BEYOND DYADS: DECISION SUPPORT FOR ONLINE

MULTIPARTY NEGOTIATION, COALITION

FORMATION, AND NEGOTIATION OUTCOMES

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SUMMARY

Negotiations are important and prevalent social processes. The complex and evolving nature of negotiation makes computer support in general and decision support in particular an appealing idea to researchers. The effort of designing and implementing such support dates from the 1970s. Much of the effort however has been focused almost exclusively on the dyadic negotiation setting, which leaves the support for multiparty negotiation greatly underexplored. Multiparty negotiation features higher degree of complexity than dyadic negotiation and researchers contend that the translation from the findings in the latter setting to the former is problematic. Decision support for multiparty negotiation hence warrants separate investigation. On the other hand, negotiations are increasingly being conducted over computer networks. This is partly due to the efficiency boost offered by the online environment. The rising phenomenon of electronic commerce has also been making it an imperative reality to negotiate online. This thesis then motivates the design and implementation of decision support for online multiparty negotiation, the efficacy of which is subsequently addressed through empirical studies.

While multiparty negotiation in general features higher degree of complexity than the dyadic setting, a spectrum of complexity is evident within the scope of multiparty negotiation per se. For example, some multiparty negotiations may be reduced to two sides (i.e., bilateral) whereas others may take the form of multiple sides interacting across the negotiation table (i.e., multilateral). In the former case, there can be multiple parties negotiating within a side and we label such interaction as level-2 negotiation and the negotiation across the negotiation table as level-1 negotiation. Whereas level-1

negotiation involves conflict of interest, level-2 negotiation concerns cognitive conflict between negotiators in terms of how best to satisfy their common interest. It is envisioned that a multiparty negotiation setting with may well involve both levels of negotiation with multiple parties interacting at each level. Notwithstanding that our ultimate objective is to shed light on such setting, we devised a divide-and-conquer strategy for the research endeavor. Specifically, we conducted two empirical studies to examine the settings of bilateral inter-team negotiation and group negotiation, with a focus on level-2 negotiation in the former and level-1 negotiation in the latter. The findings from both studies are then to collectively inform the more complex settings, e.g., multilateral inter-team negotiation.

When there are three or more parties in a negotiation, coalition is deemed a major variable in understanding and explaining the negotiation. In this light, coalition formation is examined as a central process mechanism in our investigation of the efficacy of the proposed decision support. Conceptualizing coalition formation as a strategy to simplify multiparty negotiation, we argue that the availability of decision support that addresses the complexity of the negotiation will demotivate negotiators from coalition formation attempts. Coalition formation is defective and distributive in nature, a lowered extent of which can therefore be expected to associate with better negotiation outcomes. Laboratory experiment is the dominant research method adopted for the verification of these propositions. Both theoretical and practical implications are drawn from this thesis.

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CHAPTER 1. INTRODUCTION

Negotiations have been treated as persuasive social processes, involving dyads, small groups, organizations or governments in an attempt to "define or redefine the terms of their interdependence" (Walton & McKersie 1965 p. 3). Negotiations are prevalent and important (Thompson 1990a); occurring in a wide variety of political, economic, and social settings (Lim & Benbasat 1993). Negotiations are characterized as complex, ill-structured and evolving tasks that require sophisticated decision support (Bui et al. 1992). A body of research has since blossomed around this notion. There are theoretical works that focus on the conceptualization, design and implementation of negotiation support (e.g., Lim & Benbasat 1993, Lim 1999). There are also empirical studies that attest to the efficacy of these support in enhancing negotiation process and outcomes (see Starke & Rangaswamy 1999 for a review). However, prior literature has focused almost exclusively on the dyadic negotiation setting, which leaves behind a vacuum concerning the support for negotiation settings that involve beyond dyads. Most nontrivial real-world negotiations however, involve many parties (Watkins 1999). The translation from dyadic to multiparty negotiation is not obvious (Bazerman et al. 1988, Mannix et al. 1989). Accordingly, the decision support for multiparty negotiation warrants separate treatment as well. On the other hand, it is an unstoppable trend that negotiations are increasingly conducted over computer networks. One driving force is the efficiency boost offered by the online environment like saving in time, travelling effort, and other logistical expenses, and the ease of exchanging information (Katsh et al. 2000). The other driving force is the blossoming of electronic commerce (e-commerce) that makes negotiation online an

imperative reality. In view of the vacuum and the trend, this thesis is dedicated to motivate the design and implementation of decision support for online multiparty negotiation. We then verify the efficacy of the proposed decision support through theoretically modeling and empirically testing its impact upon the negotiation process and outcomes.

Multiparty negotiation refers to negotiation that involves "more than two parties or factions, which may be countries, district regions or organizations as well as groups or even individuals within larger entities" (Lax & Sebenius 1986). Compared to dyadic negotiation, multiparty negotiation features higher degree of complexity. Simply adding a third party to a negotiating dyad introduces increased information processing demands and more complex interpersonal processes (Neale & Bazerman 1991). Crump and Glendon (2003) point out that the degree of complexity is a central organizing construct for the entire field of negotiation. It applies in the arena of multiparty negotiation as well, the complexity of which varies with the actual setting. According to Touval (1991), while involving more than two parties, some multiparty negotiations may be reduced to two "sides" (bilateral) whereas others take the form of multiple sides interacting (multilateral). In real-life settings, it is possible for a multiparty negotiation to involve the complexity of multiple sides interacting at one level, and multiple parties within a side interacting at the other level. The ultimate objective of the thesis is to shed light on the decision support of online multiparty negotiation with such complexity. However, to make the goal more manageable, we devise a divide-and-conquer methodology by examining two exclusive multiparty negotiation settings that each features less complexity, but the combined

findings from both will collectively inform the more complex setting. The first setting is the bilateral inter-team negotiation setting, which involves the interaction between two sides with multiple parties on each side. The design of decision support is focused on facilitating the negotiation within a side so that the negotiation across the sides can achieve better outcomes. The second setting is the group negotiation setting, which involves the interaction between multiple individuals (i.e., monolithic sides). The design focus is on facilitating the negotiation between the multiple individuals to improve its process and outcomes.

For both settings of multiparty negotiation, the intrinsic complexity lies with the number of parties. The complexity, ill-structure and evolving nature of negotiation (Bui et al. 1992) can easily go beyond the limited information processing capacity and capability of negotiators. Human beings are bounded in their rationality and they tend to use simplifying strategies or heuristics to reduce the cognitive demand of decision making (Simon 1957, March & Simon 1958). The heuristics although help decision makers to simply their situation, may lead them away from optimal decisions (Bazerman & Tenbrunsel 1998). It is no exception for negotiators. Researchers who take a cognitive processes perspective on negotiation actually consider negotiators' failure to reach integrative agreements (i.e., agreements that realize the integrative potential) to be a function of their reliance on heuristics (Bazerman & Neale 1983, Neale & Bazerman 1991). To address the intrinsic complexity of multiparty negotiation, i.e., the complexity related to multiple parties (Najam 2001), forming coalitions to reduce the number of parties to an agreement is a viable simplifying strategy (Bazerman et al. 2000). In view of

the importance credited to coalition formation in understanding and explaining multiparty negotiation (DuPont 1996), we are motivated to examine it as the central process mechanism through which the proposed decision support effects upon negotiation outcomes. Our fundamental proposition is that with appropriate decision support that eases the cognitive load of negotiators with respect to multiple parties, they resort less to the heuristic of coalition formation, which in turn leads to better negotiation outcomes. The corresponding propositions are then fleshed out for both multiparty negotiation settings and subsequently verified through empirical studies.

In a nutshell, the thesis aims to answer two sets of research questions (RQ) in relation to online multiparty negotiation:

RQ1: What decision support is needed for online multiparty negotiation? How can it be designed and implemented?

RQ2: Is the proposed decision support effective? In particular, does it subdue the employment of coalition formation as simplifying strategy and consequently result in better negotiation outcomes?

As two exclusive settings of multiparty negotiation are to be addressed in order to construct an overall answer, the two sets of research questions will be answered sequentially for each setting. The two sets of research questions call for distinct approaches to answering them owing to their different natures. The first is a design-based, problem-solving question and it demands a design science approach of building and evaluating Information Technology (IT) artifacts that extend the boundaries of existing

IT applications and addressing important problems not yet attempted by computational approaches (Hevner et al. 2004, Markus et al. 2002, Walls et al. 1992). The second is a theory-based, causal-related question and demands a behavioral science approach, which in the particular context of negotiation research seeks to develop and test predictive theory about the impact of environmental conditions on negotiator behavior and the impact of these conditions and behavior on outcomes (see Pruitt 1981, Rubin & Brown 1975). Taking into account that rigorous evaluation of the IT artifact enabling the assessment of its utility is required of a complete design science research contribution, the behavioral science approach we are taking to answer the second set of research questions can be considered as part of the design science cycle and thus making design science the dominant research paradigm of the thesis.

Revolving around answering the two sets of research questions with the defined research paradigm, the rest of the thesis is organized as follows. Chapter 2 is devoted to literature review on the topics of negotiation in general, multiparty negotiation, coalition formation, and negotiation support. While being a design science effort to propose decision support for online multiparty negotiation, the thesis also represents an effort of theorizing the support. Chapter 3 lays out the theoretical framework in this regard. Chapter 4 presents an overview of the empirical studies we conducted to address the research questions, elucidating why the settings of bilateral inter-team negotiation and group negotiation are singled out and how the findings are going to inform the more complex settings. Chapter 5 depicts the empirical study we conducted to address the first setting. Chapter 6 then

details the empirical study we conducted to address the second setting. The thesis is then concluded in Chapter 7.

CHAPTER 2. LITERATURE REVIEW

This chapter is devoted to the review of literature that has informed the thesis as a whole. The topics covered include the literature on negotiation in general and multiparty negotiation in particular, prominent theories concerning coalition formation, and prior research on and the state-of-the-art of negotiation support.

2.1. Negotiation

There are ample definitions of negotiation in the literature. Walton and McKersie (1965) define negotiations as persuasive social processes, involving dyads, small groups, organizations or governments in an attempt to "define or redefine the terms of their interdependence" (p. 3). Negotiation is also defined as a process by which a joint decision is made by two or more parties, who perceive that their interests conflict (Pruitt 1981, Thompson & Hrebec 1996). Some other definitions highlight the motions of exchanging offers and counter offers that characterize a negotiation process by which two or more parties try to resolve a (perceived) divergence of interest (Lewicki et al. 2006, Pruitt & Carnevale 2003).

Notwithstanding the various possibilities of defining negotiation, a defining characteristic is unifying, that is the mixed-motive nature of negotiation, in which the parties cooperate as well as compete (Putnam & Roloff 1992). For example, in negotiations over a fixed resource, each party competes to claim a larger portion of the resource for himself. However, each party also cooperates with the other parties to the extent that an agreement

can be reached because lack of agreement (or impasse) decreases the potential utility of the negotiation for all parties (Lax & Sebenius 1986, Neale & Bazerman 1985). The elements of competition and cooperation are more widely referred to as the distributive and integrative aspects in the negotiation literature (see Walton & McKersie 1965). The distributive aspect relates to how negotiators distribute values among themselves whereas the integrative aspect is about how negotiators increase the total value available to all parties in the meantime of satisfying their own needs. A fully integrative decision is one in which no other agreement exists that all parties would prefer (Raiffa 1982). Researchers argue that most negotiation situations provide opportunities for integrative agreements that maximize joint gains (e.g., Bazerman 1986). Integrative outcomes are more stable than compromise agreements and can enhance the welfare of the broader community (Pruitt & Rubin 1986).

According to Bell et al. (1988), three different perspectives and corresponding theories can be distinguished in the study of decision making in general, and negotiation in particular. The normative perspective focuses on rational choice and normative models are built on basic assumptions (or axioms) that people consider as providing logical guidance for their decisions. People, however, make decisions that are inconsistent, that are not Pareto efficient, or that are based on normatively irrelevant factors (Bazerman 1998). The descriptive perspective then focuses on how real people actually think and behave. The prescriptive perspective is focused on helping people make better decisions by using normative models, but with awareness of the limitations and descriptive realities of human judgment.

Behavioral decision theory joins the normative, descriptive, and prescriptive perspectives of decision making with a somewhat greater emphasis on the latter two aspects (Bell et al. 1988), primarily concerned with creating descriptive models that show clear departures from a prescriptive model rather than simply providing process descriptions (Bazerman & Tenbrunsel 1998). In attempt to reconcile what normative models predict and what people actually do, behavioral decision researchers attribute these to systematic variances. Simon's (1957) and March and Simon's (1958) work on bounded rationality, is considered to form the backbone of this research line. According to Simon (1957), several human weaknesses and limitations cause the deviation of human decision making from the predictions of the normative models: (a) the inability to evaluate decision alternatives simultaneously rather than sequentially, (b) the tendency to suffice rather than to choose the optimal alternative, and (c) the use of simplifying rules or heuristics to reduce the cognitive demand of decision making. The central argument of behavioral decision perspective is that people rely on simplifying strategies, or rules of thumb, called heuristics. When an individual inappropriately applies a heuristic to decision making, cognitive bias is considered to have occurred (Bazerman 2006). An optimal choice may be missed because it has been eliminated by the use of a specific heuristic (Bazerman & Tenbrunsel 1998).

Built upon behavioral decision research, the cognitive processes perspective on conflict and negotiation gained momentum with the work by Bazerman and Neale (1983, Neale & Bazerman 1991). In essence, this work considers negotiation behavior and failure to

reach integrative agreements to be a function of the individual's tendency to rely on cognitive heuristics, and to engage in erroneous reasoning (De Dreu & Carnevale 2003).

It is suggested that all theories of negotiation and bargaining attempt to explain (1) strategy (i.e., the parties' choice of goals and objectives and their plans to achieve them), (2) structure (i.e., whether the bargaining situation involves individuals, groups, organizations, or other entities, and the locus of decision making in negotiation), (3) process (i.e., the interaction between the parties in negotiations, including their choice of tactics and other behaviors), and (4) outcomes (i.e., whether negotiations result in an agreement and the nature of that agreement) (Lipsky & Avgar 2006). We then organize the relevant literature around this framework. Essentially, negotiation research from a behavioral decision perspective seeks to develop and test predictive theory about the impact of environmental conditions on negotiator behavior and the impact of these conditions and behavior on outcomes (see Pruitt 1981, Rubin & Brown 1975).

2.1.1. Negotiation Structure

The structure of a negotiation can be reflected in both the task and the people who are involved in the task.

A prominent characteristic of a negotiation task is the **negotiable issues**. The preference structures of negotiators as regards the negotiable issues determine the degree of conflict between them. The degree of conflict, aligned along the mixed-motiveness of a negotiation task, ranges on a spectrum with the distributive and integrative ends. The

degree of conflict is closely related to the number of negotiable issues. While it is completely distributive when the negotiation involves a single issue as only a "fixed pie" is available for sharing, there is oftentimes integrative potential when there are multiple issues under negotiation, especially when negotiators attach different priorities to the issues. Additional issues makes the search for ways to increase the amount of total benefit available to the parties possible through capitalizing on differences in the parties' preferences; specifically, parties can trade issues which asks each party to concede on low-priority issues in exchange for concessions on higher-priority issues (Pruitt 1983). Sometimes though, negotiators may miss opportunities to trade issues because information about priorities is not revealed (Harvey 1977, Janis 1982).

One of the basic doctrines within the negotiation literature is that it is strategically advantageous to bring as many issues to the negotiation table as possible in order to maximize the integrative opportunity, creating the potential for better objective outcomes (see Fisher et al. 1991, Lewicki et al. 1997, Thompson 2001). Specifically, the more negotiable issues that are available the greater the opportunity to logroll, trading issues based on differences of preference. Higher joint gains may be achieved by strategically trading issues of low value to get those that are highly valued (Froman & Cohen 1970, Lax & Sebenius 1986, Pruitt & Rubin 1986, Ury 1993). This creates a better outcome for negotiators than if they negotiated and simply compromised on each issue individually (Thompson 2001). It is for such logrolling potential that many professional negotiators and managers trained in negotiations will search out as many issues as possible to bring into the negotiation or fractionate a single issue into multiple ones. Additionally, having

more negotiable issues at the table may allow for greater opportunity to have add-ins, issues not obligatory for the negotiation at hand but can enhance economic gains nonetheless. In a nutshell, both theoretical and prescriptive approaches to negotiation have a common mindset that having multiple issues in a negotiation is a beneficial characteristic, largely because it allows for choice among strategic options, and inventing options for mutual gain is often put forth as a negotiator's greatest source of opportunity (e.g., Fisher et al. 1991, Ury 1993).

The negotiable issues together with the **reservation points** of the issues collectively define the feasible region of agreements for a negotiator. The reservation points of all parties collectively establish a bargaining zone. A negotiator should walk away without reaching a negotiated agreement for any outcome worse than his reservation point R; he should prefer reaching a negotiated agreement for any outcome at, or better than, R (Raiffa 1982). High reservation point is a necessary condition to superior joint outcomes (Pruitt & Rubin 1986). Knowledge of the other negotiation party's (or parties') reservation points is critical information.

Another important aspect of structure is the parties involved in a negotiation. A party in a negotiation can be an individual person, a team, an organization, or even a government (Walton & McKersie 1965). Apparently, as the party progresses along the line, the factors related to the party that will affect negotiation process and outcomes will also complicate. For example, when a party is an individual, the individual portraits like gender, negotiation experience, and personality are all relevant factors. A consensual

tradition in the literature is to negate and whenever possible downplay the importance of personality (De Dreu & Carnevale 2003). A same conclusion is reached by Thompson (1990b), Rubin and Brown (1975), Carnevale and Pruitt (1992), and more recently by Bazerman et al. (2000) that there are few significant relationships between personality and negotiation outcomes. While earlier research on gender has reached a conclusion that females are more cooperative and less competitive in negotiation than males (Walter et al. 1998), and that males tend to achieve better negotiation outcomes than women (Stuhlmacher & Walters 1999), with development in society with respect to gender status and roles, researchers suggest that gender effects may be faded or even reversed in negotiation (Kray et al. 2001). In any case, individual differences are of limited use because they are not under negotiators' control (Bazerman & Carroll 1987).

