normative judgment policy for predicting criterion based on least-squares regression (standardized coefficients reported).

Table 8: Criterion task environment (Study 2)

Variable	Mean	SD	Pearson correlations			
			1	2	3	4
1. Percent change in sales (criterion)	0.60	2.30	1.00			
2. Change in S&P 500 index (points)	10.42	11.36	.33	1.00		
3. Cash flow (\$ million)	9.30	5.49	.74	.38	1.00	
4. Change in website traffic (1,000s)	46.96	40.69	.72	.17	.25	1.00
5. Number of patents	2.75	1.22	.65	.33	.23	.31

Role	Cue				R^2
	S&P 500 index	Cash flow	Website traffic	Patents	
Accountant	.06	.71			.55
Marketer	.22		.69		.57
Engineer	.13			.61	.44
All	-.09	.56	.47	.40	.99

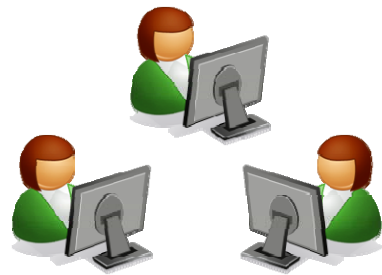
Notes. There were 24 criterion judgments. Normative judgment policy for predicting criterion based on least-squares regression (standardized coefficients reported).

After the training, participants independently made their 24 criterion judgments. As in the training, the values of their respective cues were presented on the screen, and the participants were asked for their prediction. Unlike in the training, the participants did not receive feedback on their performance. However, they were informed that they would earn additional money based on the accuracy of their judgments, which they would learn at the end of the experiment. The per trial bonus was the greater of 0 cents or 20 minus 5 cents for each percentage-point error (e.g., if the prediction was +1.0% and the true value -1.0%, the bonus was 10 cents). New criterion and cue values were drawn from the same population as those of the training sample. Table 8 summarizes the task environment for the criterion judgments, which due to sampling error differed slightly from the training environment.

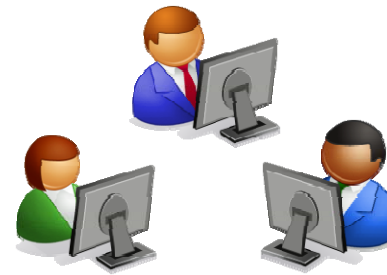
Task process. The openness of the group's task process was manipulated in two ways. The first was in the seating of the participants in the room. In the open condition, group members sat at a common table with their computers in front of them; these group members worked together in close proximity and face-to-face. In the closed condition, group members sat in opposite corners of the room; these group members worked together at a distance and had to physically move to communicate with each others. The second manipulation was in the instructions provided by the administrator at the start of Phase 3. All groups were told to work together to arrive at a collective forecast for the 24 periods using whatever strategy or method they preferred. They were also told they would earn additional money based on the accuracy of their group's forecasts (the incentive system was identical to that outlined above). At this point the instructions

diverged for the two task-process condition. Open groups were encouraged to debate freely their individual forecasts, to avoid reaching a quick consensus, to consider all information, and to not place a time limit on their deliberation; closed groups were urged to avoid open debate over their individual forecast, to reach a quick consensus, to limit the amount of information considered, and to place a time limit on deliberation as necessary. (See Appendix A for the exact text.)

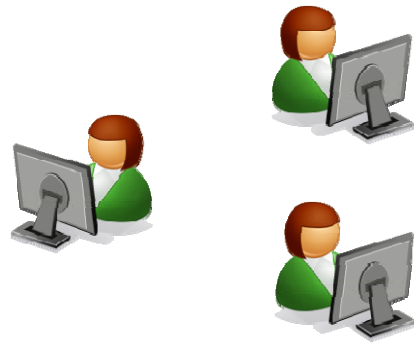
The task setting for each of the four experimental conditions is illustrated in Figure 3. Following the manipulation of task process, the group exercise began (Phase 3). Group members saw on their computer screens the original cue values and their initial forecasts. After discussing these, they entered their group's criterion forecast. They then made their final, private individual forecast of the criterion. This repeated for the 24 periods, after which group members completed the post-task questions (Phase 4) and were dismissed.



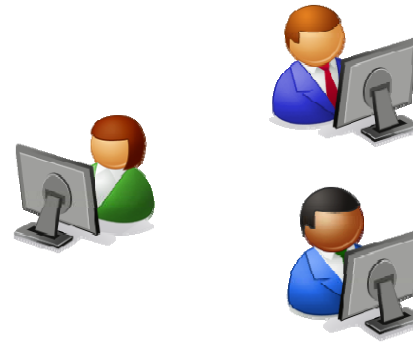
Low conflict-Open task process



High conflict-Open task process



Low conflict-Closed task process



High conflict-Closed task process

Figure 3: Experimental conditions of Study 2

Measures

Manipulation checks. Assessing the manipulation of substantive conflict was straightforward. For each criterion trial, the group started with their three independent forecasts. The standard deviation of these three forecasts measured how similar or dissimilar they were. These per-trial standard deviations were averaged over the 24 periods for a group-level score called *substantive conflict*; these scores were expected to be significantly higher for the high-conflict groups. In addition, responses to four post-task questions were averaged to create a measure of *perceived differences*, which assessed the extent to which group members perceived their forecasts as similar or dissimilar. (The scales for all self-reported measures in Phases 1 and 4 are listed in Appendix B.)

Two measures were used to assess the manipulation of task process. Presumably, open groups would spend more time on the task as they discussed and debated their differences, so *logged time* was one measure. A second measure asked participants directly about the extent to which they deliberated during the task. Responses to five post-task questions were averaged to create a measure of *perceived discussion* for each individual.

Performance. Individuals and groups were judged on the accuracy of their criterion forecasts. The absolute deviation between the true criterion value and the individual or group forecast was calculated for each trial. These were then averaged over the 24 periods to provide a mean absolute deviation score for *actual performance* (Actual MAD) by both individuals and groups. Lower actual MADs indicated superior performance.