Negotiation experience seems to play a significant role in negotiation turnout. O'Connor and Adams (1999) found that novices tend to assume that negotiators' interests are incompatible and believe that negotiation is characterized by sequential issue settlement. Both assumptions present obstacle to optimizing outcomes because they prevent negotiators from recognizing opportunities for mutually beneficial tradeoffs (Mannix et al. 1989). In contrast, expert negotiators are more skilled at seeing links among related issues (Van Boven & Thompson 1999) and are able to craft creative deals that translate into joint gains for both self and opponents (Neale & Northcraft 1986). Despite the evident causal effect of negotiator's experience on negotiation performance, ample evidence shows that even experts are poor at making clinical assessments about another

person's personality in order to accurately formulate an opposing strategy (Morris et al. 1995, 1999).

If the party expands from an individual to a team, the negotiation dynamics ensued will be different. A body of literature has focused on comparing the performance between teams and individuals. There are experimental studies suggesting that teams have some distinct advantages and disadvantages over individual negotiators (Bazerman et al. 2000). When teams negotiate against individuals, teams exchange more information (Thompson et al. 1996) and generate more high-quality ideas for solutions (Polzer 1996). Consequently, teams tend to enhance the integrative value of the resulting agreement and also to claim a larger portion of the bargaining surplus (Polzer 1996, Thompson et al. 1996). However, teams perceive themselves, and are perceived by their opponents, to be less cooperative and less trustworthy than individual negotiators (Polzer 1996). Furthermore, members of a negotiating team tend to be less satisfied with both the negotiation process and outcome than individual negotiators (Polzer 1996). The composition of team members would influence the negotiation performance of a team as well. For example, Peterson and Thompson (1997) suggest that teams of friends would perform better than teams of acquaintances, unless they experienced accountability pressures or were information dependent.

Sometimes the negotiators at the negotiation table may be representing someone else, for instance, their organizations. It brings in the issue of principal-agent relationship and correspondingly accountability. There are other parties brought in to facilitate the

negotiation process (also referred to as the "third" parties, see O'Connor & Adams 1999), for example, a facilitator, a mediator, or an arbitrator, who do not have direct interests in the negotiation outcomes (also referred to as institutional third parties, see Elkouri & Elkouri 1981). The principal-agent relationship and the third parties are beyond the scope of the current thesis and we shall not cover them in detail.

2.1.2. Negotiation Process

As a negotiation unfolds, there are several aspects of the negotiation process that are strongly related to negotiation outcomes. First and foremost, negotiators employ certain strategies and tactics during negotiation process, which may be resulted from the goals negotiators have for the negotiation, the understanding and orientations negotiators hold towards the negotiation. The dual concern model postulates that the basic orientation of a negotiator towards negotiation is determined jointly by his concern for the self as well as for the opponents (Pruitt & Rubin 1986). Self-concern and other-concern are regarded as independent dimensions, rather than as opposite ends of the same dimension (Thomas 1976). The model predicts that high resistance to yielding (i.e., high concern for the self) coupled with a prosocial motive (i.e., high concern for the opponent) leads to higher joint outcomes. In this case, parties want good outcomes for the opponent but not at their own expense. They are then expected to concede reservedly and exhibit problem solving behavior that facilitates the discovery and development of integrative agreements. The prediction has generally been supported by empirical studies (Thompson 1990b, Carnevale & Pruitt 1992).

A widely adopted typology of negotiation behavior that also relates to negotiators'

strategic orientation is that developed by Weingart et al. (2002) and Olekalns et al. (2003).

It derives four strategy categories based on the dimensions of both strategic orientation

and strategic function. The strategic orientation is distinguished between the integrative

and the distributive. Regardless of a negotiator's social motive (e.g., proself vs. prosocial),

strategies that attempt to realize joint gains typically through creative problem solving

and the practice of mutually beneficial tradeoffs are considered integrative. On the

contrary, strategies that focus on the distribution of resources by holding tight individual

interests and bugging on individual issues are considered distributive. This differentiation

is in line with Walton and McKersie's (1965) conceptualization of the integrative and

distributive aspects of negotiation. Underlying the other dimension of strategic function is

the management functions of information exchange versus action. Whereas information

exchanged between negotiators establishes the base upon which agreements can be

crafted, the actual crafting of the agreements constitutes their actions (Pesendorfer et al.

2007). The typology with some exemplar tactics under each strategy category is

represented in Table 2.1.

Table 2.1: A typology of negotiation strategies (Source: Olekalns et al. 2003, Weingart et al. 2002).

Strategic Function	Strategic Orientation	
	Distributive	**Integrative**
Information	**Distributive Information** • Positions • Facts	**Integrative Information** • Priorities • Needs • Interests
Action	**Claiming Value** • Substantiation • Threats • Power use • Bottomline • Single-issue offers	**Creating Value** • Packaging • Tradeoffs • Creative solutions • Multi-issue offers

Reflection upon the typology leads to two intuitions. First, while an integrative orientation is generally expected to promise better outcomes for negotiation, the orientation must not only be manifested in information exchange, but also action. Apparently, integrative exchange of information coupled with distributive action will not be any near to integrative agreements. On the other hand, while information exchange is believed to be beneficial in general, distributive exchange of information may only harden the relationship between negotiators, doing no good to the final negotiation outcomes. It is noteworthy that a specific action item with distinct orientations has been addressed separately in the literature and that is the making of single-issue versus multi-issue offers. As negotiators address issues sequentially, they forgo the potential benefit of tradeoffs, in which one may concede on his low-priority issues in exchange for the opponents' concessions on his higher-priority issues (Pruitt 1983). In contrast, simultaneous consideration of issues promotes the practice of tradeoffs between issues and options (Jelassi & Jones 1988). Simultaneous consideration of issues has thus been associated with higher joint outcomes (Mannix et al. 1989).

As negotiation is basically a matter of give and take, a most widely accepted determining process toward negotiated agreement is concession making (Magneau & Pruitt 1979, Pruitt 1981, Pruitt & Carnevale 1982). Ritualized as an exchange of offers and counteroffers (Tutzauer 1992), the actual occurrence of concession making features one party's offer accommodating another party's interests in such a way that there is a reduction of utility to the party who extends the offer (Pruitt 1981).

There are studies that focus on investigating the first offers made in a negotiation (e.g., Johnson & Cooper 2009). The rationale is that first offers provide valuable information about what kind of agreements would be acceptable, and influence the way negotiators think about the negotiation process (Galinsky 2004, Thompson 2004). For example, first offers can significantly influence negotiators' judgments because they can serve to anchor subsequent offers (Adair et al. 2007, Musweiler & Strack 2000, Northcraft & Neale 1987).

A phenomenon that is found common in negotiations is reciprocation of communications (Axelrod 1984, Deutsch 1973, Putnam & Jones 1982). To reciprocate means to return in kind and is deemed occurring when the conditional probability of an act based on the opponent's preceding act is greater than the base-rate probability of the act (Gottman 1979). Negotiators reciprocate not only the integrative moves of their opponents but also the distributive ones (Donohue 1981, Putnam 1983, Weingart et al. 1990). "[O]nce a feud gets started, it can continue indefinitely" (Axelrod 1984 p. 138). The ensuing conflict

spiral may result in extreme agreement (Brett et al. 1998) or no agreement at all (Schelling 1960). That is why researchers have been looking for ways to break the bonds of contentious reciprocations (e.g., Brett et al. 1998, Fisher et al. 1991, Lewicki et al. 1994, Osgood 1962, Pruitt & Carnevale 1993, Schelling 1960, Ury 1991).

2.1.3. Negotiation Outcomes

Good measures of negotiation outcomes (or negotiators' performances) are essential for researchers to draw correct conclusions on why negotiators do not perform well and how they can do better, and eventually to offer helpful advice to practitioners (Tripp & Sondak 1992). There are both social psychological and economic measures of negotiation outcomes (see Thompson 1990a for a review). The former include the negotiators' perceived fairness of and satisfaction with negotiated agreement, and the relationship turnout between the negotiators (Rubin & Brown 1975, Neale & Bazerman 1991). Economic measures are more objectively focused and are concerned mostly with the quality of the agreements if reached at all vis-à-vis the predicted outcomes from economic models of rationality such as game theory (Nash 1950, 1953, Raiffa 1982, Roth 1979). The common measures include impasse rates, joint profit and Pareto efficiency. An impasse is considered occurring when negotiators do not reach agreement. Correct strategies are called for in dealing with impasses even if the impasse rate per se is not of interest to researchers (Tripp & Sondak 1992).

Pareto efficiency describes the extent to which a negotiated agreement approaches the Pareto frontier (Tripp & Sondak 1992). The Pareto frontier comprises the set of Pareto

optimal agreements (Raiffa 1982). Pareto optimal agreements are those from which no other agreement is possible that would be preferred by both negotiators or would be preferred by one and solicits indifference from the other (Tripp & Sondak 1992). Joint profit on the other hand is simply the sum of profits achieved for all parties from the negotiated agreement. Despite the popularity of joint profit as the measure of joint outcome in a negotiation, it is argued that Pareto efficiency is generally a better measure of the quality of negotiated agreements at the dyadic level than joint profit because the latter implicitly assumes that negotiators should sometimes act against their individual interests for the sake of joint profit (Tripp & Sondak 1992). It is proved however by Clyman (1995) that for every possible measure, a negotiating setting always exists where use of the measure implies that negotiators should sometimes act against their own self-interest for the sake of the measure. No measure is then universally applicable and "researchers must choose their dependent variables carefully to ensure that their choice does not provide implicit incentives for negotiators to act irrationally by violating self-interest" (Clyman 1995 p. 40). Furthermore, although in theory large discrepancies are possible, empirically joint outcomes appear strongly correlated with outcome measures such as distance from Pareto frontier (De Dreu et al. 1998, Weingart et al. 1996).

To quantify negotiators' interest and subsequently derive the economic measures, the concept of utility has turned out powerful. The existence of utilities with the property of expected utility is an appropriate guide for consistent decision making because if an appropriate utility is assigned to each possible consequence of an alternative and the

expected utility of each alternative is calculated, then the best course of action is the alternative with the highest expected utility (see Keeney & Raiffa 1976).

Social psychological measures that are widely adopted to gauge the emotional outcomes of negotiators include their perceived climate of and their satisfaction with the negotiations. Climate has been argued to affect effectiveness and performance in a group context (Beersma & De Dreu 2002). Research also suggest that groups with a positive climate engage in more efficient task coordination (Edmondson 1999, Shaw 1981) and experience higher morale and satisfaction (McGrath 1984, West et al. 1998) than those with a less positive climate. Despite that climate as a soft performance measure has received much less attention than economic measures in negotiation research (Hackman 1998, West et al. 1998), it was accounted for in several studies, for instance, as "perceived collative/negative climate" in Foroughi et al. (1995) and Delaney et al. (1997).

As for satisfaction, not only has it been shown that negotiators with high degree of satisfaction are more likely to warrant future business with their partners (Oliver et al. 1994, Barry & Oliver 1996), but also is it generally believed that negotiators who are satisfied with negotiation process and outcomes in the past will approach future negotiations with positive attitudes, thus improving their performance in the long run (Delaney et al. 1997). It is argued that satisfaction is derived from a variety of utility payoffs (Thaler 1985, Thompson 2001), which are likely to be a function of time (Naquin 2003). According to Thaler (1985), whereas transaction utility lends itself to immediate feelings of satisfaction, acquisition utility (i.e., benefits that flow from the transaction)

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lends itself more to long-term satisfaction. While both dimensions of satisfaction can be important, in line with prior empirical studies, the current thesis addresses feelings of satisfaction immediately following a negotiation.

2.2. Multiparty Negotiation

Susskind et al. (2003) note that as soon as there are three or more parties, with at least two of them at the table, a negotiation is multiparty; defining a party as an interested person or group holding a stake in a negotiation, and having "some influence on the negotiation process and its outcome" (p. 159).

As suggested by Neale and Bazerman (1991), multiparty negotiation is distinguished from dyadic negotiation along two factors: increased information processing demands and more complex interpersonal processes. The intrinsic complexity of multiparty negotiation as compared to dyadic negotiation can still be solely attributed to but the increased information processing demands related to multiple parties. The complexity of multiparty negotiation is said to extend the length of time it takes to reach agreement (Polzer 1996). But much more than that, the large number of parties in a multiparty negotiation makes it much more difficult for negotiators to develop a complete cognitive understanding of the situation (Kramer 1991a). Limits to negotiators' cognitive capabilities will hamper their ability to represent the negotiation problem accurately (Tetlock 1983, Kramer 1991a). Essentially, increases in the informational complexity of the negotiation situation may well lead to information overload (Morely 1982). Because heuristics (i.e., simplifying strategies or rules of thumb) allow them to simplify their

decisions much of the time, decision makers coping with information overload are more likely to rely on heuristics and consequently be biased if the heuristics are inappropriately applied (Neale & Bazerman 1991). In line with the central argument of behavioral decision research, the increased information processing demands in multiparty negotiation can lead to negotiators' employment of heuristics and consequently systematic errors in their judgment in encoding and retrieving information (Neale & Bazerman 1991).

One way of managing the complexity of multiparty negotiation lies with the employment of decision rules (Bazerman et al. 2000). While it is a given that consensus must be reached in dyadic negotiation, multiparty negotiation presents more options. In fact, in multiparty settings, a decision rule must be implicitly or explicitly selected and implemented to determine how individual preferences will be combined to yield a multiparty agreement (Messick et al. 1997, Neale & Bazerman 1991). The two most often used and studied decision rules are majority rule and unanimity rule (Baron et al. 1992). Under majority rule, the support of a majority of group members is sufficient for an agreement to be valid. Parties that hold a majority position are empowered in this case because the majority rule enables them to marginalize or even exclude a minority from an agreement (Miller et al. 1987). Most individuals believe that majority rule is the most fair and efficient means of combining divergent individual preferences (Harnett & Cummings 1980). This could be true for purely cooperative and purely competitive settings. However, in a mixed-motive context, majority rule may lead group members to compromise on rather than integrate issues (Neale & Bazerman 1991) as majority rule

system fails to recognize the strengths of individual preferences (Kaplan & Miller 1983).

Under unanimity rule, all group members' support is needed to validate an agreement.

Parties that hold a minority position are more powerful under unanimity rule because

they can block unfavorable decisions by using a veto (Ten Velden et al. 2007). While

integrative strategies require negotiation parties to learn others' preferences, and find

ways to increase the available resources to accommodate those preferences, unanimity

encourages negotiation parties to learn the preferences of others and forces them to

consider non-obvious alternatives which may increase the available resources and hence

better satisfy the interests of all parties (Neale & Bazerman 1991). Therefore, although

unanimity rule usually requires more effort to implement, it tends to yield higher quality

agreements (Thompson et al. 1988).

Whether majority rule or unanimity is implemented, forming coalitions to reduce the

number of parties to an agreement represents a viable simplifying strategy that confronts

the intrinsic complexity of multiparty negotiation (Bazerman et al. 2000). DuPont (1996)

also associates the end of complexity reduction with the means of coalition formation.

The vast literature on coalition formation is reviewed in the next section of this chapter.

2.3. Coalition Formation

2.3.1. Definition

A coalition is commonly defined as two or more parties who cooperate in order to

achieve a mutually desired outcome that satisfies the interests of the coalition rather than

those of the embedding group (Komorita & Kravitz 1983, Murnighan 1986). There are

two different approaches in addressing the coalition phenomenon. The most common approach revolves around outcomes; i.e., whether or not resources are divided between a subset of parties (i.e., a coalition) as opposed to the entire group within which it is embedded (Pruitt & Carnevale 1993). A second approach recognizes that in a negotiation context, the coalition phenomenon is not only reflected in the negotiated outcome but also during the interaction per se (Diermeier et al. 2008); it thus focuses on the communication process that precedes any possible outcome (Huffaker et al. 2008). Within this approach a coalition can be conceptualized as a temporary agreement among the corresponding subset of parties. The term "proto-coalition" has been used to denote the transient nature of such preliminary agreements and the fact that parties may engage in multiple agreements of this sort (Diermeier et al. 2008). Aligned with the second approach is the conceptualization of coalition as an influence tactic. The coalition tactic is considered in use when the actor seeks the aid of others to help persuade or uses the support of others as a reason to pressure a target to comply (Yukl & Falbe 1990). Apparently, the two approaches differ not only in their emphasis on outcome vis-à-vis process, but also in their connection with the negotiation context. As a matter of fact, coalition and negotiation research have progressed rather independently over decades (Polzer et al. 1998). That also explains why the second approach has not been as common as the first.

Whether addressed with the first or the second approach, the forming of a coalition is determined by some antecedents, goes through certain process, and incurs some consequences. The following literature review is structured under these sub-headings.

2.3.2. Antecedents

Early theories on coalition formation focused on predicting two outcomes in coalition games: which coalition is likely to form and how the reward is to be shared between the coalition parties (Komorita & Parks 1995, Raiffa et al. 2002). As early theorizing generally assumed that people are primarily motivated by self-interest, a most replicated finding of coalition research is that parties would rather share payoffs with few others in a small coalition than with many others in a large coalition, essentially because they are capable of enhancing their own power status and thus improving their own individual outcomes.

The early efforts mostly address two types of coalition games: simple resource games and variable-sum games (Kahan & Rapoport 1984). In a simple resource game, varying levels of resources are assigned to players that determine their bargaining strength, who are to decide on how to share a given value of reward (cf. Caplow 1956, Chertkoff 1967, Gamson 1961, Komorita & Chertkoff 1973). A variable-sum game involves the characteristic function of an n-person game that specifies a value or payoff to each possible coalition, including one-person coalitions (cf. Von Neumann & Morgensten 1947, Shapley 1953, Aumann & Maschler 1964, Davis & Maschler 1965, Komorita 1979, Komorita & Tumonis 1980). Variable-sum games are deemed applicable to a wider range of organizational settings than simple resource games because the value of the reward is subject to the makeup of the coalition (Komorita & Hamilton 1984).

Caplow's (1956) represents the first social psychological model of coalition formation in solving simple resource games. The quintessence of the model is the assumption that players will try to control as many other players as possible. The definition of the control has two dimensions: all members of a winning coalition (i.e., the coalition that has the majority of resources) control the out-coalition players and the members with most resources in the coalition control the other coalition member(s). As Caplow assumes that the primary motive to form a coalition is to control other members, while ignoring the motive to maximize external rewards, the model is limited in that it does not predict the payoff distribution among coalition members (Komorita 1984).

In contrast to Caplow's model, the minimum resource theory proposed by Gamson (1961) assumes that all players will try to maximize their payoffs and will expect their payoffs to be proportional to the resources they can contribute to a coalition if they join it (i.e., a form of parity norm is expected). The two assumptions lead to the prediction that the coalition with the least amount of resources necessary to form a majority will form and that the coalition members will divide the payoff according to the parity norm. Using the same principle of parity norm, Gamson (1964) proposed the minimum power theory, which, instead of using resources as a measure of a person' contribution, uses pivotal power. The pivotal power was operationalized based upon the concept of Shapley value.

One prominent example in solving the variable-sum games is the Shapley value model (see Shapley 1953), in which the author tried to make a priori evaluation of the game for each of the players through determining the average marginal payoff that a player accrues

to a coalition by joining it (i.e., the Shapley value). Another example is the bargaining set model (Aumann & Maschler 1964). The bargaining set model assumes that one member of a potential coalition may attempt to increase his or her payoffs by using alternative coalitions as a threat, and its quintessence is the concepts of objections and counterobjections. Consider the following 3-person game: $v(i) = 0$, $v(AB) = 70$, $v(AC) = 60$, $v(BC) = 50$, $v(ABC) = 75$, where i refers to individual players, A, B, and C. According to Aumann and Maschler (1964), the bargaining set should consist of those payoff configurations where a valid counterobjection can be raised for any possible objection. For the particular game, the bargaining set contains the following payoff configurations: (40, 30, 0), (40, 0, 20), (0, 30, 20). Take the first payoff configuration for an example: suppose A proposes a coalition with B in which he receives 40 points whereas B receives 30; B may raise an objection saying that he can form a coalition with C, giving C 15 points (better for C than the case where A and B form a coalition) and obtaining 35 points for himself; given this objection, however, A can raise a counterobjection, saying that he can retain the 40 points for himself in a coalition with C while giving C 20 points (better for C than B's objection case). With a bargaining set of such payoff distributions, a "fragile state of stability" (Murnighan 1978 p. 1133) is deemed achieved.

Other than theories assuming that players are motivated to maximize control of others or some external reward, there are also theories assuming that players are motivated to maximize similarity of attitudes and values. The said approach is evident in the minimum range – conflict of interest political models of coalition formation. All the prominent

models in this aspect (e.g., Axelrod 1970, Leiserson 1966, Rosenthal 1970) make the assumption that parties with similar ideologies are most likely to be coalition partners. Leiserson (1970) in an experimental study actually found that persons who exhibited high, as opposed to low, ideological agreement were more likely to choose each other as coalition partners. Accordingly, assuming political parties can be placed on a uni-dimensional ideological scale, coalitions that minimize ideological range should form: the models predict that all coalition members should be literally adjacent to at least one other coalition member on the ideological scale. Looking beyond the political context, ideology is clearly not the only factor that determines the similarity of attitudes and values among players. The faultline theory suggests a list of other factors from a social psychological perspective.

Lau and Murnighan (1998) posit that coalition formation is closely connected to faultlines. Group faultlines can be conceived as hypothetical dividing lines that may split a group into subgroups based on one or more attributes (Bezrukova et al. 2001). Depending on the similarity and saliency of group members' attributes, groups may have many potential faultlines, each of which may activate or increase the potential for particular subgroupings. Demographic attributes might be most capable in activating group faultlines and thus triggering coalitions in newly formed groups. On the other hand, Harrison et al. (2002) suggest that the effects of demographic diversity on group outcomes become weakened as time passes, whereas the effects of psychological diversity strengthened over time (see also Newcomb 1961). Lau and Murnighan (1998) suggest that task characteristics moderate how faultlines exaggerate or mitigate subgroup

formations; especially at early stages of group development, task type may exacerbate perceived differences among subgroups.

The theorization of faultlines is based on the self-categorization theory (Turner 1987), social identity theory (Tajfel 1978), and the similarity-attraction paradigm (Byrne 1971). The similarity-attraction paradigm simply states that individuals who possess similar individual characteristics and attitudes will perceive one another as similar and be attracted to one another, which may lead to more frequent communication and a desire to remain in the group (Lincoln & Miller 1979). Self-categorization theory posits that individuals classify themselves and others into categories they are familiar with in order to make predictions about subsequent interactions. The categorization notion is inextricably linked to the concept of social identity, which refers to an individual's knowledge that he or she belongs to a social category or group characteristic of certain emotions and values. The bottom line suggested by the theoretical foundation is that coalitions can only exist when individuals identify with certain groupings and categorize themselves as belonging to particular groups (Thatcher et al. 2003).

Admittedly, a large number of coalition theories have been proposed. On the other hand, research on coalition formation has declined markedly, which is partly because the vast majority of coalition studies lack social relevance or ecological validity (Komorita & Parks 1995). Essentially, in favor of clear predictions, simplified situations have often been sought after in the development of coalition theories. A major aspect of coalition literature's lack of social relevance or ecological validity is the narrow scope reflected in

the individual studies. Undeniably, the literature has examined a diverse set of antecedents of coalition formation. Nevertheless, the uni-factor approach has been the norm in which only the principle factor governing coalition choices is singled out for investigation. The uni-factor approach upholds the parsimony of the research but sacrifices the generality. One way to enhance the generality of coalition theories is therefore to enlarge the number of antecedents in the modeling of players' coalition formation (Komorita & Parks 1995). The formidability of such approach is also real. Komorita (1984) argues that it "would be highly intractable" (p. 187) as some members may be motivated to maximize rewards or achieve the goals of the group, some may be motivated to maximize control or status, while others may be motivated by similarity of attitudes and values. The approach would not be fruitful unless the strength of each motive of each participant can be specified (Komorita & Parks 1995). Lawler and Youngs (1975) represent an early attempt in proposing an integrative, multi-causal model that includes payoff, probability of success, and attitudinal agreement as antecedents of coalition formation. Two intervening factors, perceived utility and anticipated conflict are posited to mediate the impact of these antecedents on coalition choices. While the proposed model is largely supported empirically, there are residual effects of both probability of success and attitudinal agreement which are not mediated by the intervening factors. The authors speculate that winning and attitudinal similarity may have important symbolic value and thus being an end themselves.

The other manifestation of coalition literature's lack of social relevance or ecological validity is the consistent segregation of coalition literature from negotiation literature,

despite the evident connection between the two phenomena. Exceptions are few that explicitly bridge them together. While negotiation researchers examine settings that involve both opposing and compatible interests amongst parties typically embedding integrative potential, coalition researchers have largely addressed issues that are distributive in nature (Polzer et al. 1998). The segregation therefore limits the generalizability of the findings from coalition literature to negotiation contexts at large.

Polzer et al. (1998) represents a rare instance that addresses coalition formation in multi-issue multiparty negotiation. They argue that in such setting subsets of parties often have compatible interests on one or more issues, who can band together to influence the incompatible party. Polzer et al. (1998) posit that parties whose interests are compatible will be more likely to form coalitions than will parties whose interests are not compatible. They also postulate that to the extent that multiple parties can be more persuasive than a single party, compatibility should help parties who have compatible interests to attain higher outcomes on the issues on which their interests are compatible than will those who have incompatible interests.

The theories reviewed so far assume that people are primarily motivated by self-interest. Nonetheless, as new insights about human judgment and decision making have been developed in recent decades, a new approach in studying coalition formation has surfaced, assuming that coalition formation is best understood in terms of both self-interest and more other-oriented concerns such as fairness (Van Beest et al. 2004a). Specifically, adding to the assumption that people may be motivated by self-interest, this approach

assumes that people are indeed concerned about how their actions affect the outcomes of others including those excluded from a deal (Van Beest & Van Dijk 2007). In light of this assumption, a distinct research stream has blossomed and should not be neglected that essentially answers the research question of when exclusion is (not) likely to occur in a coalition-prone context (see Van Beest et al. 2005 for an example). An even newer approach suggests that coalition behavior is not only shaped by self-interest and concern for others, but also by emotions (see Thompson et al. 2001, Van Kleef et al. 2008). Van Beest et al. (2008) represent a first work that studies the communication of anger and its effect on coalition formation dynamics in multiparty negotiation.

Thus far, we have enumerated antecedents of coalition formation that are driven by parties' intentional coalition choices. Rarely addressed in the literature is that coalition formation may be driven instead by complexity reduction (DuPont 1996) and parties are very likely to be unaware when they employ coalition formation to address the complexity of a multiparty negotiation (see Bazerman & Tenbrunsel 1998). As framed in Bazerman et al. (2000), a multiparty negotiation involves different parties bringing a variety of interests to the table; simply understanding these interests, let alone finding ways to integrate them, can become an exceedingly complex task. Bazerman et al. (2000) therefore posit that to make multiparty negotiation tractable, it is often necessary to simplify the structure or organization of the negotiation interaction. In addition to the necessity, human tendency to resort to simplifying strategies (or heuristics) is reported in the literature (see Fiske & Taylor 1984 for more details). In this regard, forming coalitions to reduce the number of parties to an agreement is considered viable to

simplify a complex multiparty negotiation (Bazerman et al. 2000). Research finding that such factors as asymmetry between parties (Mannix 1993) or uncertainty regarding outcomes (Mannix & Blount White 1992) that increase the complexity of multiparty negotiation also increase the occurrence of coalition agreements supports the notion of coalition formation as a mechanism for complexity reduction.

2.3.3. Process

Other than increasing the complexity of situations to enhance social relevance or ecological validity in the development of coalition theories, for instance, to link coalition theories to actual negotiation settings, it is believed that the same objective can be achieved by the development of process theories of coalition formation. As early as in the 1970s, Chertkoff (1970) already made the point that, although there is great difficulty in analyzing the process between the time a preferred coalition partner is approached and the time when the negotiation ends, the effort might lead to vital discoveries towards further understanding of coalition formation. Later, there are other researchers who have also stressed the development of a process theory (e.g., Kahan & Rapoport 1984, Komorita 1984). An encouraging attempt can be found in Stevenson et al. (1985) which developed a process model of coalition development. First and foremost, the model suggests that any potential coalition formation is preceded by the perception of compatible interests. While various antecedent conditions may produce "latent coalitions" based on compatibility of interests as a potential pool of coalition members, the opportunity for interaction around issues is essential for members' perception of compatible interests to occur. Subsequently, the latent coalition members may fail to take

joint action; however, once they actually take the important step of joint action, the coalition is considered formed. The actual forming of a coalition is supposed to invoke a response from out-coalition parties. Given the response, there could be various outcomes. The coalition may formalize, not necessarily because of its successes though as it could be persisting in joint action despite its failures. Alternatively, the coalition may disband, whether or not the joint action has been successful. The disbanded coalition should be regarded dormant at best, as the former members with prior interaction could be mobilized to take concerted action again with less effort than those who have never taken joint action. Stevenson et al. (1985) therefore depict a complete cycle of coalition formation, which provides valuable insight for any future study in this arena.

2.3.4. Consequences

In addition to possible exclusion as a direct effect of coalition formation, other consequences have not been addressed in much depth in the literature. The speculated valence of the consequences is at best mixed. On one hand, it is argued that coalition formation on the part of the weaker parties in a negotiation can help them preserve a balance of power against the demanding powerful party (Mannix et al. 1989) and bring needed resources to the coalition members (Mannix 1993). The rationale is aligned with that of the equity theorists who contend that perceived inequity produces uncomfortable dissonance and individuals are motivated to reduce it (Stevenson et al. 1985). Apparently, forming a coalition that pools together sources of power could be an answer to reducing experienced inequity. In a similar vein, Van Velzen (1973) suggests that "leveling coalitions" are commonly formed to counter the actions of powerful parties. On the other

hand, coalition formation has been more widely seen as an instance of distributive behavior (Beersma & De Dreu 2002) and considered a defection at the group level as it is inherently concerned with claiming reward for the coalition itself without regard for out-coalition parties (Mannix 1993). The positioning of coalition formation as distributive behavior is consistent with research showing that joint outcomes tend to be lower and less equally distributed when coalitions are formed and some parties are excluded (Van Beest et al. 2005, Van Beest et al. 2003). Taking a process view, Clark et al. (2000) posit that when coalition formation divides a negotiation group, the processes that parties typically go through to reach consensus are hindered as communication and task interdependence are hurt, resulting in such consequences as decreased morale of group members and their dissatisfaction with the group process (Thatcher et al. 2003).

Interestingly, Polzer et al. (1995) has taken the unique perspective of group identification in addressing the consequences of coalition formation. The authors adopt Tajfel's (1978) definition of group identification as the part of an individual's self-concept which derives from his knowledge of his membership in a social group together with the value and emotional significance attached to that membership. The authors then posit that distinct sources of identification exist in the multiparty negotiation context, including a coalition and the negotiation group as a whole. As generally hypothesized in the group identification literature, when people identify strongly with a group, they are more likely to cooperate with the other members in order to serve the group's interest (Brewer & Kramer 1985, Kramer 1993, Kramer & Brewer 1984). It is postulated that if parties identify with coalitions, intergroup processes may occur between the coalitions while

intragroup processes occur within each coalition. On the contrary, if parties identify with the entire set of parties, intragroup processes characterize the negotiation. Research on group processes demonstrates that intergroup interactions are characterized by higher levels of competition and lower levels of cooperation and trust than intragroup interactions (Brewer 1981). Furthermore, negotiators are more likely to share information with those they view as in-group members than with those out-group parties (Kramer 1991b, Polzer 1993). Eisenhardt and Bourgeois (1988) also argue that coalition formation hampers flow of information. As information exchange is a critical factor that facilitates integrative bargaining (Lewicki & Litterer 1985, Neale & Bazerman 1991), more integrative agreements are expected to be reached in multiparty negotiation when coalition-incurred barriers do not exist (Mannix 1991, 1993).

It should not be neglected that the decision rule adopted in a multiparty negotiation will influence the potential power of a coalition in dictating the final agreement as well. Implicitly, majority rule plays a dominant role in the coalition literature (Ten Velden et al. 2007). Under majority rule, unless there is an impasse, the outcome of a multiparty negotiation is either a consensus agreement among all parties, or a majority agreement which is a coalition's dictation on how to divide resources. Extant literature suggests that a majority settlement is more likely to occur when negotiators focus on gains rather than losses (Van Beest et al. 2005), have corresponding interests (Bazerman et al. 2000), have self-centered motives (Van Beest et al. 2003), negotiate in absence of a shared identity between all the parties involved (Swaab et al. 2008), or when there are opportunities to communicate in private (Swaab et al. 2009).

There is a void concerning the coalition dynamics in multiparty negotiation that adopts the unanimity rule. In this thesis, the use of unanimity rule is assumed. It is possible that majority rule is still advocated among parties as means to reach agreement. Nonetheless, as the ultimate goal is for all to reach consensus, any such attempt is counted towards coalition dynamics under the governing rule of unanimity.

2.4. Negotiation Support

Research on computer support for negotiation activities dates from the 1970s (e.g., Keen & Scott-Morton 1978) and is still active nowadays. However, different emphases are evident along the time frame. The following review generally follows a chronological perspective on the evolution of negotiation support.

2.4.1. Theory of Negotiation Support Systems (NSS)

Negotiation support systems (NSS) are generally regarded as an extension of group decision support systems to cater towards bargaining tasks (Bui 1992). NSS are intended to assist negotiating parties in reaching mutually satisfactory agreements by supporting information processing and communication protocols (Bui & Shakun 1996). The seminal work of Lim and Benbasat (1993) is amongst the first to theorize negotiation support systems. Their foundational proposition is that "the use of computer support will have much to offer in terms of compensating negotiators with what they lack in conducting rational negotiations, that is, higher information-processing capabilities and capacities" (p. 32). In this light, Lim and Benbasat (1993) conceptualize negotiation support systems as

consisting of decision support systems that are networked. To further define negotiation support, the authors envision two major components: a decision support system (DSS) for each negotiating party, and electronic linkage between the DSSs so that the negotiators may communicate electronically. What distinguishes NSS from the pre-NSS-era negotiation support is thus the electronic linkage between negotiators and their DSSs. Lim and Benbasat (1993) reason that through expanding negotiators' information processing capacity and capability, DSSs would enable negotiators to achieve more efficient and fairer outcomes; the decision aid would also render the negotiators more confident with the negotiated solutions. As for the electronic communication channel, the authors argue that when it is used as a complement to the verbal channel in transmitting task-oriented communication involving technical data and graphics which serve as common referents to back a negotiator's arguments, the opponent's perceived commitment of the negotiator would increase. The increase in perceived commitment in turn promotes trust between parties and thus speeding up the negotiation process and heightening negotiators' satisfaction. Lim and Benbasat (1993) acknowledge that their proposed theory of NSS is focused in dyadic negotiation setting that involves two monolithic parties.