Potential productivity. The model proposes increases in potential productivity as one mechanism through which substantive conflict improves task performance. The standard for this is debated. Steiner (1972) argued that groups should be expected to perform at the level of their most expert member. Gigone and Hastie (1997) discussed the problems with this and proposed as a benchmark instead the performance of the group's average judgment (which should not be confused with the judgment of the average person in the group). This was the approach chosen here. For each trial, the average of group members' independent forecasts was calculated. The absolute deviation between the true criterion value and this average forecast was calculated and then averaged over the 24 periods. This provided a *potential performance* (Potential MAD) the groups could achieve simply by averaging their individual forecasts.

Psychosocial measures. Two instruments were used in Phase 1 to assess epistemic motivation. *Need for cognition* was measured with ten items from the International Personality Item Pool (Goldberg et al., 2006). And as part of a Big-5 personality inventory, *Openness to experience* was assessed with eight trait adjectives (Goldberg, 1990; Saucier, 1994). All other self-reported measures were completed in Phase 4. *Task conflict* and *relationship conflict* were measured using Jehn's (1995) original intragroup conflict scale; responses to four items per conflict were averaged for each participant. Each participant's *liking* of their other group members was measured with the average response to four items. *Positive affect* was measured with the average response to ten trait adjectives (Watson, Clark, & Tellegen, 1988). And *satisfaction* was measured with the average response to two items.

Table 9: Psychometric properties of self-reported measures (Study 2)

Construct	Items	Confirmatory tests of unidimensionality							α	ICC(1)
		χ^2	<i>df</i>	<i>p</i> <	CFI	TLI	RMSEA	SRMR		
Openness to experience ^a	8	91.140	17	.01	.821	.704	.156	.099	.74	NA
Need for cognition ^a	10	67.972	28	.01	.907	.851	.089	.057	.76	NA
Perceived differences ^a	4	0.424	1	.52	1.00	1.02	.000	.003	.87	.266*
Perceived discussion	5	5.567	5	.36	.997	.993	.025	.028	.82	.389*
Task conflict	4	1.653	2	.44	1.00	1.01	.000	.020	.74	.137*
Relationship conflict	4	9.961	2	.01	.837	.510	.149	.051	.72	.009
Liking	4	1.605	2	.45	1.00	1.00	.000	.012	.87	.198*
Positive affect	10	132.026	35	.01	.855	.813	.124	.070	.90	.153*
Satisfaction	2				NA				.87	.138*

Notes. *N* = 180 individuals nested in 60 teams. CFA estimator was maximum-likelihood with robust standard errors to account for correlated responses within groups (for all but pre-existing differences in openness to experience and need for cognition, which used maximum-likelihood estimation). ^aIndicator errors were free to covary for reverse-coded items and common word stems (e.g., creative, uncreative); full details are available from the author. CFI is the comparative-fit index; TLI is the Tucker-Lewis index; RMSEA is the root mean square error of approximation; and SRMR is the standardized root mean square residual. Reasonably good fit is indicated by CFIs/TLIs > .95, SRMRs < .08, and RMSEAs < .06 (Brown, 2006). **F*(59, 120) > 1.43, *p* < .05.

RESULTS

Measurement Model

Self-reported scales were evaluated for unidimensionality and reliability through a combination of item-level and factor analyses. A summary of their psychometric properties is presented in Table 9. Although the reliability of the composite scores was adequate for all measures, a unidimensional factor model fit the data poorly for some constructs.

Preliminary Analysis

The criterion forecasts were examined for data entry errors. Of the 4,320 individual forecasts (180 people x 24 periods), only two were extreme (predictions of 33.5% and 23%) and dropped from the analysis. Another 64 were considered mild outliers, distributed similarly across condition, and were included in the analysis. There were no outliers in the group forecasts.

Groups were examined for unplanned differences across conditions which might affect the results. These included diversity of the groups in age, gender, ethnicity, and academic major; the time that individuals spent on the 48 training trials and 24 criterion trials; and individual expertise (operationalized as the MAD of each individual's initial criterion estimates). None of these variables differed significantly across roles (i.e., cue distribution) or conditions.

Descriptive statistics for all variables are presented in Table 10.

Table 10: Summary statistics and correlations (Study 2)

No.	Variable	Mean	SD	Pearson correlations						
				1	2	3	4	5	6	
1.	High conflict condition ^a	0.50	0.50	1.00						
2.	Open task process ^a	0.50	0.50	.00	1.00					
3.	Substantive conflict ^a	1.75	0.47	.61	-.05	1.00				
4.	Perceived differences	0.05	0.84	.46	.03	.35	1.00			
5.	Logged time ^a	6.58	0.39	.40	.48	.31	.37	1.00		
6.	Perceived discussion	3.76	1.07	.15	.45	.06	.05	.62	1.00	
7.	Actual MAD ^a	1.70	0.35	-.59	.08	-.31	-.52	-.44	-.24	1.00
8.	Potential MAD ^a	1.61	0.37	-.69	-.02	-.30	-.48	-.43	-.28	-.24
9.	Task conflict	0.89	0.40	.28	.13	.13	.25	.49	.43	.43
10.	Relationship conflict	0.17	0.21	.07	.03	.03	-.02	.21	.05	.05
11.	Liking	1.00	0.43	-.03	-.11	.00	-.24	-.05	.33	.33
12.	Positive affect	3.10	0.68	.26	-.06	.15	-.07	.19	.42	.42
13.	Satisfaction	0.61	0.81	.08	-.13	.04	.04	.13	.28	.28
14.	Need for cognition	0.79	0.31	.21	.03	-.02	.12	.28	.26	.26
15.	Openness to experience	4.06	0.45	.27	.11	.34	.10	.22	.16	.16

No.	Variable	Pearson correlations							
		7	8	9	10	11	12	13	14
7.	Actual MAD ^a	1.00							
8.	Potential MAD ^a	.84	1.00						
9.	Task conflict	-.44	-.44	1.00					
10.	Relationship conflict	-.22	-.16	.54	1.00				
11.	Liking	.16	.03	-.10	-.26	1.00			
12.	Positive affect	-.10	-.17	.27	.19	.53	1.00		
13.	Satisfaction	-.11	-.12	.23	.14	.49	.78	1.00	
14.	Need for cognition	-.19	-.16	.15	-.12	.08	.04	.17	1.00
15.	Openness to experience	-.12	-.15	.34	-.02	.08	.09	.05	.42

Notes. $N = 60$ groups. MAD is mean absolute deviation (lower values equal better performance). ^aUnit of measurement is the group; all other variables were measured at the individual level and averaged within group (intraclass correlations for these measures are reported in Table 9). Correlations exceeding approximately .22, .26, and .34 in absolute value are significant at alpha levels of .10, .05, and .01, respectively

Manipulation Checks

The manipulation of substantive conflict was successful. Table 10 shows positive correlations between the high-conflict condition and both substantive conflict ($r = .61$) and the average perceived difference among the forecasts reported by group members ($r = .46$). Analysis of variance indicated that substantive conflict was significantly higher in high-conflict groups ($M = 2.03, SD = .35$) than low-conflict groups ($M = 1.47, SD = .40$) ($F(1, 56) = 33.56, MSE = .142, p < .001; \omega^2 = .35$); high-conflict groups ($M = .44, SD = .77$) also reported greater differences in their forecasts than low-conflict groups ($M = -.33, SD = .72$) ($F(1, 56) = 15.50, MSE = .569, p < .001; \omega^2 = .19$). In other words, groups consisting of three engineers made more similar predictions than groups consisting of an accountant, a marketer, and an engineer. Neither the manipulation of task process nor its interaction with conflict was a significant predictor of either measure.

The manipulation of task process was also successful. Table 10 shows positive correlations between the open task process and both time spent on the group task ($r = .48$) and the average perceived level of discussion reported by group members ($r = .45$). Analysis of variance indicated that open groups ($M = 6.77, SD = .38$) spent more time on the task than closed groups ($M = 6.40, SD = .31$) ($F(1, 56) = 21.06, MSE = .099, p < .001; \omega^2 = .25$); open groups ($M = 4.24, SD = 0.80$) also reported greater discussion than closed groups ($M = 3.28, SD = 1.10$) ($F(1, 56) = 14.94, MSE = .921, p < .001; \omega^2 = .19$).

Though not predicted, high-conflict groups ($M = 6.74, SD = .32$) also spent more time on the task than low-conflict groups ($M = 6.43, SD = .40$) ($F(1, 56) = 14.30, p <$

.001; $\omega^2 = .18$). They did not, however, report more discussion than low conflict groups ($F(1, 56) = 1.74, ns$).

Hypotheses

Conflict and performance. Because time spent on the task was correlated with both actual MAD ($r = .44$) and the experimental conditions, it was included as a covariate in the analysis of variance. Controlling for time, high-conflict groups ($M = 1.50, SD = .29$) performed better (i.e., had lower actual MADs) than low-conflict groups ($M = 1.91, SD = .28$) ($F(1, 55) = 15.11, MSE = .070, p < .001; \omega^2 = .19$). Surprisingly, open groups ($M = 1.73, SD = .37$) performed slightly worse than closed groups ($M = 1.67, SD = .32$) ($F(1, 55) = 5.51, p < .05; \omega^2 = .07$). That is, groups who deliberated more over their forecasts underperformed groups that deliberated less, holding time constant. Reasons for this result are left for the discussion. The interaction of conflict and task process on actual performance was not significant.

The model proposes that substantive conflict improves performance in part because it increases the potential productivity of the group. This was measured by potential MAD, which was what was achievable by the group if members simply averaged their independent estimates without discussion. To establish mediation, the independent variable (conflict condition) should predict both the dependent variable (actual MAD, step 1) and the mediating variable (potential MAD, step 2) but have significantly less influence on the dependent variable controlling for the mediator (step 3; Baron & Kenny, 1986). The results are presented in Table 11.

Table 11: Effects of conflict on potential and actual performance (Study 2)

Variable	Dependent Variable		
	Actual MAD	Potential MAD	Actual MAD
	(1)	(2)	(3)
Logged time	-.356** (.113)	-.238* (.115)	-.189* (.081)
Open task process	.189* (.080)	.076 (.082)	.135* (.056)
High-conflict groups	-.299** (.077)	-.435** (.079)	.011 (.066)
Process x conflict	-.062 (.137)	.020 (.140)	-.076 (.095)
Potential MAD			.710** (.091)
Adjusted R^2	.42	.47	.72
F test	$F(4, 55) = 11.57$ $MSE = .070$	$F(4, 55) = 14.20$ $MSE = .074$	$F(5, 54) = 31.34$ $MSE = .034$

Notes. $N = 60$ groups. Negative coefficients reduce MADs, improving performance. Open task process and high-conflict groups are effects coded; unstandardized coefficients thus indicate differences in group means adjusted for covariates. Standard errors are reported in parentheses. Intercepts omitted. * $p < .05$, ** $p < .01$.

As discussed above, high-conflict groups had lower actual MADs than low-conflict groups, which satisfied step 1. High-conflict groups also had lower potential MADs than low-conflict groups, which satisfied step 2. This, of course, was expected; because the high-conflict groups by design had dissimilar forecasts (i.e., more substantive conflict), a simple average of them was likely to be more accurate than an average of forecasts by the low-conflict groups, which were similar (Hogarth, 1978). Finally, the effect of conflict condition on actual MAD was significantly less once its impact on potential MAD was accounted for (step 3). The difference in the coefficients for high-conflict groups between the unmediated and mediated models was significantly greater than zero by a Sobel test ($\Delta = -.309$, $SE = .069$, $Z = 4.51$, $p < .01$), and conflict condition was no longer a significant predictor of actual MAD. In sum, in this judgment and task environment, the association between conflict condition and actual performance was completely mediated by the higher potential productivity of the high-conflict groups. Beyond this, conflict had no effect on performance.

Substantive conflict and task conflict. Teams' average level of reported task conflict was correlated moderately with conflict condition ($r = .28$) and weakly with substantive conflict ($r = .13$). The model proposes that the relationship between objective and perceived conflicts will be stronger in open task environments. To test this, task conflict was regressed on the main and interactive effects both of conflict condition and task process and of substantive conflict and task process. In neither regression was the interaction between task process and conflict significant. In sum, an open task process did not improve the accuracy of conflict perceptions as proposed.

Task conflict and relationship conflict. The model predicts a positive association between task and relationship conflict moderated by an open task process. Unfortunately, there was very little variance in relationship conflict reported by individuals; of the 180 participants, 125 reported zero relationship conflict, with the remainder scoring below the midpoint of the five-point scale. At the group level, the average reported relationship conflict was zero for 23 teams and less than one for the remainder. These distributions did not vary by experimental condition. As a result of this range restriction, formal tests of the predicted effects were not carried out. The non-parametric, Spearman correlations between task and relationship conflict were .38 for low-conflict teams with the closed task process, .74 for low-conflict teams with the open task process, .53 for high-conflict teams with the closed task process, and .64 for high-conflict teams with the open task process. If anything, these results suggest that the association between task and relationship conflict was stronger in the open task environment, not weaker as expected.