A series of experimental studies were subsequently conducted, attesting to the validity of Lim and Benbasat's (1993) NSS theory. The first of the series is Foroughi et al. (1995) which found that negotiating dyads that were supported with NSS achieved higher joint outcomes, greater contract balance, and reported greater satisfaction, but took longer in time than those not supported with NSS. The limitation of Foroughi et al. (1995) is that

the two components of NSS, i.e., DSSs and the electronic communication channel, are not distinguished in their impacts. Following Foroughi et al. (1995) was Perkins et al. (1996) which studied standalone DSS without incorporating the electronic communication channel at all. Although, in a strict sense, the study did not investigate the complete suite of NSS, it did sort out the impact of DSS alone, indicating that negotiating dyads supported with DSS achieved higher joint outcome and greater contract balance.

The third study in the series is considered to have lent better support to Lim and Benbasat's (1993) theory as compared to the preceding two. Through incorporating a "DSS only" condition in the experimental design, Delaney et al. (1997) showed that it was the DSS component that led negotiating dyads to higher joint outcomes and greater contract balances. The DSS component, on the other hand, did not improve negotiators' perceptions of the negotiation climate. Concerning the electronic communication component, it was found to be the reason for higher satisfaction as reported by negotiating dyads. The electronic communication component did not show a significant impact on negotiators' perceived climate of the negotiation either. A most significant deviation of Delaney et al.'s (1997) experimental results from the NSS theory was found with the negotiation time. There was no significant difference in time taken between NSS-supported dyads and the DSS-only dyads, which is incongruent with the proposition of Lim and Benbasat's (1993) theory that the electronic communication component should speed up the negotiation process. Plausible explanations include that subjects were unfamiliar with the computer systems and that interaction with computer systems simply takes extra time (Delaney et al. 1997).

The series of the three experimental studies used the same negotiation task that was earlier adopted by Jones (1988) and employed the same interactive NSS, except for Perkins et al. (1996) which studied the DSS alone. They have accumulatively provided modest support for the validity of Lim and Benbasat's (1993) NSS theory. The accumulation effect of this series, on the other hand, limits the generalizability of its findings to other negotiation task settings and other NSS designs. That is why Starke and Rangaswamy (1999) in their review of empirical studies on NSS contended that "it is important to understand the specific manner in which a certain NSS influences cognition and behavior of its users", calling for "finer-grained" conceptualization of how different system features shape negotiators' cognition and behavior and thus improving their negotiation performance (p. 19).

A limitation of Lim and Benbasat's (1993) theory as regards the electronic communication component is that the channel is conceptualized as a complement to verbal channel in transmitting task-oriented communication. Because the complementary electronic channel is an ideal mechanism for providing common referents that back negotiators' arguments, it is expected to increase negotiators' perceived commitment of their opponents, which in turn speed up negotiation process and heighten the satisfaction of negotiating dyads. The theory did not address, however, the scenario where verbal communication is not possible and the only communication channel is electronic. In fact, in Rangaswamy and Shell's (1997) study, negotiating dyads that used electronic communication channels perceived the negotiation process to be less friendly and did not

report higher satisfaction with the negotiation outcome (Starke & Rangaswamy 1999). The finding is consistent with the literature suggesting that the impersonal mode of communication carried over electronic channels may promote more non-cooperative behavior than face-to-face interaction (Wichman 1970, Arunachalam & Dilla 1995).

Research on the differences between negotiations through face-to-face medium and electronic channels has thus witnessed mixed findings at best (Morris et al. 2002). More recently, researchers have argued that the lack of social cues and its effect can be overcome (Thompson & Nadler 2002). From a broader perspective, research has shown that people communicating through electronic channels can overcome the mediated effects: they are able to share and express in similar ways as through face-to-face medium (Tidwell & Walther 2002, Walther 1996). The implication is that the difference between the two communication media might be fading (Huffaker et al. 2008).

Regardless of how electronic communication channel differs from face-to-face medium, negotiation is increasingly conducted over computer networks. One driving force is the efficiency boost offered by the online environment like saving in time, travelling effort, and other logistical expenses, and the ease of exchanging information (Katsh et al. 2000). The other driving force is the blossoming of electronic commerce (e-commerce) that makes negotiation online an imperative reality. Although the practical usage of actual NSS as conceptualized by Lim and Benbasat (1993) in organizations has been minimal (Lim 2003), negotiation is being widely supported online in a broader sense by e-negotiation systems, which will be reviewed in the next section.

2.4.2. From NSS to E-Negotiation Systems (ENS)

According to the definitions of Kersten (2004), negotiations conducted over the Web are commonly called e-negotiations, and it is mandatory that e-negotiations are supported by e-negotiation systems as the Web already constitutes the bare minimum. An e-negotiation system (ENS) is software deployed on the web leveraging on Internet technologies for the purpose of facilitating, organizing, supporting, or automating activities undertaken by negotiating parties or a third party (Bichler et al. 2003, Insua et al. 2003).

The definition of ENS expands the scope of negotiation support and accommodates process-oriented support that lacks a DSS component (Jelassi et al. 1990). The applications may include software focused on facilitating communication (Yuan 2003), even email, chat and streaming video programs (Moore et al. 1999, Lempereur 2004), software used to facilitate documentation and the preparation of documents in negotiation (Schoop & Quix 2001), automated negotiations and auctions (Zlotkin 1996, Beam & Segev 1997, Jennings et al. 2001), and software that combines negotiation and auction mechanisms (Teich et al. 2001).

To bring structure to the broad scope of e-negotiation systems, Kersten (2004) initiated the typology comprising three categories of ENS based on its overall role and behavior: passive, active, and proactive. Passive systems require users' full control over their actions. They can be focused on helping users with their communication with negotiating partners, or with computing complex mathematical or statistical formulae, or with data

visualization, taking no action though without being given full specification from users (Kersten & Lai 2007). Active systems differ from passive systems by following a process model of the negotiation that demands compliance from users. They often have components for problem structuring and solving, offer assessment and counter-offer construction. Proactive systems possess similar capabilities as the active ones, on top of which are also capable of coordinating negotiation activities, critiquing negotiators' actions, providing suggestions on offers to make and agreements to accept, all without any request from its users. The typology is found to be in line with the three levels of group support systems as proposed in DeSanctis and Gallupe (1987).

It should be noted that in our design of multiparty negotiation support, we adopt the active approach. Essentially, while there are decision aids at negotiators' finger tips, it is still up to them as in whether and how they appropriate the decision aids. In our design, system does not make decision for negotiators: it is active, but not proactive; it facilitates, but not intervenes.

2.4.3. State-of-the-Art Negotiation Support in E-Commerce

The state-of-the-art negotiation support in e-commerce can be seen in two prominent aspects. First is the in-house negotiation support on e-commerce websites. A popular mechanism to help define and redefine the terms of interdependence between trading parties is the auction mechanism. A representative example is the Auction on eBay.com. A go-through of the Auction mechanism reveals that eBay has embedded artificial intelligence (or agent technology) that largely automates the bidding process by placing

bids on users' behalf and keeping track of the bidding status while alerting the users when necessary. Notwithstanding that auctions meet specific needs well, for example, English auction secures best price for seller and reverse auction solicits best deal for buyer, circumstances abound where the auction formats are not adequate in closing a deal; auctions being held guilty of setting up win-lose relationship between trading parties remains a concern as well (Subramanian 2009). Real-time negotiation that allows verbal interaction between trading partners is indeed available with some e-commerce websites. For example, the TradeManager in Alibaba.com boasts of real-time chat, real-time translation, and file transmission of any size. Sophisticated process-oriented support maybe, it is obvious that the real-time negotiation support by TradeManager is still largely passive.

Other than the in-house negotiation support on e-commerce websites, there are third parties who started with the mission of specializing in negotiation solutions for e-commerce businesses. Among others, TradeAccess.com and FrictionlessCommerce.com were set up in 1998 with the ambition of providing sophisticated negotiation solutions for e-commerce through automating commercial negotiations where trading parties can negotiate in real-time over multiple issues (Accenture 2000a, b). Specifically, TradeAccess provided process-oriented support through the set up of an e-negotiation table (see Rangaswamy & Shell 1997, Ströbel 2003) oriented towards bilateral purchasing negotiation. The website did maintain a database of potential trading parties and selected products. In 2001, the company was renamed as Ozro with some extension of its services including secure communication between trading parties and legal support

encompassing access to lawyers in different jurisdictions (Kersten & Lai 2007). FrictionlessCommerce were to completely automate commercial negotiations via agent technology, where software agents were to negotiate on behalf of their human principals (Maes et al. 1999). The agents were to source for products their principals wanted and engage in negotiations over multiple issues to achieve win-win agreements (Thompson 1999). Because of the inadequacy of agents in representing their human principals, the company moved to other types of services and was eventually acquired by SAP Inc.

In addition to services that focus on purchasing negotiations, there are those oriented towards other commercial conflicts. Commercial disputes involving billing, order fulfillment, breaches of contract, content disputes, privacy violations, and other issues may commonly arise from e-commerce transactions (Yuan et al. 2003). The online dispute resolution (ODR) is then receiving growing interest in the dispute resolution and legal arenas (Tyler & Raines 2006). SquareTrade.com, for instance, mediated over 30,000 disputes between sellers and bidders for eBay.com in year 2000 alone (Katsh & Rifkin 2001). There is a growing demand from government agencies, consumer groups, and industry associations for e-commerce businesses to provide ODR services to ensure that consumers have a efficient and affordable way to resolve their disputes (Yuan et al. 2003). It was reported that the Federal Trade Commission of the United States promoted online mediation services, as lawsuits or arbitrations in court were too expensive and impractical to resolve online disputes (Dennehy 2000) and due to the convenience and cost efficiency, even traditional arbitration services were setting up their online presence (Thompson 2000). There is also more specialized online dispute resolution service, for

instance, CyberSettle.com supporting dispute resolution between insurers and claimants (Kersten & Lai 2007).

A prominent service that claims to be a generic tool for decision makers with conflicts to resolve ranging from family to e-commerce disputes and many others is found on SmartSettle.com. It boasts of the capacity and capability to support negotiations that involve any number of decision makers and any number of issues. It is intended to produce better negotiated agreements, more Pareto-efficient and fairer, in a shorter time (Thiessen & Soberg 2003). Provided with users' preferences, SmartSettle generates suggestions along the negotiation process until a tentative solution is reached. It then proceeds upon request to determine if any value is left on the negotiation table and generates improvement based upon the algorithm of "maximize the minimum gain" (Thiessen & Loucks 1992).

CHAPTER 3. THEORETICAL FRAMEWORK

In this section we are elucidating the theoretical framework that guides the empirical studies of this thesis. As laid out upfront, the overall paradigm of the thesis is a combination of design science approach and behavioral science approach. Apart from the empirical studies we conducted to verify the efficacy of proposed design of decision support for online multiparty negotiation, the thesis also represents a theorization attempt concerning the impact of decision support on multiparty negotiation process and outcomes. In Whetten's (1989) seminal work on theory development, four building blocks of a theory are enumerated: "what", "how", "why", and "when".

What concerns the factors to include in the explanation of a phenomenon of interest. In the thesis, a phenomenon that intrigues us is the scarcity of research that addresses decision support for online multiparty negotiation. Because the translation from dyadic to multiparty negotiation is not obvious (Bazerman et al. 1988, Mannix et al. 1989), so is it with the decision support appropriate for them. Coupled with the pervasiveness of multiparty negotiation in practice (Mannix et al. 1989, Watkins 1999) and the prevalence of online negotiation, the phenomenon of interest translates into two research questions (i.e., RQ1 and RQ2) that guide the undertaking of the entire thesis. Balancing concerns about both comprehensiveness and parsimony, three main factors we include in the theorization are decision support, multiparty negotiation process, and multiparty negotiation outcomes.

How concerns the relationships between the factors, including correlation and causality. As far as the factors of our interest are concerned, we postulate that the decision support would impact upon multiparty negotiation process which would in turn shape multiparty negotiation outcomes, which is in line with the well-established context – process – outcome approach of the negotiation support literature (Starke & Rangaswamy 1999, Kersten & Lai 2007).

Why concerns the underlying dynamics (psychological, economic, or social) that justify the selection of facts and the proposed relationships. In this regard, we answer two questions: why is decision support needed for multiparty negotiation, and why decision support impacts upon multiparty negotiation process and in turn shape multiparty negotiation outcomes. Decision support is needed because negotiation is inherently a complex, ill-structured and evolving task (Bui et al. 1992). It is even more of such case in multiparty negotiation as compared to dyadic negotiation because of the additional parties involved (Bazerman et al. 1988). On the other hand, human beings have only "bounded rationality" (Simon 1957, March & Simon 1958). Negotiators are no exceptions. A central argument of behavioral decision research is that people devise simplifying strategies (or heuristics) to ease their decision making process (Bazerman & Tenbrunsel 1998), especially so when they are cognitively overloaded (Neale & Bazerman 1991). The heuristics, while simplifying the deal, may lead the decision makers away from optimal choices (Bazerman & Tenbrunsel 1998). The complexity of multiparty negotiation may well lead to information overload (Morely 1982) and necessitate the reliance on simplifying strategies (Bazerman et al. 2000) when no external

aid is available to negotiators. A group of researchers who take a cognitive processes perspective on negotiation actually consider negotiators' failure to reach integrative agreements (i.e., agreements that realize the integrative potential) to be a function of their reliance on heuristics (Bazerman & Neale 1983, Neale & Bazerman 1991).

On the other hand, taking the form of an external memory, decision support may assist multiparty negotiators by providing information processing capacity and capability, thus expanding their cognitive limits (Lim & Benbasat 1993). We posit that when their cognitive limits are expanded, negotiators will be less reliant on cognitive heuristics. Being more thorough and creative in solving the negotiation problem, they can in turn achieve better negotiation outcomes. Bearing the same design objective (or criteria), the proposed decision support in prior literature has generally supported this notion. For example, the decision support examined in the 3-study series on NSS efficacy (i.e., Foroughi et al. 1995, Perkins et al. 1996, Delaney et al. 1997) embedded the alternative evaluation and generation components that both impose on negotiators the structure of simultaneous consideration of issues in the form of contract package (in which options are specified for all negotiated issues). While sequential consideration of issues is thought to greatly simply the negotiation process, it forgoes the tradeoff opportunities across issues and options and leaves the integrative potential unrealized (Pruitt 1983). The structure imposed by the decision support component and more importantly the way it makes it possible for negotiators to consider multiple issues simultaneously leads to the achievement of more integrative outcomes (Mannix et al. 1989, Thompson 2001).

While various simplifying strategies might be applicable to a multiparty negotiation setting, coalition formation to reduce the number of parties to an agreement is highlighted in the literature (Bazerman et al. 2000). The importance of modeling coalition dynamics towards understanding and explaining multiparty negotiation cannot be overemphasized (DuPont 1996). Other than the conspicuous addition of negotiating parties, the inherent potential for coalition formation to influence negotiation outcomes is also the most unique characteristic that distinguishes multiparty negotiations from dyadic settings (see Polzer et al. 1998). It is then justifiable for us to examine coalition formation as the central process mechanism. The fundamental propositions of the thesis reflected in both empirical studies are as follows:

Proposition 1: When decision support is availed to multiparty negotiators, they resort less to the simplifying strategy of coalition formation; the extent of coalition formation is hence lower.

Proposition 2: When the extent of coalition formation is lower, better negotiation outcomes can be achieved.

While we use the theoretical framework and propositions to test the efficacy of decision support for online multiparty negotiation, another theme of the thesis is to design the decision support as well. Instead of proposing decision support solutions to overcome specific stumbling blocks of successful negotiation (see Foroughi et al. 1995) or to enforce recommended principles by structuring the negotiation process in certain manner (see Fisher & Ury 1981), we start our design with conceptualizing the information processing needs of negotiators, the cognitive tasks they engage in and the activities they

go through. Our design rationale is that when the information processing capacity and capability of negotiators is appropriately enlarged, they will resort less to simplifying strategies that are intended to tackle the corresponding information processing needs. It is not the other way round, where design is specifically targeted at reducing the employment of coalition formation; such an approach is narrowly focused and prone to lose sight of the design implications for other important aspects of the negotiation task. For instance, suppressing free format communication between negotiating parties, the extreme end of which is a non-cooperative game, leaves less chances for coalitions to form, thus making it a good design for the sake of reducing coalition formation. However, it alters not only the coalition dynamics, but also other aspects of the negotiation, bearing potentially undesirable consequences for negotiation outcomes.

According to Whetten (1989), while "what" and "how" describes a theory, "why" explains a theory, the combination of the three already produces a simple theory. For the simple theory to be more sophisticated and more importantly to be complete, a fourth building block is needed, that is the "who, where, when". *Who, Where, When* defines the boundary conditions of a theory, which basically concerns its generalizability. When it is reported in the literature that simultaneous consideration of issues results in higher joint outcome than the sequential approach (Mannix et al. 1989), it is implicitly assuming that the multiple issues embed integrative potential which can be unleashed through tradeoff across the issues the options. In the event of no such integrative potential, both the simultaneous and the sequential approaches may produce the same outcomes. Nevertheless, it is suggested that integrative potential exists for most multi-issue

negotiations (Bazerman 1986, Pruitt & Rubin 1986b, Raiffa 1982). Similarly, there are circumstances when coalition formation may produce better outcomes than otherwise. However, because of its defective nature (Mannix 1993) and its ensuing dynamics, it should generally associate with inferior negotiation outcomes. Other boundary conditions of our theorization will be unfolded in due course.