Task conflict and psychosocial outcomes. The model proposes that controlling for its association with relationship conflict, task conflict will have a positive influence on the liking of fellow group members, satisfaction, and positive affect. This influence is also predicted to be stronger for those high in epistemic motivation, namely need for cognition and openness to experience.

At the team level, a multivariate analysis of variance failed to find differences in liking, satisfaction, or positive affect across conditions (Wilks' $\Lambda = .785, ns$). Zero-order correlations were -.10 between task conflict and liking, .23 between task conflict and satisfaction, and .27 between task conflict and positive affect. Controlling for relationship

conflict, their semi-partial correlations were .05, .18, and .19, respectively; all positive as predicted, but none statistically significant. At the individual level, these outcomes were regressed on task conflict, relationship conflict, and the interactions between task conflict and both openness to experience and need for cognition. The results are presented in Table 12. Overall, the predictions were not supported. The unique effect of task conflict controlling for relationship conflict was not significant for any outcome (model 1s), nor were the interactions between task conflict and openness to experience (model 2s) and between task conflict and need for cognition (model 3s).

Table 12: Effects of task conflict on liking, satisfaction, and affect (Study 2)

	Liking			Satisfaction			Positive Affect		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
RC	-.152 (.162)	-.134 (.153)	-.174 (.169)	.175 (.331)	.201 (.322)	.135 (.349)	-.005 (.275)	.021 (.264)	.048 (.294)
TC	-.133 (.104)	.519 (.507)	-.132 (.102)	-.161 (.212)	-.901 (1.064)	-.160 (.210)	-.121 (.176)	-.068 (.873)	-.130 (.178)
OPENX		.253** (.067)			.420** (.141)			.396** (.116)	
TC x OPENX		-.151 (.118)			.182 (.248)			-.007 (.204)	
NFC			.195+ (.101)			.331 (.209)			.016 (.177)
TC x NFC			-.280 (.172)			-.485 (.354)			.178 (.299)
<i>R</i> ² (within)	.04	.16	.09	.01	.08	.05	.01	.10	.01

Notes. *N* = 180 individuals nested in 60 teams. Intercepts and team fixed effects are omitted. Standard errors are in parentheses. TC is task conflict, RC is relationship conflict, OPENX is openness to experience, and NFC is need for cognition. +*p* < .10, **p* < .05, ***p* < .01.

DISCUSSION

Some of the predictions in the proposed model of team conflict were substantiated in this experimental study, but several were not. The manipulation of substantive conflict increased the forecasting accuracy of groups. This was explained entirely by its effect on potential productivity. Hogarth (1978) demonstrated that the validity of a group's mean forecast increases with the accuracy of the component judgments and their inter-correlations. Because the individual forecasts of the high-conflict groups were less correlated (average $r = .38$) than those of the low-conflict groups (average $r = .69$), their mean forecasts were more valid as well.

So did the groups benefit at all from active collaboration? In this judgment and task environment, the evidence suggests not. As discussed above, groups with the open task process performed worse than those with the closed task process, holding time constant. In total, 41 of the 60 groups (68%) had actual MADs that were worse than their potential MADs—that is, they underperformed a simple average of their forecasts. To explain this, it is useful to look inside the teams' processes. Although group judgments were highly correlated with their average forecast (average $r = .94$), this varied across conditions ($F(3, 56) = 2.98$, $MSE = .004$, $p < .05$; $\omega^2 = .09$) Groups with higher levels of substantive conflict were, ironically, less likely to rely on averaging their judgments ($r_s = -.62$, $p < .01$) even though it benefited them the most. Direct evidence for this comes from a post-task question in which group members were asked to choose, from among six options, the decision-making strategy most descriptive of their judgment process (e.g., we averaged, we relied on consensus, we chose an expert, etc.). Only 1 of the 15 high-

conflict, open task process groups claimed they averaged. In comparison, averaging was chosen by 12 of the high-conflict, closed task process groups; 9 of the low-conflict, open task process groups; and 13 of the low-conflict, closed task process groups (all remaining groups chose consensus as their process).

This, nevertheless, does not diminish the benefits of substantive conflict. The model proposes two mechanisms—increases in potential productivity and improvements in task process—by which substantive conflict enhances performance. It also stipulates that the relative importance of these mechanisms will vary by task. For this specific task and judgment environment, substantive conflict helped groups primarily by increasing their potential productivity. Because the environment was conducive to averaging, it is not a complete surprising that the interacting groups failed to do as well as their statistical equivalents (Gigone & Hastie, 1997; Hastie, 1986; Hill, 1982; McGrath, 1984). That a greater number of high-conflict groups underperformed their potential than low-conflict groups (24 vs. 17) should not obscure that they outperformed them in an absolute sense.

Predictions about task conflict by and large were unsupported. The manipulation of substantive conflict did generate higher reports of task conflict, but the effect was modest at best. The manipulation of task process, moreover, did not improve the accuracy of these perceptions. Task conflict had no unique effect on interpersonal liking, satisfaction, or positive affect, either for the entire sample of participants or for those high in epistemic motivation. Finally, although task conflict and relationship conflict were positively correlated, there was remarkably little variance in the latter across participants. This made substantive analysis of relationship conflict problematic.

The weak associations among task conflict and other outcomes may have methodological explanations. For one, these were ad hoc groups with limited time together. Because they were focused on completing their assigned task and moving on, opportunities for interpersonal differences to materialize were absent. And as students, they may have been unwilling to report unkind things about their fellow group members. For another, the low covariances may reflect lower method bias in this study compared with prior work. Researchers typically measure task conflict, relationship conflict, and outcomes like satisfaction at the same time and on a single-scaled instrument. This is likely to inflate the correlations among these constructs (Podsakoff et al., 2003). In this study, task and relationship conflict were rated on an identical 5-point, unipolar scale (and correlated quite high); the other measures, in contrast, were rated on a mix of unipolar and bipolar scales, with either five or seven response options (see Appendix B). Moreover, these measures appeared at random either before the conflict scale or after it. These steps, designed to reduce common method variance among these constructs, may be responsible in part for the poor associations among them.