CHAPTER 4. EMPIRICAL STUDIES OVERVIEW

In this thesis, we aim to design and empirically test the efficacy of decision support for online multiparty negotiation. While simply put, multiparty negotiation refers to negotiation that involves more than two parties, according to Touval (1991) some multiparty negotiations may be reduced to two "sides" (i.e., bilateral) whereas others take the form of multiple sides interacting (i.e., multilateral). In the case of bilateral multiparty negotiation, negotiations occur in at least two different levels, one between the two sides and the other within a certain side (see Figure 4.1 for an example, where two sides are negotiating across the table while within each side there are three parties negotiating among themselves also: P1-P3 on one side and P4-P6 on the other). For easy reference in the rest of the thesis, we refer to the former as "level-1" negotiation and the latter as "level-2" negotiation. In Walton and McKersie's (1965) behavioral theory of labor negotiation, a similar concept to level-2 negotiation, "intraorganizational negotiation", is considered an important aspect of the embedding negotiation process. The authors contend that it could be particularly challenging to achieve internal alignment within a side through intraorganizational negotiation and such negotiation inevitably affects the overall negotiation process and outcomes.
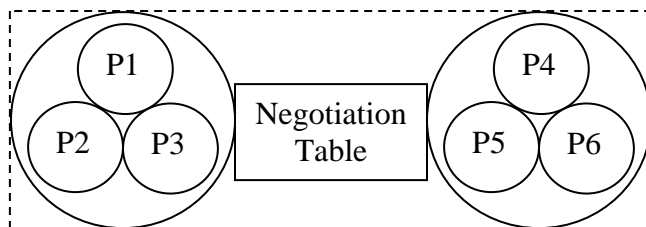
Figure 4.1: An example of bilateral multiparty negotiation.

The conceptualization of level-1 versus level-2 negotiations can also be drawn along the line of conflict type that is involved. An early attempt of classifying conflicts of different types differentiated between cognitive conflicts and conflicts of interest (Brehmer 1976, McGrath 1984). Cognitive conflicts involve tasks where group members share the same goals but disagree on how best to get there, whereas conflicts of interest arise in situations where resources are limited and each group member prefers more to less resources distributed to himself (Tindale et al. 2005). Level-1 and level-2 negotiations tally with conflicts of interest and cognitive conflicts respectively.

Clearly, both levels of negotiation deserve careful examination for a holistic understanding of multiparty negotiation to be acquired. Only with such understanding, can we design effective decision support for it. Employing a divide-and-conquer approach, the thesis includes two empirical studies that address the decision support for both levels of negotiation respectively. This helps to make answering our research questions more manageable.

In the first empirical study, we conceptualize, design and implement decision support for online bilateral multiparty negotiation (see Figure 4.1 for an example) with special emphasis on supporting level-2 negotiation. On top of the analytical tools traditionally implemented for dyadic negotiation, decision support feature catered specifically toward level-2 negotiation is proposed. The efficacy of the proposed decision support for negotiation process and outcomes is then evaluated through an experimental study.

In the second empirical study, we conceptualize, design and implement decision support for online multilateral negotiation where negotiation within a side is not a concern (see Figure 4.2 for an example, where each side is a monolithic party, meaning that level-2 negotiation is not concerned; negotiation only occurs between P1, P2 and P3 across the table, i.e., level-1 negotiation). Level-2 negotiation is omitted in the setting so that the emphasis of the decision support is for level-1 negotiation. With everything else being equal, the information processing required of multilateral negotiators is inherently more complex than that of bilateral negotiators; the corresponding decision support therefore warrants separate investigation. Once the information processing tasks of multilateral negotiators have been crystallized, we proceed to design features that support the completion of the tasks. Again, the efficacy of the proposed decision support is evaluated through an experimental study.
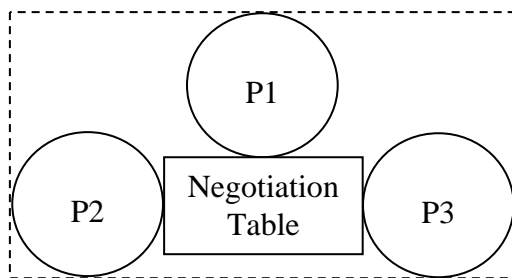
Figure 4.2: An example of multilateral negotiation.

For both empirical studies, we resort to laboratory experiment as the major research method. Compared to other social research techniques (e.g., survey or field research), experiment research is known as the strongest for testing causal relationships because the three conditions for causality (i.e., temporal order, association, and no alternative

explanations) are duly met in experimental designs (Neuman 2003). The strength for testing causal relationships makes the laboratory experiment method most fitting for our research models concerning the causal effects of proposed designs of decision support on multiparty negotiation process and outcomes. The negotiation tasks we adopt are simplified versions of reality, nonetheless retaining key elements of the negotiation structure and ensuing processes, which is a commonly used approach in the negotiation literature (De Dreu & Carnevale 2003).

Naturally, the most complex, which might also turn out to be the most realistic, negotiation setting, is multilateral negotiation that also necessitates level-2 negotiation. Having not addressed this setting in a single shot, we believe that the divide-and-conquer approach is more feasible for our exploration into this novel phenomenon. In a discussion section overseeing both of the empirical studies, we will enumerate the implications of the proposed designs of decision support and their efficacy for the more complex negotiation settings.

CHAPTER 5. THE BILATERAL INTER-TEAM NEGOTIATION SETTING

5.1. Introduction

Negotiations take place in a wide variety of political, economic, and social settings (Lim & Benbasat 1993), which is also true for bilateral multiparty negotiations. As each setting has its own idiosyncrasy, addressing all the settings with their uniqueness is hardly manageable for a single study. In view of this, we decide to extract a simplified bilateral multiparty negotiation model out of the different settings, i.e., bilateral inter-team negotiation. Essentially, in this model, two teams negotiate with one another while each team is comprised of multiple parties.

A formal definition can be found in Lewicki et al. (2003) that describe *inter-team negotiation* as a situation where two or more negotiators sharing the same interests negotiate with two or more negotiators on the other side who share their own interests. A few negotiation researchers have looked into inter-team negotiations (see Lewicki et al. 2003 for a review). Nonetheless, there is an absence of the examination into the *intra-*team dynamics, which constitute an important level of analysis in the study of inter-team negotiations. The intra-team dynamics also constitute the focus of our study. Donnellon (1994) conceptualizes team work as a negotiation of differences among team members, in which the differences must be reconciled by mutual agreement. Members of a negotiating team are compatible in interests, but not necessarily in other aspects, for example, their ways of securing the interests. In other words, there are cognitive conflicts on how best to accomplish their goal as a team in the negotiation (Tindale et al. 2005). They have to go

through a negotiation process to achieve internal alignment before an agreement can be reached with the other team, and this is what we refer to as level-2 negotiation.

5.2. Conceptualization, Design and Implementation of Decision Support for Online Bilateral Inter-team Negotiation

While in the bilateral inter-team negotiation setting, both level-1 and level-2 negotiation is involved, the level-1 negotiation remains bilateral. Negotiation support research that has extensively addressed the dyadic setting is then very much relevant. To spare the research focus of the current study for level-2 negotiation support that addresses the intra-team dynamics, we incorporate the established decision support features for dyadic negotiation as they commonly are. Traditionally, such decision support encompasses two components: alternative evaluator (see Figure 5.1 for a snapshot of the prototype system interface) and generator (see Figure 5.2). Alternative evaluator supports the evaluation of alternative contracts based on the preset preference scores of the negotiator. Alternative generator supports the generation of possible concessions and solutions. Based on a negotiator's preset preference structure and the estimated preference structure of the opposing side, it generates all possible alternative contracts and displays the alternatives promising the highest joint outcomes.

Figure 5.1: Alternative evaluator.

Figure 5.2: Alternative generator.

A question that remains to be answered is whether all the members in a negotiating team are to be assisted with their own copies of decision support and to be electronically connected, or should the whole team share a single access point to the system. Our answer is the former approach, because the decision support features that help two sides of a bilateral negotiation to reach agreement are also capable of fostering a quality internal alignment among the members of a negotiating team. First and foremost, they can force negotiators to employ objective criteria through imposing structures that require the relevant dimensions of the negotiation problem to be identified (Starke & Rangaswamy 1999). Moreover, the analytical models embedded in the decision support that uniformly assist all members of a negotiating team promote consistency in their

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decision making processes (DeSanctis & Gallupe 1987). As the negotiating team members develop more objective and consistent understanding of the negotiation situation, their definitions of the negotiation problem will tend to converge. Consequently, an internal alignment is more likely to be established with ease. Last but not least, decision support is intended to aid negotiators in overcoming their cognitive limitations (Fisher & Ury 1983). With each member's cognitive capacity and capability being expanded, the negotiating team can be expected to reach a higher quality internal alignment with regard to the negotiation problem at hand.

While decision support for each member helps to keep his focus on the problem by imposing a decision structure on the negotiation process (Starke & Rangaswamy 1999), electronic communication between the negotiating team members also enhances the problem focus by taking the focus away from the individual differences in physical appearance, semantics, or even power status, and by encouraging the use of precise and specific language (Jelassi & Foroughi 1989). In this light, we decide that all members of a negotiating team shall communicate with one other only through electronic channel. The setting is also well aligned with the objective of the thesis in examining decision support for online multiparty negotiation.

The rest of this section is devoted to conceptualizing the decision support specially tailored for level-2 negotiation in the bilateral inter-team setting. As the main outcome sought after level-2 negotiation is a quality internal alignment, the objective can be translated into making quality group decisions. The literature informs us of at least three

alternative methods for group decision making: interacting, nominal, and Delphi processes (Van De Ven & Delbecq 1974).

The interacting process is traditionally the most popular form of group decision making. A group meeting with this format typically begins with the group leader projecting the statement of a problem. Subsequently, the group goes through an unstructured discussion for the purposes of generating ideas and soliciting judgments amongst participating members. The meeting is usually concluded with a consensus agreement or a majority decision. The nominal group technique (NGT) is a group meeting with a structured format directing the decision making. It proceeds as follows. First, each participating member write down his ideas independently. Second, in a round-robin fashion each member presents one of his ideas to the group without discussion, which is noted down tersely. Once a round is finished, a discussion is opened up for the clarification and evaluation of the recorded ideas. The meeting concludes with an independent voting procedure in which participating members rank order or rate the ideas.

Clearly, both the interacting and the NGT processes require direct communication (in either physical or virtual space) among group members. The Delphi technique is distinct in this regard: participants in the Delphi technique are physically (or virtually) dispersed and do not communicate directly for the group decision making. The Delphi technique can be defined as a method for the systematic solicitation and collation of judgments on a particular topic (Turoff 1970). It permits only a restricted exchange of ideas in order to reduce counterproductive or inefficient communication that might otherwise occur during

unrestricted interaction (Huber 1980). It is intended to obtain the most reliable consensus of a group, by interspersing sequential questionnaires with summarized feedback being derived for each round of responses (Dalkey & Helmer 1963).

According to Van De Ven and Delbecq (1974), the Delphi technique can improve group decision making performance for the following reasons. First and foremost, the isolated generation and articulation of ideas forces members to really think through the problem and hence submit quality solutions, which reduces the chances of any member to free-ride others by doing nothing or passively reacting to others' ideas. The anonymity characteristic also frees the participating members from evaluation apprehension and conformity pressure, which in turn allows them to more readily advocate their positions (Murnighan 1981). Taken together, the Delphi technique promises a pool of diverse quality ideas contributed by all participating members.

Because of the task-oriented focus promoted by the Delphi technique, Van De Ven and Delbecq (1974) also highlight the possible drawbacks of its application. First, the absence of verbal clarification may create interpretation difficulties among participating members. Second, the socio-emotional dimension of the group interaction is barely attended to. For both reasons, while majority rule uplifts group priorities, the Delphi process may leave some group conflicts unresolved. We believe however that these concerns can be addressed by availing an alternative communication channel where the interacting discussion mode is also possible. This stand is similarly held by Turoff (1970) which suggests that Delphi may serve as a useful complement to the conventional interacting

group approach and a combination of the two methods may eliminate many of the disadvantages inherent with each. And because of the facilitative characteristics of the Delphi technique that are not equally met by NGT, we contend that the Delphi technique is at a better position to go complementarily with the conventional group decision making process in a level-2 negotiation setting.

We therefore conceptualize decision support for online bilateral inter-team negotiation support to comprise two components: individual decision support for each negotiator and the Delphi tool for level-2 negotiation in a negotiating team. As far as a total online environment is concerned, the communication for both level-1 and level-2 negotiation is through the electronic channel. Given the abundant literature on the design of decision support for dyadic negotiators, it is incorporated directly into our design of individual decision support for each negotiator. While the incorporation of the Delphi technique into negotiation support is largely novel, we have made the original effort in designing and implementing the feature. As a repetitive decision for a negotiating team to make along the negotiation process is to make offers to the opposing team, the Delphi technique is implemented in such a way that members of a negotiating team first input the offers they deem most sensible for the current round of exchange with proper reasoning (see Figure 5.3 for a snapshot of the prototype system interface). All members then proceed to vote on these suggested offers (see Figure 5.4). Such procedure iterates until there emerges one with the majority of votes as the finalized offer for the current round of exchange.

Please give out your suggest offer and any support reason for this offer:

Price:	200 ▼	dollars
Warranty:	1 ▼	year
Delivery:	5 ▼	months
Quantity:	5000 ▼	
Details:	[text area]	
		Submit

Figure 5.3: Delphi tool (1).

Here are the suggest offers, please make your choice:

Price:	204
Quantity:	6000
Warranty:	3
Delivery:	7
Reason:	I think the price is the most important to us, right?
Times:	0

Click submit to choose this suggestion:

Vote for This

Price:	208
Quantity:	6000
Warranty:	3
Delivery:	7
Reason:	I think this offer is more likely for our opponent to accept.
Times:	0

Click submit to choose this suggestion:

Vote for This

Price:	204
Quantity:	5500
Warranty:	3
Delivery:	7
Reason:	Follow the instruction, the utility score for the offer should be higher than 44, right?
Times:	0

Click submit to choose this suggestion:

Vote for This

Choose the round to view previous records: 1 ▼ submit

Figure 5.4: Delphi tool (2).

5.3. Research Model and Hypotheses

In this section, we put forward the research model and hypotheses concerning the efficacy of the conceptualized, designed and implemented decision support for online bilateral inter-team negotiation process and outcomes. Once there are more than two parties, coalition turns out to be a major variable in understanding and explaining negotiations (DuPont 1996). This is also true for level-2 negotiation that occurs in a negotiating team. When there are three or more members in a negotiating team, the phenomenon of coalition formation could easily arise. We would examine coalition formation as a key process variable that is to be influenced by the availability of the proposed decision support and in turn impacts upon online bilateral inter-team negotiation outcomes.

In a level-2 negotiation, parties are governed by compatible interests, but potentially incompatible ideologies. According to the literature review, the faultline theory is most applicable to anticipate coalition formation in this setting. Lau and Murnighan (1998) posit that faultlines and coalition formation are closely connected. Group faultlines are hypothetical dividing lines that may split a group into subgroups based on one or more attributes. A group may have many potential faultlines, each of which may trigger particular subgroupings (i.e., coalition formation). Lau and Murnighan (1998) suggest that how faultlines exaggerate coalition formation is moderated by task characteristics as they make certain attributes of group members and the corresponding differences among subgroups more salient; this is especially true at early stages of group development.

As far as negotiation task is concerned, the cultural attribute has received considerable attention from researchers. Culture is defined as "the collective programming of the mind which distinguishes the members of one category of people from those of another" (Hofstede 1984 p. 389). Prior research indicates that negotiation styles differ from culture to culture (Weiss 1994). Indeed, culture may influence how negotiators perceive the very nature of negotiation (Salacuse 1999), in other words, how they define a negotiation situation. It is believed that negotiators with similar cultural trait tend to define negotiation situations similarly (Salacuse 1991). Drawing from the faultline theory, the similarity in the definition of negotiation and the saliency thereof in a negotiation task make cultural trait an outstanding attribute to form the active group faultline that bears great potential for the corresponding coalition formation.

As conceptualized, the online bilateral inter-team negotiation support comprises two components, decision support for individual negotiators and the Delphi technique for level-2 negotiation in a negotiating team. To investigate the effects of both components, we bring in the construct of the degree of decision support. Three degrees can be visualized. A baseline is an online negotiation platform without any decision support. A higher degree incorporates individual decision support for all negotiators. The Delphi technique is essentially a structured group method; when it is conjoined with individual decision support, a higher degree of support is formed. Essentially, while the individual decision support helps individual negotiators make informed decisions, the Delphi technique is capable of systematic solicitation and collation of the informed individual decisions and fosters the internal group alignment, which qualifies the conjoined support

literally as group decision support in contrast to sheer individual decision support. While it is possible to involve the Delphi technique even when individual decision support is not in place, our stand is that the technique is only fruitful when individuals make informed decisions at the first place, or else, the analogy of "garbage in, garbage out" will apply. For this reason, we are looking only at three increasing degrees of decision support in an online platform only: no decision support, individual decision support, and group decision support that is realized through the aggregation of individual decision support and the Delphi technique operating at the negotiating team level. For easy reference of the three degrees, they will be labeled as low, medium, and high respectively with regard to the sophistication of their rendered decision support.