It should be noted that task conflict did not significantly undermine satisfaction in this study, in contrast with prior work (cf. De Dreu & Weingart, 2003). One reason may be incentives. In real-world teams, groups operate with incentives, goals, and objectives that are in part shared and in part at odds with each other. Cross-functional team members, for instance, serve the group but also represent the parochial interests of their functions. It would be interesting to examine this effect in a mixed-motive experiment. In the present study, group members had the identical goal: maximize the accuracy of their

individual and group judgments. It may be possible to generate more variance in task conflict and relationship conflict if goals are not completely shared. Participants, for example, could be paid in part as a function of their influence over group members.

There is a final interesting story in the results. Whereas task conflict proved a weak predictor of liking, satisfaction, and positive affect, these outcomes were better predicted by perceived discussion. From Table 10, perceived discussion correlated .33 with liking, .28 with satisfaction, and .42 with positive affect (these effect sizes were reduced but still significant at the individual level). In a multivariate regression of liking, satisfaction, and positive affect on perceived discussion and task conflict, only the former had a significant, positive effect ($F(3, 177) = 10.69, p < .01$). The model of team conflict argues that task conflict provides an arena in which people can exercise their mental faculties, which is expected to increase satisfaction, for one. Although task conflict and perceived discussion are correlated ($r = .43$ in this study), and although the items used to measure these constructs are similar, they may be different enough to make separate predictions about their effects. In this study, teams who discussed their differences more were on average happier than those with less discussion, which is consistent with the logic of the proposed model. Going forward, researchers need to discriminate better among perceptual constructs similar to task conflict like debate, information elaboration, and dissent. This requires greater conceptual clarity about their differences, better instrument design, and continued empirical testing. I hope this study provides an impetus for this effort.

CONCLUSION

Sixty 3-person groups were challenged to make accurate forecasts of monthly sales for a fictional company. Half the groups were trained to think similarly about the task, the other half trained to think dissimilarly. Each of these was in turn instructed either to actively collaborate on the task or to accomplish it as quickly as possible. Consistent with the model of team conflict from chapter 1, teams trained to think dissimilarly experience more substantive conflict, which improved their potential and actual performance compared with teams trained to think dissimilarly. These teams also reported greater task conflict but were no less or more satisfied than the other teams despite this.

CHAPTER 4

My goal in this final chapter is to revisit the conflict over conflict in light of the empirical results just presented. I first address task conflict's associations with substantive conflict and performance; I then address its associations with relationship conflict and satisfaction.

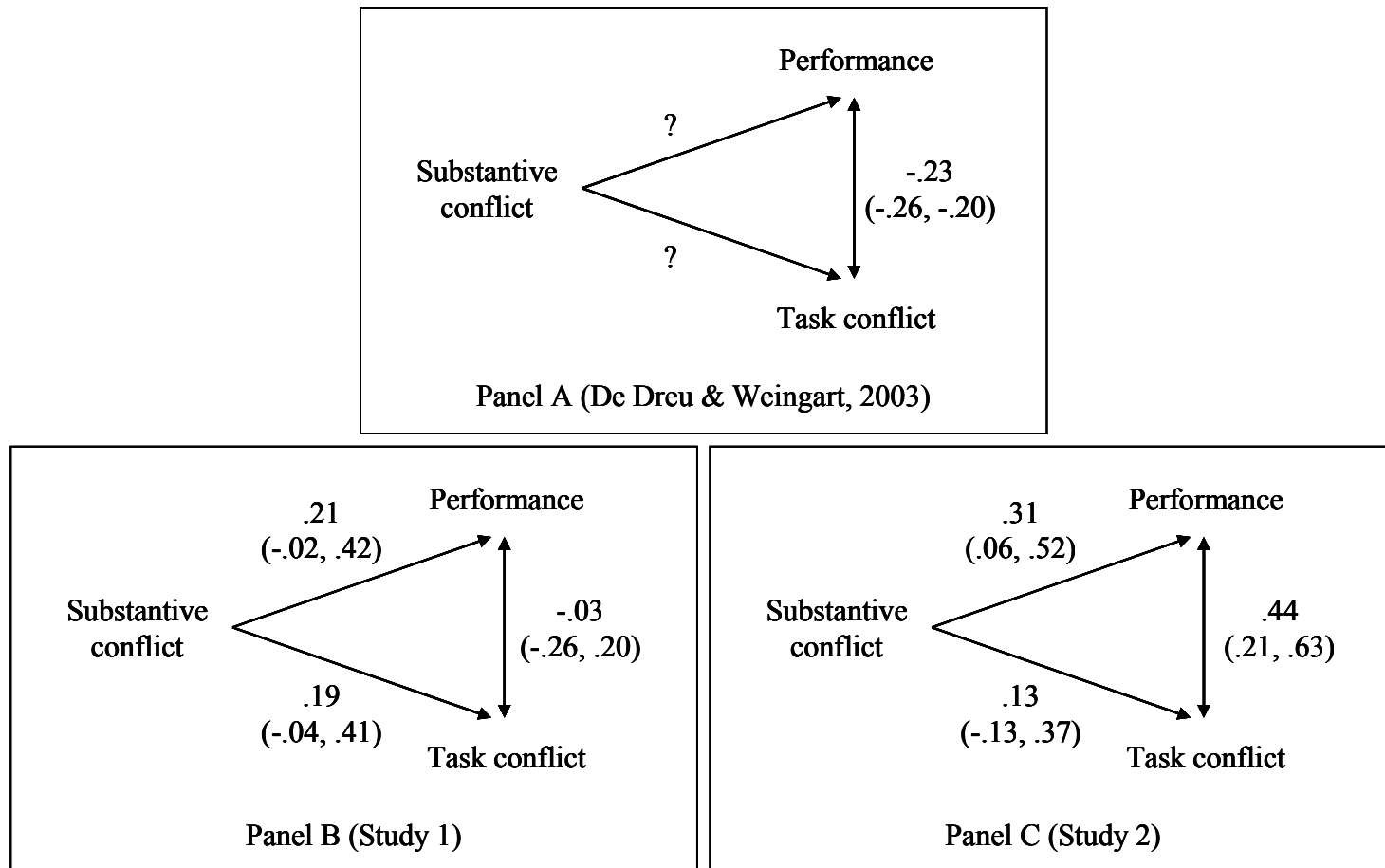
CONFLICT AND PERFORMANCE

The argument was made in chapter 1 that pessimism about the value of task-related conflict to organizations is overstated. This pessimism has emerged primarily from field studies which on balance have featured negative associations between task conflict and task performance in teams (see De Dreu & Weingart, 2003, for a review). I discussed that retrospective reports of conflict during team interaction (i.e., task conflict) may poorly reflect objective states of task-related disagreement (i.e., substantive conflict); team members may misperceive differences among them or fail to learn about their differences (see Table 1). These substantive conflicts elude measurement in the field, but they are well established in the experimental literature as positive contributors to task performance. Moreover, I suggested that because substantive conflict is associated with both task conflict and performance, associations between the latter may in part be spurious (see Figure 3). Given the considerable past and present research on task conflict and performance, this is not a trivial issue. Should it turn out that task conflict and performance have only a spurious association, researchers can redirect their efforts towards other drivers of team effectiveness.

The novel empirical contribution of the present work is the study of both substantive conflict and task conflict simultaneously. This was done with multiple methods, populations, and tasks: namely, a correlational study of intact MBA teams with a decision-making task (Study 1) and an experimental study of ad hoc undergraduate teams with a forecasting task (Study 2). What can be concluded about the conflict–performance relationship from these two studies?

Figure 4 reproduces the findings of these studies. In each panel, substantive conflict is modeled as a common predictor of task conflict and performance. Suggesting a spurious correlation between task conflict and performance is equivalent to arguing that substantive conflict is a systematic factor (among others perhaps) responsible for covariance between the two. In factor-analytic terminology, this can be assessed by evaluating how well the product of the correlations between (a) substantive conflict and task conflict and (b) substantive conflict and performance reproduces the observed correlation between task conflict and performance.

Panel A is a summary of these relationships by De Dreu and Weingart (2003). Their meta-analysis revealed a corrected correlation between task conflict and performance of $-.23$, with a 95% confidence interval of $-.26$ to $-.20$. The studies included in their review were conducted exclusively in the field, and as a result they included no measure of substantive conflict. Thus the effects of substantive conflict on task conflict and performance in these studies are unknown.



Notes. 95% confidence intervals are in parentheses.

Figure 4: The effects of substantive conflict on task conflict and performance across studies

Panel B is a summary of these relationships in Study 1. The correlation between task conflict and performance was $-.03$. Does shared variance with substantive conflict adequately account for this? Multiplying the correlations between substantive conflict and task conflict ($r = .19$) and between substantive conflict and performance ($r = .21$), the predicted correlation between task conflict and performance is $.04$, which falls within the wide 95% confidence interval of the observed correlation.

Panel C is a summary of these relationships in Study 2. The correlation between task conflict and performance was $.44$. Multiplying the correlations between substantive conflict and task conflict ($r = .13$) and between substantive conflict and performance ($r = .31$), the predicted correlation between task conflict and performance is also $.04$, which in this case falls outside the 95% confidence interval of the observed correlation.

So whereas their shared variance with substantive conflict reproduced within sampling error the correlation between task conflict and performance in Study 1, this was not the case in Study 2. A third analysis was carried out by combining these studies using meta-analytic techniques (Hunter & Schmidt, 1990). This yielded estimates of a $.18$ correlation between substantive conflict and task conflict (95% CI: $.01, .34$); a $.26$ correlation between substantive conflict and performance (95% CI: $.09, .41$); and a $.22$ correlation between task conflict and performance (95% CI: $.05, .38$). Based on these estimates, the predicted correlation between task conflict and performance is $.05$ ($.18 \times .26$). This does not reproduce well the observed correlation of $.22$ and is only on the boundary of its 95% confidence interval. Because of this, and with only two studies, it

would be premature to conclude that the association between task conflict and performance is spuriously caused by their shared variance with substantive conflict. Although substantive conflict may explain their association in part, it remains possible that task conflict is causally related to performance or that another factor contributes to their covariance.

It is noteworthy that the effects of substantive conflict were similar across studies which differed on several dimensions. Its effect on performance was positive in both, and their combined results suggest that a standard deviation increase in substantive conflict on average produces a .26 standard deviation increase in performance ($p < .05$). Its effect on task conflict was also positive in both studies, and their combined results suggest that a standard deviation increase in substantive conflict on average produces a .18 standard deviation increase in reported task conflict ($p < .05$).

This last discovery is quite important in light of the discussion of chapter 1. A central argument of the proposed model of team conflict is that objective and perceived conflicts are distinct constructs conceptually and empirically. Though the conceptual reasoning has existed for some time (see Bernard, 1957; Deutsch, 1973; Fink, 1968; Pondy, 1967), the empirical evidence has not surfaced. Until now: Initially at least, it does appear (with an estimated correlation in the population significantly less than 1.0) that substantive conflict and task conflict are distinct constructs. And although their association is positive, it is modest at best. Teams do misperceive conflicts that do not exist and fail to recognize those that do.

The implication is straightforward: Researchers should not assume that their retrospective measures of team task conflict capture well objective task-related differences among team members. If their theories are unaffected by this—for example, if they are investigating conflict perceptions and team viability (e.g., Bayazit & Mannix, 2003)—then this is of no concern. If, however, their theories are grounded in a logic more suited to the effects of substantive conflict, then task conflict will not suffice as an operationalization of this.

TASK CONFLICT AND SATISFACTION

Several criticisms were leveled in chapter 1 at the conclusion that task conflict reduces satisfaction. De Dreu and Weingart (2003) supported this by reporting a corrected correlation between the two of $-.32$. I offered several caveats to this: the causality may be reverse, the effect size is inflated by method and aggregation biases (Podsakoff et al., 2003; Robinson, 1950), and the effect is confounded by the co-occurrence of relationship conflict. In this concluding section, I address two of these criticisms. As in the prior section, I conducted a meta-analysis of the relationship between task conflict and satisfaction using data from Studies 1 and 2. In contrast to De Dreu and Weingart (2003), I examined this relationship at the team *and* individual levels and focused on the unique effect of task conflict controlling for relationship conflict.