Figure 5.5 depicts our research model for the current empirical study. The foundational proposition is that the degree of decision support impacts on the extent of coalition formation within a negotiating team, which is the primary dependent variable of our study. In addition, the degree of decision support through altering coalition formation dynamics also has consequences for various aspects of bilateral inter-team negotiation outcomes, which are the secondary dependent variables (as represented in dotted box and arrow). Cultural diversity is conceptualized as the antecedent of coalition formation in the level-2 negotiation of a negotiating team.
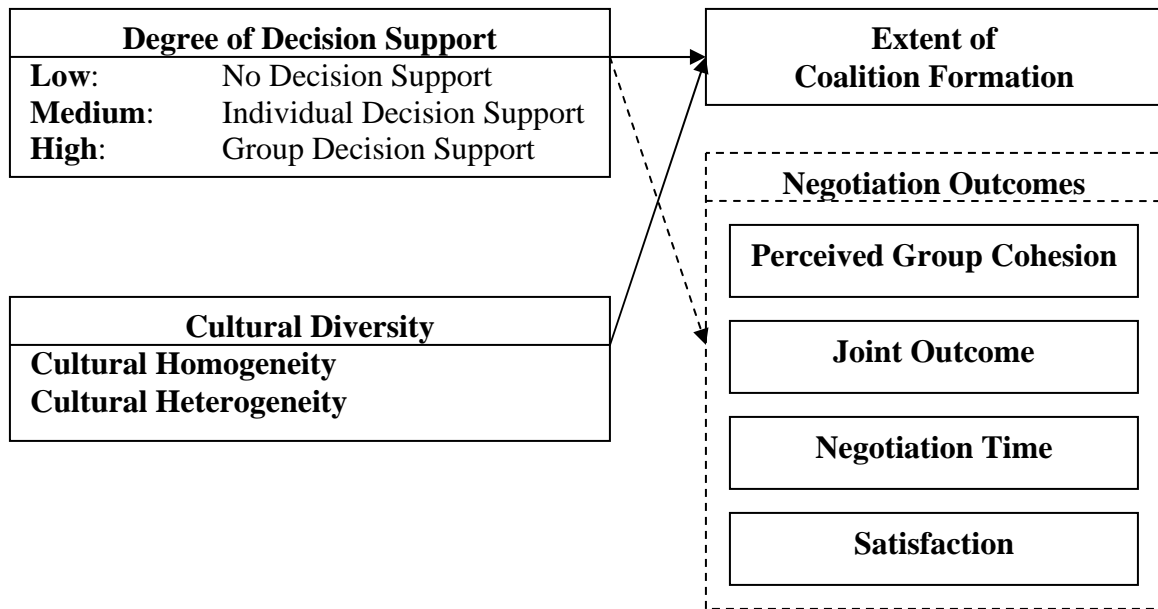
Figure 5.5: The research model.

5.3.1. Degree of Decision Support, Extent of Coalition Formation, and Negotiation Outcomes

As the model reflects, we posit that the degree of decision support impacts upon the extent of coalition formation within a negotiating team. More specifically, we contend that the higher the degree of decision support, the lower the extent of coalition, exactly due to the higher sophistication of decision support extended to individual team members and to a negotiating team as a whole. Essentially, members in a negotiating team share the same interests in the negotiation exercise. They are however still prone to coalition formation because they practice differing approaches to the negotiation problem in line with their different personal attributes which constitute the group faultlines. While negotiators may choose coalition partners consciously based upon the similarity of their personal attributes and consequently their definition of the negotiation situation with other team members, the reason for their resort to coalition formation at the first place,

which they may not even be aware of, is to simplify the group decision making process. They may want to join and persist over the position of their coalitions because they are not motivated to explore differing positions even if they might turn out better and more importantly it may be beyond their cognitive limit to completely process all differing positions in order to derive an optimal decision. We postulate that with appropriate decision support that enhances the information processing capacity and capability of negotiators, their approaches to the negotiation problem will all get closer to the rational model and hence less divergent from one another, which renders a simplifying strategy to resolve their differences less imperative. Moreover, the negotiators will also be more open to differing cognitions and ready to resolve the differences in a more fruitful manner than through the simplifying strategy of coalition formation. We contend further that, the higher the degree of decision support, the lower the extent of coalition formation in a negotiating team. We hence put forward the general hypothesis as follows:

Hypothesis 1: The extent of coalition formation within a negotiating team is lower when assisted by higher degree of decision support.

Specifically, compared to the low degree, the medium degree of decision support subdues the extent of coalition formation because of the individual decision support that is introduced into the picture. In our conceptualization, all negotiators are provided with their own individual decision support. The individual decision support aids negotiators in overcoming their cognitive limitations (Fisher & Ury 1983). It can force negotiators to employ objective criteria through imposing structures that require the relevant dimensions of the negotiation problem to be identified (Starke & Rangaswamy 1999).

Moreover, the analytical models embedded in the decision support that uniformly assist all members of a negotiating team promote consistency in their decision making processes (DeSanctis & Gallupe 1987). As all negotiating team members are more objective and consistent in their approaches to the negotiation problem, the approaches are less deviant from one another. The expanded cognitive limit also allows negotiators to more readily process and integrate differing cognitions. For the above reasons, with medium degree of decision support negotiating team members are less driven to form coalitions in order to simplify the process of resolving their differences. We have the following hypothesis:

> *Hypothesis 1a: The extent of coalition formation within a negotiating team is lower when assisted by medium than low degree of decision support.*

Subsequently, we posit that the high degree of decision support further lowers the extent of coalition formation as compared to the medium degree. Whereas the medium degree comes with individual decision support, the high degree renders the literal group decision support through the conjunction of both individual decision support and the Delphi technique. Through systematic solicitation and collation of individual judgments, the Delphi technique further structures the group decision making process and facilitates the establishment of internal group alignment. It not only forces individual members to submit quality solutions without cues from others but also frees them from evaluation apprehension and conformity pressure. To the extent that the Delphi technique stretches negotiating team members' cognition and filters out the noises during their individual decision making (i.e., evaluation apprehension and conformity pressure), we posit that

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the approaches they take towards the negotiation problem are even closer to the rational model and hence closer to one another. The Delphi technique also forces negotiators to process and integrate differing cognitions and to vote only for the best. For the above reasons, we hypothesize that with high degree of decision support negotiating team members are even less likely to resort to coalition formation, thus further lowering its extent:

Hypothesis 1b: The extent of coalition formation within a negotiating team is lower when assisted by high than medium degree of decision support.

Through altering the dynamics of coalition formation, the degree of decision support, also impacts upon various aspects of negotiation outcomes. Lau and Murnighan (1998) pointed out that unspoken but implicit subgrouping (coalition formation) limit cross-subgroup communication and as the notion of in-groups and out-groups gets perpetuated, conflict between subgroups increases, which in turn may create hostility between these subgroups, thus leading to lower cohesion perceived by team members. Conversely, as the extent of coalition formation gets lower with higher degree of decision support, we contend that the perceived group cohesion gets higher. Hence, the following hypothesis:

Hypothesis 2: The group cohesion as perceived by negotiating team members is higher when assisted by higher degree of decision support.

According to Clark et al. (2000), when coalition formation divides a negotiating team, the processes that its members typically go through to reach internal alignment are hindered their interdependence is hurt. Consequently, the morale of the negotiating team members

decreases and they feel less satisfied with the group process (Thatcher et al. 2003). However, as the extent of coalition formation becomes lower with higher degree of decision support, the negotiating team members' satisfaction should become higher. We have the following hypothesis:

Hypothesis 3: The satisfaction of negotiating team members is higher when assisted by higher degree of decision support.

Coalition formation is considered a defection at the group level (Mannix 1993). When it divides a negotiating team, both communication and task interdependence is hurt and the processes towards reaching internal alignment are hindered (Clark et al. 2000). Foreseeably, as a result of coalition formation, the internal alignment if reached at all by the negotiating team is likely to be of lower quality, which reflects the degenerated effectiveness of the negotiating team. Although the team effectiveness is a strong indicator of the team performance, it is not deterministic of the one-side outcome of the team in a negotiation context as it is interdependent with that of the other side as well. Nonetheless, prior literature suggests that the fluctuation of one side's performance will be reflected in the embedding dyad's ability to discover joint gains (Fry 1985). Moreover, it is argued that the degree of cooperation or competition in intragroup interaction is a good predicator of how the group is likely to behave in intergroup conflicts (Keenan & Carnevale 1989, Louis & Terry 2003). Along this line of thought, a negotiating team that experiences intragroup coalition formation which is inherently non-cooperative is likely to extend such orientation into the intergroup setting, which caps the integrative potential of the negotiation setting that can be unlocked. Consequently, we can infer that in a

bilateral inter-team negotiation when both negotiating teams are less effective and less cooperative, the joint outcome they can reach will be worsened. Correspondingly, when a higher degree of decision support lowers the extent of coalition formation in both negotiating teams, it also warrants better joint outcome achieved together by them in the bilateral inter-team negotiation. Hence, the following hypothesis:

Hypothesis 4: The joint outcome achieved in a bilateral inter-team negotiation is higher when assisted by higher degree of decision support.

Meanwhile, as coalition formation hinders the process a negotiating team goes through to reach internal alignment, the efficiency of the team also degrades. But again, the one-side efficiency of a negotiating team is not deterministic of the actual time taken for a bilateral inter-team negotiation as it is also dependent upon the other side. However, we can infer that when both negotiating teams are less efficient, the negotiation time they take to reach agreement will be lengthened. In this regard, when a higher degree of decision support lowers the extent of coalition formation and as a result boosts both negotiating teams' efficiency in reaching internal alignment, it also warrants shorter negotiation time taken in the bilateral inter-team negotiation. We have the following hypothesis:

Hypothesis 5: The negotiation time taken in a bilateral inter-team negotiation is shorter when assisted by higher degree of decision support.

5.3.2. Antecedent of Coalition Formation: Cultural Diversity

From the faultline perspective, cultural traits of members constitute a salient faultline to activate subgrouping process in the level-2 negotiation of a negotiating team. Members

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with similar cultural traits, based on various cues, may identify with each other and categorize themselves as a subgroup. With the implicit formation of the coalition, its members act according to their acknowledged codes of behavior, balanced by a concern to represent their coalition favorably, and thus perpetuating the coalition.

As individual parties are formed into a negotiating team, their cultural traits are naturally aggregated; the construct of cultural diversity is therefore invoked. Cox (1994) defines cultural diversity as the representation of people in a social system with distinctly different group affiliations of cultural significance. Cultural homogeneity and heterogeneity are the two possible conditions assumed by cultural diversity. Lau and Murnighan (1998) define heterogeneity as the number of distinguishable subgroups that a team's members perceive on the basis of their salient characteristics and a homogeneous team as one in which all members perceive themselves as sharing key salient characteristics. Apparently, a negotiating team with a heterogeneous-cultural composition is more prone to the phenomenon of coalition formation for in a homogeneous-cultural team the cultural attribute is likely to keep the members together in a grand coalition which literally translates to no coalition formation. Hence, the following hypothesis:

Hypothesis 6: The extent of coalition formation is higher in teams characterized by heterogeneous culture than in those characterized by homogeneous culture.

5.4. Research Method

In this section, we elucidate the research method we adopt for verifying the research model and hypotheses in the current empirical study. Essentially, we resort to a laboratory experiment, the details of which are elaborated as follows.

5.4.1. Experimental Design

The experiment devised a 3x2 factorial design in line with the two independent variables of our research model, i.e., degree of decision support and cultural diversity. Forty-eight students were recruited from a large university in Singapore as subjects, resulting in eight subjects per experimental condition (see Figure 5.6). All of the subjects were from mainland China with Mandarin as their native language. However, they were proficient in English conversation (both spoken and written). The subjects were randomly assigned to the various experimental conditions, and the specific negotiating roles and teams. Each negotiating team is comprised of three members, with one of them being a confederate. Two negotiating teams form a negotiation session and the subjects involved in the negotiation session scoring the highest joint outcome within each degree of decision support were each given monetary reward equivalent to 20 Singapore dollars.

Cultural	Homogeneity	8 subjects	8 subjects	8 subjects
Diversity	Heterogeneity	8 subjects	8 subjects	8 subjects
		Low	Medium	High

Degree of Decision Support

Figure 5.6: The 3x2 factorial design.

5.4.2. Manipulation of Independent Variables

Degree of decision support is manipulated by providing distinct system features in different treatment conditions. Low degree of decision support entails the sole provision of electronic communication channel over the online platform, which is realized through commonly used instant messaging software (ICQ and MSN). Medium degree of decision support provides similar electronic communication channel, on top of which individual decision support catered specifically towards individual negotiators (including both components of alternative evaluator and generator) is put in place. High degree of decision support avails all the functionality of the medium degree, plus the incorporation of the Delphi technique, which collectively forms the group decision support.

As nationality is widely considered the most salient dimension in determining cultural heterogeneity (Earley & Mosakowski 2000), cultural diversity in the study is operationalized through composition of nationalities and manipulated via the scripting of confederates. Since all the actual subjects are from mainland China, a homogenous-cultural negotiating team involved a confederate playing a student of the same origin. On the other hand, a heterogeneous team included a confederate negotiator of a different nationality, in this case Singaporean. As all the negotiation sessions were conducted electronically with communication channel enabling mainly text, language was deemed an appropriate index of culture to manipulate the cultural diversity of teams.

It is suggested that Singapore's unique English style, which is the shared language of Singaporean society, reflects its unique culture. For instance, there is extensive use of

discourse particles and interjections (e.g., ah, lah, what, and ai-yah) in Singapore English. Wee (1998 p. 191) points out that these "exclamations and particles … convey attitudes and emotions, and are often seen as lexical items which are most uniquely Singaporean". In our experiment, the confederates' cultural backgrounds could hence be discriminated by the jargon they use (Romaine 1994). A standardized script embedding cultural diversity conditions was crafted to be used by confederates in homogeneous and heterogeneous sessions respectively. In a negotiation session, the words a confederate spoke would strictly follow the script. A confederate's behavior in the negotiation had also been defined previously. An offer sequence was provided, and the confederate would follow that sequence to give out suggestions for subsequent rounds of offer exchange. The offer sequence was designed in such a manner that the issues the buyer/seller team cares less are to be compromised first; the more important issues are not to be compromised until both subjects would like to do so. Nevertheless, the confederate would not be the first to suggest an offer in any round; instead they would let the actual subjects to share their opinions first, and encourage them to participate in the negotiation. The script thus provided a clearly standardized script for the confederates to follow during negotiation and meanwhile minimized the control they could impose on the negotiation process, which restricted the impact of the confederates to the sole purpose of cultural diversity manipulation. There was one item in the post-experiment questionnaire probing subjects' perceived level of cultural diversity: "All the members in our group seem to have similar backgrounds." Results showed that subjects' level of agreement with this statement is significantly higher in the condition of cultural homogeneity (5.125) than cultural heterogeneity (4.750) ($p < 0.01$). The construct is hence successfully manipulated.

5.4.3. Measurement of Process Variable

The extent of coalition formation is a novel construct and has not yet been operationalized in extant literature to our knowledge. Due to the dynamic nature of the coalition phenomenon, it is inadequate to measure the extent of coalition formation through self-reporting in a post-experiment questionnaire. Therefore, we resorted to the approach of content analysis, which has been widely adopted in negotiation studies. During each negotiation session, all input made by the negotiators, including the subjects and the confederates, was logged. The coding scheme proposed by Bales (1950) was adapted to analyze the content of the negotiation sessions (see Table 5.1). In order to illustrate the application of the general coding scheme of small group interaction to the negotiation task context, we have listed down typical examples for the corresponding content categories.

Table 5.1: Coding scheme (adapted from Bales 1950).

Main Aspects	Categories	Examples
Social-emotional aspect: *positive reactions*	Shows solidarity, raises other's status, offers compliment, gives help	"I can see how you feel," "You've done a good job," "That's fine."
	Shows tension release, cracks jokes, expresses laughter, shows satisfaction	"Great, we have finally worked it out," "lol," (stands for "laugh out loudly" in virtual chat), "I am pleased with that."
	Shows agreement, shows passive acceptance, displays understanding, gives affirmation, expresses compliance	"Yes, that's it," "Then I guess we're all agreed on that," "I think you are right about that," "Let's do that."
Social-emotional aspect: *negative reactions*	Raises disagreement, shows passive rejection, displays formality, withholds	"I don't think that will work," "Are you sure?" "How I wish that is the case!"

	help	
	Shows tension, seeks help, displays withdrawal	"That's my fault indeed," "Oh mine, what can we do now?" "There's nothing much we can do in this case."
	Shows antagonism, deflates other's status, defends or asserts self	"Stop that!" "See what an idea you have suggested," "I've tried my best though."
Task aspect: *attempted answers*	Gives suggestion, direction, implying autonomy for other	"Shall we start with an offer that's best for us?" "We'd better make compromises little by little so as not to miss any better deal."
	Gives opinion, evaluation, analysis, expresses feeling, wish	"I think that might be a good deal," "So far, the buyer has been compromising only on price," "I feel they will accept our offer this time."
	Gives orientation, information, makes repetition, offers clarification, gives confirmation	"I have just double checked—our bottom line is 44 scores," "What I meant was actually to wait for their offer first."
Task aspect: *questions*	Asks for orientation, information, repetition, confirmation	"Where are we now?" "What's our score if we accept the offer?" "I did not really get you."
	Asks for opinion, evaluation, analysis, expression of feeling	"How long do you think they will take to pose an offer?" "What do you think of their offer?" "What strategy are they using?"
	Asks for suggestion, direction, possible ways of action	"Which issue shall we concede on first?" "What is our general strategy?" "What can we do now to improve our outcome?"

A mathematical index was constructed as in the subsequent formula to quantify the extent of coalition formation. Essentially, the relative frequency of positive versus negative reactions between two members is considered a representative indicator of the extent of their coalition formation. As the confederates were employed to manipulate the cultural diversity conditions, we were only examining the extent of coalition formation between

the two actual subjects in a negotiating team (reflected in the formula).

$$ExtentOfCoalitionFormation = \frac{PR(s1 \rightarrow s2) + PR(s2 \rightarrow s1)}{PR(s1 \rightarrow c) + PR(s2 \rightarrow c)} * \frac{NR(s1 \rightarrow c) + NR(s2 \rightarrow c)}{NR(s1 \rightarrow s2) + NR(s2 \rightarrow s1)}$$

In the above formula, *PR* indicates frequency of positive reactions, while *NR* indicates frequency of negative reactions. *PR(s1→s2)*, thus, represents the positive reactions from subject 1 to subject 2. In the same vain, *NR(s1→c)* denotes the negative reactions from subject 1 to the confederate. In essence, the formula calculates the relative positivity between the two actual subjects in terms of their reactions toward each other. Controlling for the length of negotiation, the division operation is opted over subtraction in calculating the relative positivity. It is noted that the formula also controls for the positive/negative reactions from subject 1 and 2 to the confederate, which results in the "corrected" extent of coalition formation between the two actual subjects against the embedding negotiating team. A possible contention for such measurement of the extent of coalition formation is that positive/negative reactions towards others' opinions may not be sufficiently coalitional in nature. The concept of "opinion coalition" however is not new in the political context. For example, Rohde's studies (1972a, 1972b) emphasize that the formation of the opinion coalition is the crucial stage of Supreme Court decision making.

5.4.4. Measurement of Outcome Variables

The bilateral inter-team negotiation outcome variables were measured as follows. Perceived group cohesion and satisfaction were both measured through subjects' response to questionnaire items, which were adapted from the scales of Evans and Jarvis

(1986) and Foroughi et al. (1995) respectively. The items for the former include: "I feel involved in what is happening in my group," "in spite of individual differences, a feeling of unity exists in my group," "I do not feel a part of the group activities," "I feel it would make a difference to the group if I were not here," and "it makes a difference to me how this group turns out." The items for the latter include: "I was satisfied with the group processes of our team," "our group worked well as a team," "I was satisfied with the accomplishments of our group during this session," and "I was satisfied with our group's ability to meet all of its task objectives." Joint outcome was calculated as the sum of utility scores for both buyer team and seller team achieved from the final agreement. Negotiation time was measured in minutes, from the time when the negotiation was started till the moment that the final agreement was reached.

5.4.5. Experimental Task and Procedure

Negotiation sessions in all experimental conditions performed the same negotiation task. The task involved the negotiation between a buyer team and a seller team over a three-year purchase agreement for an engine subcomponent, revolving around four issues – unit price, purchase quantity, time of first delivery, and warranty period (adapted from Jones 1988). The negotiation scenario predefined the unique preference structure of the buyer team and the seller team through the expression of utility values (see Table 5.2); different weightage across the negotiation issues was assigned to the opposing teams, creating a bargaining situation in which mutually beneficial tradeoffs are possible. The negotiation scenario included a BATNA (Best Alternative to Negotiated Agreement),

represented as an alternate offer from another company, which provided the negotiating teams with a minimum utility level to achieve.

Table 5.2: Preference structures of the experimental task.

Price	Quantity	Warranty	Delivery
Seller			
$224 (37)	8000 (15)	1 year (28)	8 months (20)
$220 (31)	7500 (13)	2 years (19)	7 months (13)
$216 (25)	7000 (10)	3 years (9)	6 months (7)
$212 (19)	6500 (8)	4 years (0)	5 months (0)
$208 (12)	6000 (5)	-	-
$204 (6)	5500 (3)	-	-
$200 (0)	5000 (0)	-	-
Buyer			
$200 (16)	5000 (39)	4 years (16)	5 months (29)
$204 (13)	5500 (33)	3 years (10)	6 months (19)
$208 (11)	6000 (27)	2 years (5)	7 months (10)
$212 (8)	6500 (20)	1 year (0)	8 months (0)
$216 (5)	7000 (13)	-	-
$220 (3)	7500 (7)	-	-
$224 (0)	8000 (0)	-	-

The recruited subjects were randomly assigned to the experimental conditions, the roles of buyer and seller, as well as the specific negotiating teams. They were briefed online prior to their respective negotiation sessions and provided electronic versions of the general instructions, case description (including private information for buyer and seller such as their preference structure) and training materials for their designated degrees of decision support. The subjects were given sufficient time to go through the materials and encouraged to clarify any doubt they had. Afterwards, they filled out a short pre-experiment questionnaire mainly measuring their demographics. The questionnaire also included a short quiz verifying the subjects' understanding of the negotiation task and their proficiency in using the designated support systems.

The subjects were required to log into their designated systems during assigned time slots. The experiment coordinator oversaw each experimental session to make sure all regulations were properly observed and in the meantime logged the sessions. There was no time limit imposed upon any negotiation session. The closure of any session was symbolized by the buyer and seller teams both agreeing to one common settlement. Upon settlement, the subjects were asked to complete a post-experiment questionnaire. Before logging off the systems, the subjects were reminded explicitly not to reveal any detail of this experiment to any others.

5.5. Data Analysis

This section reports the empirical results derived from the data collected from the laboratory experiment.

First of all, some background information about the subjects is reported as follows. Among the 48 student subjects, 22 (45.83%) are male and 26 are female (54.17%). All the subjects are in the age group of 20-24. No significant difference is found in either gender or age distribution across the experimental conditions. All of the subjects have used instant messaging software (e.g., ICQ, MSN) before.

The extent of coalition formation was measured through content analysis with the adapted version of Bales' (1950) coding scheme. The transcripts of all the negotiation sessions were coded and analyzed. A random sample of 25% of the transcripts was drawn

to establish inter-coder reliability in the application of the coding scheme. Each of these transcripts was subsequently coded by two different coders. A Cohen's Kappa of 82.40% suggests satisfactory inter-coder reliability (Cohen 1960). Two-way ANOVA (see Table 5.3) was conducted to test the main effects of degree of decision support and cultural diversity. First of all, there was no sign of interaction effect between the two independent variables (F-statistic = 0.253; p > 0.05). With this assurance, we proceeded to focus on the main effects. Cultural diversity was shown to exert significant main effect on the extent of coalition formation within a negotiating team (F-statistic = 5.235; p < 0.05). The mean comparison indicated that the extent of coalition formation is higher in cultural-heterogeneous teams (1.6067) than in cultural-homogeneous teams (0.9433). We then conclude that hypothesis 6 concerning cultural diversity as the antecedent of coalition formation is supported.

Table 5.3: Two-way ANOVA for extent of coalition formation.

Tests of Between-Subjects Effects

Dependent Variable:ExtentOfCoalitionFormation

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7.290[a]	5	1.458	2.891	.044
Intercept	39.015	1	39.015	77.358	.000
DegreeOfDecisionSupport	4.395	2	2.198	4.357	.029*
CulturalDiversity	2.640	1	2.640	5.235	.034*
DegreeOfDecisionSupport * CulturalDiversity	.255	2	.128	.253	.779
Error	9.078	18	.504		
Total	55.384	24			
Corrected Total	16.369	23			

a. R Squared = .445 (Adjusted R Squared = .291)

The two-way ANOVA results also showed significant main effect of degree of decision support upon the extent of coalition formation (F-statistic = 4.357; p < 0.05). As three degrees of decision support were tested, a post-hoc analysis of multiple comparisons was conducted to single out the source of the main effect. The conservative Tukey test was devised for all the post-hoc analyses in this study. As the Tukey test assumes equal variances, we first conducted the test of homogeneity of variances. The Levene statistic is insignificant which suggests that the assumption of equal variances is not violated (see Table 5.4). Table 5.5 shows the multiple comparisons results using the Tukey test. Apparently, the main effect of degree of decision support is most prominent in the comparison between the low and the medium degree (p < 0.05). The mean difference (see also Figure 5.7) indicates that the extent of coalition formation is lower in negotiating teams assisted with the medium than the low degree of decision support. Thus, hypothesis 1a is supported. The mean difference between the medium and the high degree of decision support is opposite to our hypothesized direction. However, the difference is not significant (p > 0.05). Hypothesis 1b is then not supported. Taking both hypothesis 1a and 1b into account, the general hypothesis 1 is partially supported.

Table 5.4: Test of homogeneity of variances for extent of coalition formation.

Test of Homogeneity of Variances

ExtentOfCoalitionFormation

Levene Statistic	df1	df2	Sig.
1.895	2	21	.175

Table 5.5: Post-hoc multiple comparisons for extent of coalition formation.

Multiple Comparisons

Dependent Variable:ExtentOfCoalitionFormation

	(I) DODS^	(J) DODS^	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	1.00	2.00	.99875	.37755	.039*	.0471	1.9504
		3.00	.22375	.37755	.826	-.7279	1.1754
	2.00	1.00	-.99875	.37755	.039*	-1.9504	-.0471
		3.00	-.77500	.37755	.124	-1.7266	.1766
	3.00	1.00	-.22375	.37755	.826	-1.1754	.7279
		2.00	.77500	.37755	.124	-.1766	1.7266

^DODS denotes degree of decision support.
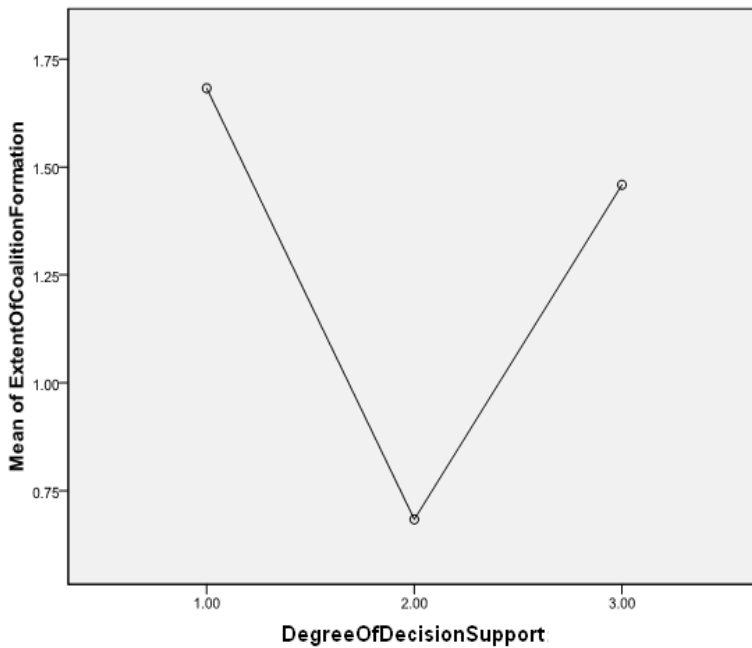
Figure 5.7: Means plot of extent of coalition formation.

One-way ANOVA has been used to analyze the various negotiation outcomes with respect to degree of decision support. As two outcome variables, namely perceived group cohesion and satisfaction are measured through subjects' response to questionnaire items, an exploratory, principal components factor analysis (PCA) with varimax rotation is first

conducted to establish the validity of the items. Table 5.6 shows the factor analysis results. The items generally load heavily on their respective constructs, thus demonstrating adequate reliability of the individual items. The Cronbach's Alpha of perceived group cohesion and satisfaction are 0.845 and 0.915 respectively, which both pass the threshold of 0.707 as suggested by Nunnally (1978), indicating that each set of measurement items is consistent in what it is intended to measure (Nunnally & Bernstein 1994). We then conclude that the items constitute reliable measurement of the two variables. From the factor analysis results, it is also seen that the loadings of items on their respective constructs are higher than loadings of other items on these constructs and the loadings of these items on other constructs, thus lending evidence to discriminant validity of these items as measurement of the two constructs.

Table 5.6: Factor analysis.

	Component	
	1	2
Satisfaction1	**.803**	.296
Satisfaction2	**.874**	.253
Satisfaction3	**.923**	.059
Satisfaction4	**.901**	.098
Cohesion1	.095	**.869**
Cohesion2	.272	**.657**
Cohesion3	-.449	**-.732**
Cohesion4	-.044	**.853**
Cohesion5	.196	**.710**

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

With assurance of validity and reliability of the measurement, we proceed to conduct ANOVA tests for perceived group cohesion and satisfaction. Table 5.7 shows that degree of decision support exhibits significant main effect on individual negotiators' perceived group cohesion (F-statistic = 3.507; $p < 0.05$). The insignificant Levene statistic (see Table 5.8) allows us to further conduct Tukey test for post-hoc multiple comparisons (results shown in Table 5.9). The post-hoc analysis informs us that the significant main effect comes from the comparisons between the medium degree of decision support and the other two degrees (both being marginally significant, $p = 0.067$). A post-hoc contrast between the medium degree and the other two degrees (see Table 5.11) by averaging the means of the low and the high degrees (as reflected in Table 5.10) further confirms that negotiators assisted with medium degree of decision support reported significantly lower perceived group cohesion than those with low and high degree of decision support ($p < 0.05$, see also Figure 5.8). The results deviate from hypothesis 2, and the hypothesis is hence disconfirmed.

Table 5.7: One-way ANOVA for perceived group cohesion.

ANOVA

PerceivedGroupCohesion

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.607	2	2.803	3.507	.038*
Within Groups	35.973	45	.799		
Total	41.579	47			

Table 5.8: Test of homogeneity of variances for perceived group cohesion.

Test of Homogeneity of Variances

PerceivedGroupCohesion

Levene Statistic	df1	df2	Sig.
1.344	2	45	.271

Table 5.9: Post-hoc multiple comparisons for perceived group cohesion.

Multiple Comparisons

Dependent Variable:PerceivedGroupCohesion

	(I) DODS^	(J) DODS^	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	1.00	2.00	.72500	.31611	.067*	-.0411	1.4911
		3.00	.00000	.31611	1.000	-.7661	.7661
	2.00	1.00	-.72500	.31611	.067*	-1.4911	.0411
		3.00	-.72500	.31611	.067*	-1.4911	.0411
	3.00	1.00	.00000	.31611	1.000	-.7661	.7661
		2.00	.72500	.31611	.067*	-.0411	1.4911

^DODS denotes degree of decision support.
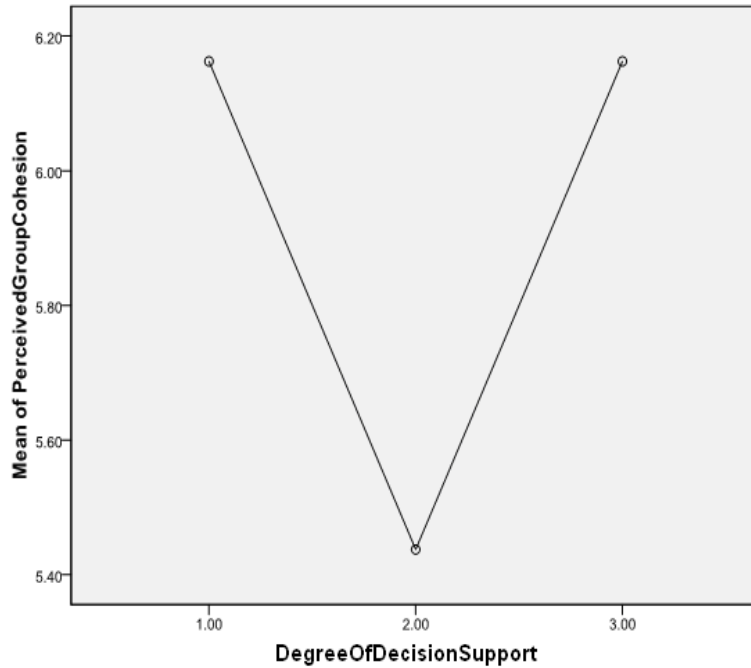
Figure 5.8: Means plot of perceived group cohesion.

Table 5.10: Post-hoc contrast for perceived group cohesion (1).

Contrast Coefficients

	DegreeOfDecisionSupport		
Contrast	1.00	2.00	3.00
1	.5	-1	.5

Table 5.11: Post-hoc contrast for perceived group cohesion (2).

Contrast Tests

		Contrast	Value of Contrast	Std. Error	t	df	Sig. (2-tailed)
PerceivedGroupCohesion	A[1]	1	.7250	.27376	2.648	45	.011*
	D[2]	1	.7250	.30867	2.349	22.266	.028

[1]Assume equal variances
[2]Does not assume equal variances

Table 5.12 shows that individual negotiators' satisfaction does not differ significantly with varying degrees of decision support (F-statistic = 0.104; $p > 0.05$). Thus, the

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hypothesized main effect of the degree of decision support on satisfaction (i.e., hypothesis 3) is not supported.

Table 5.12: One-way ANOVA for satisfaction.

ANOVA

Satisfaction

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.112	2	.056	.104	.901
Within Groups	24.133	45	.536		
Total	24.245	47			

One-way ANOVA is also conducted on joint outcome and negotiation time with respect to the degree of decision support. In view of the limited sample size for the two variables, we acknowledge the small statistical power of the hypotheses testing. However, we still are carrying out the test, while paying special care to the interpretation of the results.

Table 5.13 shows that joint outcome differs with varying degrees of decision support. The difference is marginally significant (F-statistic = 3.694; p = 0.067). The limited statistical power for the hypothesis testing should allow us to attach more significance to the result than the marginal significance suggests. The difference is further probed with Tukey test, which is qualified because the insignificant Levene statistic assures homogeneity of variances (see Table 5.14). Apparently, the main effect on joint outcome comes mainly from the comparison between the low and the high degree of decision support (see Table 5.15, p = 0.067). The mean difference as indicated in Table 5.15 suggests that negotiation sessions assisted with high degree of decision support achieved

higher joint outcomes than those with low degree of decision support. While the mean comparisons between the medium degree and the rest are in line with our hypothesized direction (see Figure 5.9), the results are insignificant. Therefore, hypothesis 4 is considered partially supported.

Table 5.13: One-way ANOVA for joint outcome.

ANOVA

JointOutcome

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	85.167	2	42.583	3.694	.067*
Within Groups	103.750	9	11.528		
Total	188.917	11			

Table 5.14: Test of homogeneity of variances for joint outcome.