The results are summarized in Table 13. Consider first the multilevel differences. The estimated correlation between team-level reports of task conflict and satisfaction in Studies 1 and 2 is $-.27$ ($p < .05$). This essentially equivalent to the estimate by De Dreu and Weingart (2003), and both unequivocally suggest that teams with higher levels of

task conflict are less satisfied. But because effects measured at one level are inflated by aggregating them to a higher level (Robinson, 1950), this correlation was also examined at the individual level using the nearly 600 participants of this research. This substantiated the aggregation bias: Unlike teams, individuals reporting higher levels of task conflict were no more or less satisfied than those reporting less ($\rho = .02, ns$).

Table 13: The complex association between task conflict and satisfaction

Level of analysis	Zero-order correlations		Semi-partial correlations	
	ρ	95% CI	sp	95% CI
Team				
De Dreu & Weingart (2003)	-.32	(-.35, -.28)	-.05	--
Studies 1 & 2	-.27	(-.42, -.10)	.05	(-.12, .22)
Individual				
Studies 1 & 2	.02	(-.06, .11)	.10	(.02, .18)

Consider next the confounding influence of relationship conflict. To fairly assess the unique effect of task conflict on satisfaction (or, for that matter, of relationship conflict on satisfaction) requires a regression-based approach (cf. Amason, 1996; Jehn, 1994). With only two predictors, semi-partial or part correlations (Cohen & Cohen, 2003) are also available and are presented in the table. Using the corrected zero-order correlations provided by De Dreu and Weingart (2003), I calculated the partial effect of task conflict on satisfaction controlling for relationship conflict; the same was then done at both the team and individual levels using the correlations from this research. At the

team level, the results again are similar between this meta-analysis and De Dreu and Weingart's. Yet the effect is drastically smaller. Holding relationship conflict constant, teams reporting higher levels of task conflict were no more or less satisfied than those reporting less ($\rho = .05$, *ns*).

The most interesting analysis is saved for last. The proposed model of team conflict makes the prediction that apart from its effect on relationship conflict, task conflict can be satisfying to individuals. The best estimate of this effect in the population based on Studies 1 and 2 was indeed positive and significant ($\rho = .10$, $p < .05$). The explanation may very well be that people find task conflict in itself cognitively stimulating (Berlyne, 1966; Deutsch, 1973) or a venue for personal expression (Miller & Monge, 1986); these require further study. But this is a stark contrast to the pronounced, negative association between task conflict and satisfaction that introduced this section, and it underscores the importance of a multilevel, multivariate approach to these complex relationships.

APPENDIX A

INSTRUCTIONS FOR PHASE 2 (INDIVIDUALS)

In this part, you assume the role of an analyst at a growing company. One of your duties is to make a forecast of the growth or decline in next month's sales. You are in a volatile industry, so sales fluctuate considerably month to month (historically, anywhere from -10% to +10% per month). Therefore, the more accurate your forecast, the better the company can meet customer demand economically. There are two phases to Part II, a training phase and an evaluation phase. In the training phase, you will make a total of 48 monthly forecasts (4 years), and you will receive feedback on your individual performance every month. The goal in the training phase is to improve your forecasting ability. You are to work independently in the training phase. In the evaluation phase, you will make an additional 24 monthly forecasts (2 years) as an individual but will not receive feedback on your performance. You will, however, earn additional money based on the accuracy of your forecasts, which you will learn at the end of the exercise today. So it is in your best interest to pay close attention in the training phase. After you make your individual forecasts, you will proceed to Part III, where you will work in a group with two other students on the same task. More instructions will follow at that time. Your forecasts of changes in monthly sales will be expressed as percentages. For example, in one month you may believe sales will increase +1%, in another month stay flat (0%), and in a third month decrease -2.1%. To help you, we will provide two pieces of information to you each month. One cue will be last month's point change in the S&P 500 index. This is a barometer of how the U.S. economy is doing. Increases in the S&P 500 generally

indicate favorable economic conditions, whereas decreases generally indicate unfavorable economic conditions. In general, above-average growth in the S&P 500 index is correlated with increased sales in your company.

Instructions for accountant role

A second cue we will provide to assist your forecasts is last month's cash flow. This statistic reflects the change in the company's "bank balance" in the last month. When cash flow is positive, your company earned more cash than it spent. When cash flow is negative, your company spent more cash than it earned. What you should remember is that large positive cash flows are a sign of your company's financial health. In general, above-average cash flows are correlated with increased sales in your company. To sum up, in the training phase you will make 48 forecasts of next month's sales for your company. To help you, we will provide last month's point change in the S&P 500 index and last month's cash flow. Use this information to help you make your forecast. After each forecast, we will tell you how accurate you were. You will have up to 15 seconds to review your performance each period before moving to the next.

Instructions for marketer role

A second cue we will provide to assist your forecasts is the latest change in your company's website traffic (in thousands; e.g. 5K = 5,000). Every month, the company tracks how many unique users have visited the site. This is important to the company because it uses the site to promote its latest products, survey customer satisfaction, et cetera. Increased web traffic is also a sign that the company's advertising is working. In

contrast, when website traffic declines, advertising is not performing as expected. What you should remember is that increases in website traffic are a sign of your company's marketing health. In general, above-average growth in website traffic is correlated with increased sales. To sum up, in the training phase you will make 48 forecasts of next month's sales for your company. To help you, we will provide last month's point change in the S&P 500 index and the latest change in your company's website traffic. Use this information to help you make your forecast. After each forecast, we will tell you how accurate you were. You will have up to 15 seconds to review your performance each period before moving to the next.

Instructions for engineer role

A second cue we will provide to assist your forecasts is the number of patents your company received last month. Your company prides itself on innovation, and one measure of this is how many patents it is awarded. Patents reflect novel services or products developed by the company which can generate future revenue. Thus the company tracks this figure every month. What you should remember is that the number of patents awarded is a sign of your company's research and development health. In general, above-average numbers of patents are correlated with increased sales in your company. To sum up, in the training phase you will make 48 forecasts of next month's sales for your company. To help you, we will provide last month's point change in the S&P 500 index and the recent number of patents awarded. Use this information to help you make your forecast. After each forecast, we will tell you how accurate you were. You

will have up to 15 seconds to review your performance each period before moving to the next.

Instructions for criterion forecasts

Now that you have had 48 months of practice predicting monthly sales changes in your company, you will now predict an additional 24 months for record. The process will be similar. We will provide you the same two cues you saw before and you will make your prediction. Again, you are to work independently on these forecasts. Although you won't receive feedback on your performance in this phase, you will be rewarded for how accurate your forecasts are. Each month, we will calculate by how much you missed the actual number. If your forecast is perfect, you will earn an additional 20 cents. For each percentage point by which you miss, you will lose 5 cents. For example, if the correct answer is 2.0% and your forecast is 1.0%, you would earn a bonus of 15 cents ($20 - 1 \times 5$); if your forecast is -2.0%, you would earn a bonus of 0 cents ($20 - 4 \times 5$). You cannot lose money, and if you make 24 perfect forecasts, your bonus will be \$4.80. This is in addition to your participation fee.

INSTRUCTIONS FOR PHASE 3 (GROUPS)

In this part, you will review your 24 forecasts as a group with the other students in the room. Each of you will see his or her original forecast and the information used to make that forecast. You will then do two things: (1) You will work with the others to come up with a group forecast. You may use whatever technique or strategy you want to come up with your group's forecast. Once you decide on a group forecast, enter it on the

screen (each of you should do this). You will each be rewarded for how accurate your group's forecasts are. For each month, we will calculate by how much your group forecast missed the actual number. If your group's forecast is perfect, you each will earn an additional 20 cents. For each percentage point by which you miss, you each will lose 5 cents. For example, if the correct answer is 2.0% and your group forecast is 1.0%, each of you would earn a bonus of 15 cents ($20 - 1 \times 5$); if your group forecast is -2.0%, each of you would earn a bonus of 0 cents ($20 - 4 \times 5$). You cannot lose money, and if your group makes 24 perfect forecasts, your bonus will be \$4.80 each. This is in addition to your participation fee and the bonus you earned in Part II. (2) After entering your group forecast, each of you will be prompted for your final individual forecast. This is your private belief of what the correct forecast is. It may be the same as your group's forecast or different. You will not share this belief with the group; it will remain your private forecast. There is no bonus associated with your final forecast.

Closed task environment manipulation

The philosopher Voltaire once wrote: "Let us work without disputing. It is the only way to render life tolerable." As you work with your group on this task, please follow these instructions:

- Avoid open debates, argument, or disputes over the correct forecast.
- Try to reach a consensus quickly.
- Limit the amount of information you discuss and consider.
- Place a time limit on your decisions.

Open task environment manipulation

The philosopher David Hume once wrote: “Truth springs from argument amongst friends.” As you work with your group on this task, please follow these instructions:

- Engage in open debates, argument, and disputes over the correct forecast.
- Avoid reaching a quick consensus.
- Do not limit the amount of information you discuss and consider.
- Do not place a time limit on your decisions.

APPENDIX B

NEED FOR COGNITION

(5-pt, bipolar scale: *Strongly disagree* [-2] to *Strongly agree* [+2])

1. I am quick to understand things.
2. I try to avoid complex people.[†]
3. I have difficulty understanding abstract ideas.[†]
4. I can handle a lot of information.
5. I avoid philosophical discussions.[†]
6. I love to think up new ways of doing things.
7. I like to solve complex problems.
8. I need things explained only once.
9. I love to read challenging material.
10. I avoid difficult reading material.[†]

OPENNESS TO EXPERIENCE

(7-pt, unipolar scale: *Not at all* [0] to *Extremely* [6])

1. Intellectual
2. Uncreative[†]
3. Imaginative
4. Deep
5. Complex
6. Philosophical

7. Creative
8. Unintellectual[†]

PERCEIVED DIFFERENCES

(7-point, bipolar scale: *Strongly disagree* [-3] to *Strongly agree* [+3])

1. Our original individual forecasts were in close agreement.[†]
2. There were large differences in our original individual forecasts.
3. Our original individual forecasts were very similar.[†]
4. There was significant variance in our original individual forecasts.

PERCEIVED DISCUSSION

(7-point, unipolar scale: *Never* [0] to *Always* [6])

1. To what extent did you talk over your differences before deciding?
2. How much did your group deliberate before making your decisions?
3. To what extent did your group discuss your individual forecasts?
4. How much did your group discuss the information used for the forecasts?
5. To what extent did group members express their points of view?

TASK CONFLICT

(5-point, unipolar scale: *None* [0] to *A lot* [4])

1. How frequently were there conflicts over the forecasts in your group?
2. How much conflict about the forecasts was there in your group?
3. How often did members of your group disagree about the forecasts?
4. To what extent were there differences of opinion about the forecasts in your group?

RELATIONSHIP CONFLICT

(5-point, unipolar scale: *None* [0] to *A lot* [4])

1. How much were personality conflicts evident in your group?
2. How much friction was there in among members of your group?
3. How much emotional conflict was there among members of your group?
4. How much tension was there among members of your group?

LIKING

(5-pt, bipolar scale: *Strongly disagree* [-2] to *Strongly agree* [+2])

1. I did not care for the other members of my group.[†]
2. I quite enjoyed working with my group.
3. I really liked the other members of my group.
4. My group members are very likable.

POSITIVE AFFECT

(7-pt, unipolar scale: *Not at all* [0] to *Extremely* [6])

1. Determined
2. Strong
3. Alert
4. Enthusiastic
5. Interested
6. Attentive
7. Inspired

8. Active
9. Proud
10. Excited

SATISFACTION

(7-point, bipolar scale: *Strongly disagree* [-3] to *Strongly agree* [+3])

1. This was a very satisfying experience for me .
2. This was quite an enjoyable task.

Notes. † Items were reverse-scored.

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BIOGRAPHY

Albert E. Mannes (Al) was born on January 26, 1968 in Oxford, Ohio. After graduating from St. Francis de Sales High School in Toledo, Ohio in 1986, he attended the U.S. Military Academy at West Point. He graduated in 1990 in the top 5% of his class with a Bachelor of Science degree and a major in International Relations. He served as an officer in the U.S. Army until 1995. He attended the Graduate School of Business at the University of Chicago and received in 1997 a Master of Business Administration degree. From there he worked in several capacities for for-profit companies until 2003. He then returned to graduate school, enrolling in doctoral studies in management and organizations at Duke University. He was awarded a five-year fellowship by the graduate school and a one-year fellowship by the Program for Advanced Research in the Social Sciences at Duke University. He received his Doctor of Philosophy degree in 2009.