Test of Homogeneity of Variances

JointOutcome

Levene Statistic	df1	df2	Sig.
2.086	2	9	.180

Table 5.15: Post-hoc multiple comparisons for joint outcome.

Multiple Comparisons

Dependent Variable:JointOutcome

	(I) DODS^	(J) DODS^	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	1.00	2.00	-1.50000	2.40081	.811	-8.2031	5.2031
		3.00	-6.25000	2.40081	.067*	-12.9531	.4531
	2.00	1.00	1.50000	2.40081	.811	-5.2031	8.2031
		3.00	-4.75000	2.40081	.173	-11.4531	1.9531
	3.00	1.00	6.25000	2.40081	.067*	-.4531	12.9531
		2.00	4.75000	2.40081	.173	-1.9531	11.4531

^DODS denotes degree of decision support.
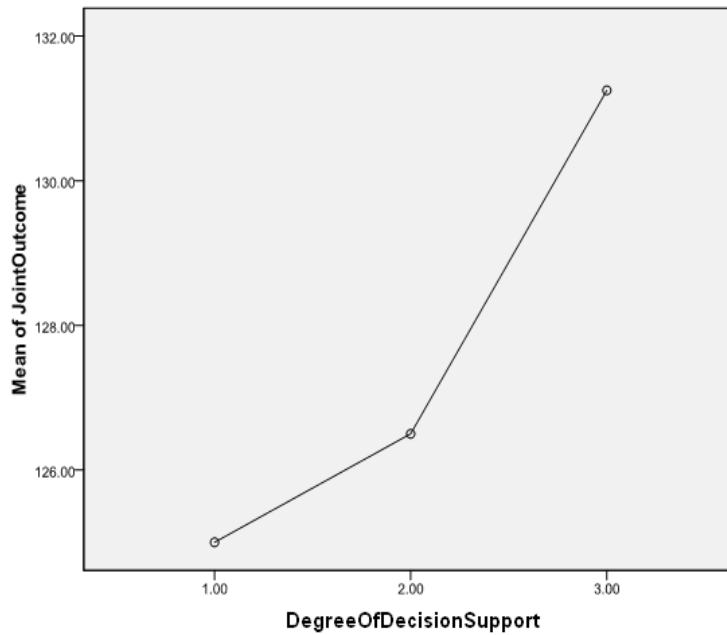
Figure 5.9: Means plot of joint outcome.

Table 5.16 shows that the degree of decision support exhibits no significant main effect on negotiation time (F-statistic = 2.513; p > 0.05). Hypothesis 5 is hence not supported.

Table 5.16: One-way ANOVA for negotiation time.

ANOVA

NegotiationTime

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1449.500	2	724.750	2.513	.136
Within Groups	2595.500	9	288.389		
Total	4045.000	11			

5.6. Discussion

The hypotheses testing results are summarized in Table 5.17. In this section, we discuss the empirical results and derive the theoretical and practical implications of the study.

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Table 5.17: Results of hypotheses testing.

#	Hypothesis	Supported?
1	The extent of coalition formation within a negotiating team is lower when assisted by higher degree of negotiation support.	Partially
1a	The extent of coalition formation within a negotiating team is lower when assisted by medium than low degree of negotiation support.	Yes
1b	The extent of coalition formation within a negotiating team is lower when assisted by high than medium degree of negotiation support.	No
2	The group cohesion as perceived by negotiating team members is higher when assisted by higher degree of negotiation support.	No
3	The satisfaction of negotiating team members is higher when assisted by higher degree of negotiation support.	No
4	The joint outcome achieved in a bilateral inter-team negotiation is higher when assisted by higher degree of negotiation support.	Partially
5	The negotiation time taken in a bilateral inter-team negotiation is shorter when assisted by higher degree of negotiation support.	No
6	The extent of coalition formation is higher in teams characterized by heterogeneous culture than in those characterized by homogeneous culture.	Yes

It is shown by the hypotheses testing result that the degree of decision support does impact upon the extent of coalition formation in the midst of level-2 negotiation of a negotiating team. The impact is more pronounced though in the comparison between the low and the medium degree of decision support than between the medium and the high degree. In other words, the availability of individual decision support makes a considerable difference in the extent of coalition formation; on the other hand, group decision support which in our case avails the Delphi technique on top of individual decision support does not mark a significant difference as compared to individual decision support alone. As elaborated in the hypothesis derivation, individual decision support subdues the extent of coalition formation because the way it structures the negotiation problem draws all members of a negotiating team to a more objective and consistent definition of the negotiation problem at hand. Consequently, individual

members are less deviant in how they approach the problem. Moreover, the individual decision support through expanding the information processing capacity and capability of negotiators empowers them to more readily process and integrate differing cognitions. For both reasons, negotiating team members are less driven to form coalitions in order to simplify the process of resolving their differences. We also hypothesized that the incorporation of Delphi technique to upgrade the decision support from individual level to group level would further subdue the extent of coalition formation. The rationale is that the Delphi technique further structures the negotiation problem while stretching individual members' cognition and filtering out the noises in their decision making processes, which bring their approaches to the negotiation problem even closer to the rational model and also to one another. The Delphi technique also forces negotiating team members to process and integrate differing cognitions and to vote only for the best. The extent of coalition formation in a negotiating team should hence be even lower. The hypothesis is disconfirmed though. A possible reason of our speculation is the insufficient employment of the Delphi technique as its use was not compulsory. The experiment instruction read that if the subjects had a hard time in reaching internal alignment, they were advised to employ the Delphi technique. The overconfidence of typical negotiators has been widely documented in the negotiation literature (see Lim 1997 for a review). In retrospection, we should not be surprised with the insignificant effect of the availability of the Delphi technique given the limited actual incorporation of it into a negotiating team's decision making process.

The hypothesis testing result confirms the role of cultural diversity as the antecedent of coalition formation in a negotiating team. Cultural trait is clearly not the only attribute that is capable of activating group faultline and thus triggering coalition formation; however, cultural trait is suggested to be closely intertwined with negotiation style concerning how a negotiator defines and approaches negotiation problems. As task characteristics moderate how faultlines exaggerate or mitigate coalition formation, cultural trait being particularly relevant in the negotiation context stands out to be a most salient attribute. The aggregation of all team members' cultural traits invokes the construct of cultural diversity. While in a cultural-heterogeneous negotiating team, the similarity shared by a subset of members in terms of cultural trait is likely to activate the corresponding faultline and result in subgrouping (i.e., coalition formation), coalition formation based on the cultural attribute is less likely in a cultural-homogeneous team as all the members stand on the same side of the group faultline. The experimental result that the extent of coalition formation was higher in cultural-heterogeneous teams than in cultural-homogeneous teams confirms the hypothesized role of cultural diversity and consequently the posited mechanism of the cultural attribute in activating group faultline and thus triggering coalition formation in a negotiating team.

The degree of decision support through altering the extent of coalition formation was also hypothesized to impact upon various bilateral inter-team negotiation outcomes, including perceived group cohesion, satisfaction, joint outcome and negotiation time. Out of these four variables, only perceived group cohesion and joint outcome were found to differ significantly with respect to varying degrees of decision support. While subjects were

expected to report higher satisfaction with increasing degree of decision support due to the anticipation of lower extent of coalition formation and less severe negative consequence thereof, no significant effect was detected. We speculate that the reason could lie with the manipulation of experimental conditions and the consequent measurement of the variable. To manipulate the contrasting conditions of cultural homogeneity versus heterogeneity in a negotiating team, confederates were employed who acted in line with predefined standardized scripts. As the participation of confederates in negotiation sessions was artificial, the data even if collected from them cannot be taken into actual analysis. For this reason, we measure the extent of coalition formation between the two actual subjects in a negotiating team and solicit only the reported perceived group cohesion and satisfaction from the actual subjects. Admittedly, the extent of coalition formation between the two actual subjects should also impact their reported perception and emotion towards the negotiation session, there could be two sides of such impact. On one hand, simply because that the group process is hindered by coalition formation, the group morale is to be lowered and members are to feel less satisfied. On the other hand, the coalition members have a reason to feel more satisfied because they are not alone and in the scenario of 3-member team they are the majority. The insignificant result concerning the reported satisfaction of the negotiating team members could therefore be attributed to the unsettled net effect accounting for both sides of the story.

As for the variable of negotiation time, it was hypothesized that as both negotiating teams were assisted by higher degree of decision support and in turn experienced higher team

efficiency due to lower extent of coalition formation, the time they took for the negotiation session would shorten. The null hypothesis concerning the effect could not be rejected though, which we speculate was inseparable from the small statistical power of the hypothesis testing due to limited sample size for this outcome variable. The small statistical power is also a concern for the variable of joint outcome. Nevertheless, the degree of decision support was shown to exhibit a marginally significant main effect on joint outcome. The trend of means is totally in line with our hypothesis that joint outcome is higher with higher degree of decision support. The rationale is that as both negotiating teams in a session experience higher team effectiveness due to lower extent of coalition formation, they both reach better internal alignment and collectively come to higher joint outcome. However, the marginal significant main effect was found to come solely from the comparison between the two extreme degrees (i.e., the low and the high degree). Again, we speculate that the small statistical power due to limited sample size for the variable could have directly led to the acceptance of null hypotheses concerning the comparisons between the medium degree of decision support and the two extreme ends.

The other outcome variable that was found to differ significantly with varying degrees of decision support was individual negotiators' perceived group cohesion. The trend of means amongst the three degrees however disconfirms our hypothesis. The conservative post-hoc multiple comparisons indicate marginal significance for comparisons between the medium degree of decision support and the two extreme ends, and in both cases, negotiators assisted by medium degree of support reported lower perceived group cohesion. Intrigued by the unexpected V-shape finding, we further conducted a post-hoc

contrast between the condition of medium degree of decision support with both of the rest by averaging the means of the low and the high degree. The contrast result confirms that the subjects in the condition of medium degree support did report lower perception of group cohesion than all the other subjects, which warrants deeper investigation to find out the reason behind it. On top of the minimum (i.e. the low) degree of decision support, the medium degree avails individual decision support which in this case embeds the alternative evaluator and generator. Whereas it is relatively natural to make use of the alternative evaluator when negotiators need to evaluate alternative contracts in terms of their utility values, the initiative to employ the alternative generator calls for an integrative mindset of a focal negotiator so that the negotiator is concerned about the opposing team's preference and the joint outcome they can achieve together. For this reason, not all negotiators took the initiative to devise the alternative generator and this renders a negotiating team vulnerable to an additional source of conflict, i.e., in the way its members appropriate the availed system features. According to Jehn (2000), it should be categorized under process conflict which is about task strategy. Process conflict is detrimental because it distracts the group from the task focus and often entails interpersonal power struggles (Jehn 2000). When such conflict was introduced, it is sensible that negotiating team members reported lower perceived group cohesion. Compared to the medium degree of negotiation support, the high degree avails not only the individual decision support but also the Delphi technique which provides a more structured mechanism for a negotiating team to reach internal alignment when the team struggles hard to do so. While the individual decision support available in this condition is still likely to introduce process conflict in terms of the appropriation of system features,

when the Delphi process is engaged, the process conflict is probably lessened because direct team interaction is minimized. It then explains why subjects in the condition of high degree of decision support also reported higher perceived group cohesion than those in the condition of medium degree.

Having discussed the hypotheses testing results, an intriguing follow-up is to scrutinize the results across the variables from a perspective of coherence. Specifically, the degree of decision support was found to exhibit main effects on the extent of coalition formation, perceived group cohesion, and joint outcome. While the extent of coalition formation was significantly lower when negotiating teams were assisted with medium than low degree of decision support because of the availability of individual decision support, negotiating team members in the condition of medium degree support reported lower perceived group cohesion than all the other subjects. The contrast of the results implies that other than the extent of coalition formation, there was (were) other prominent factor(s) that shaped the members' perception of group cohesion. Our speculation that the availability of individual decision support could have introduced an additional source of process conflict in terms of the appropriation of system features, which consequently worsened perceived group cohesion, is consistent with this postulation. As for the variable of joint outcome, a significant improvement was found in the condition of high degree of decision support as compared to the low degree. It is seemingly deviant from the proposed mechanism that lower extent of coalition formation in both negotiating teams should lead to higher joint outcome achieved collectively by them, as a significant effect of the former was only found in the transition from the low degree to the medium degree of decision support. In

this case, we should be reminded of the role of "chance" especially in view of the small statistical power associated with the hypotheses testing on joint outcome due to its limited sample size. Besides, whereas the lowered extent of coalition formation in both negotiating teams in a session boosts their team effectiveness and thus bettering the joint outcome, the lowered group cohesion they experience is likely to work against it. It may then explain why the condition of high degree instead of medium degree of decision support stood out in terms of joint outcomes achieved in negotiation sessions.

The following implications can be drawn from the theoretical and empirical findings of the current study. First and foremost, it should be highlighted that the study is a part of the overall thesis aimed at researching decision support for online multiparty negotiation. It contributes to the thesis by addressing the bilateral multiparty aspect where support for both level-1 (i.e., between the negotiation sides) and level-2 (i.e., within a same side) negotiation is a concern. Theoretically, the study represents a first attempt in conceptualizing, designing and implementing decision support for online bilateral inter-team negotiation. While incorporating the traditional individual decision support designed for and tested in dyadic negotiation to aid the individual bilateral inter-team negotiators, we proposed the incorporation of the Delphi technique to aid particularly the negotiating teams in their pursuit of quality internal alignment through their level-2 negotiation. The Delphi technique is not a new concept; however, its explicit application to the negotiating team context in a bilateral inter-team negotiation setting is novel to our knowledge. The cross-fertilization hence broadens the scope of not only negotiation support research but also the Delphi literature.

To investigate the efficacy of the conceptualized, designed and implemented decision support for online bilateral inter-team negotiation, we modeled, hypothesized, and tested its impact on various aspects of negotiation process and outcomes. When a negotiating team comprises three or more members, which is not uncommon, there is a possibility of coalition formation between subset(s) of members. The extent of coalition formation is critical in that it alters the group dynamics and shapes the related negotiation outcomes. In light of its central role, we examined the extent of coalition formation as a key process variable in our research model. At the backdrop of the relative historical independence of the negotiation literature from the coalition literature, the initiative of exploring the role of negotiation support its is invocation of coalition formation represents not only a theoretical integration of the two important phenomena but more importantly a pioneering approach in studying multiparty negotiation support.

Because of the vacuum in the prior literature, we have to devise our own measurement of coalition formation in a negotiating team, which is also part of the study's contribution. As for the antecedent of coalition formation, cultural diversity was singled out due to its strong relevance to the negotiation context. The effect of cultural diversity as the antecedent of coalition formation was formulated through the concept of group faultline. The supportive empirical result thus not only confirms the antecedent role, but also verifies the underlying faultline mechanism, which constitutes a theoretical ramification of the literature on the connection between faultline and coalition formation.

Despite the confirmed role of cultural diversity as antecedent of coalition formation, we have argued that cultural diversity provides cues for members of a negotiating team on who could be their coalition partners. A deeper reason that drives the resort to coalition formation at the first place is the complexity of group decision making and the limited information processing capacity and capability of individual negotiators. Joining and persisting on the position of a coalition simplifies the decision making for an individual negotiator. The finding that with individual decision support in place, there is a significant drop in the extent of coalition formation of a negotiating team supports the notion of coalition formation as simplifying strategy to group decision making.

The efficacy of the decision support for bilateral inter-team negotiation process and outcomes was moderately validated by the preliminary empirical results. Incorporation of the traditional individual decision support and the newly proposed Delphi technique have been shown to impact upon the extent of coalition formation in a negotiating team and the related aspects of bilateral inter-team negotiation outcomes to various extents. While future investigation (both theoretical and empirical) is much wanted to corroborate and enrich the findings of this study, there are practical implications that can already be drawn from the current results. Coalition formation is a real issue in negotiating teams and it is potentially detrimental to various aspects of negotiation outcomes. The good news, however, is that the coalition formation is manageable. To the extent that the underlying drive for members to form coalitions is to simplify decision making in the negotiating team, providing appropriate decision support is effective as it renders simplification through coalition formation less imperative. A related implication is that

while cultural diversity is shown to be an important antecedent to coalition formation in the context of a negotiating team, the managing of coalition formation should not be through reactively eliminating any cultural heterogeneity but through proactively expanding the cognitive limits of negotiators while preserving the cultural heterogeneity. As different degrees of decision support are possible, costs and benefits should be carefully weighed while practitioners decide on the degree of support to provide for the online bilateral inter-team negotiations under their concern.

The study has the following limitations, which opens up avenues for future research. First, the conceptualization, design and implementation of the decision support for bilateral inter-team negotiation are focused in the stage of "negotiation dance" (see Lim 1999 for a discussion on the multiple stages of a negotiation episode). While we believe that a focused approach is appropriate to kick a start in this arena, future research on supporting the other stages of the negotiation setting is undoubtedly a welcome. Second, as far as the "inter-team" characteristic is concerned, our empirical testing has looked solely into the simple inter-3-member-team model. As the negotiating teams get larger in size, the negotiation dynamics would further complicate and separate investigation may be warranted. But we believe that the current model is a reasonable starting point for our exploration into the novel phenomenon. Future research is again wanted to address the uniqueness of bilateral inter-more-than-three-member-team negotiation, which will definitely heighten our understanding of bilateral inter-team negotiation support. Our postulation is that as there are more participating members in a negotiating team, reaching internal alignment is more demanding in terms of information processing which

makes decision support even more desirable in order to manage coalition formation and its consequences. Last but not least, the manipulation of experimental conditions and the consequent measurement of variables have also limited the findings of the study. Specifically, having employed confederates for the manipulation of cultural diversity, we measured the extent of coalition formation, perceived group cohesion, and satisfaction based solely on the data collected from the actual subjects, as that from the confederates would be artificial. While it is reasonable to expect that as the two actual subjects in a negotiating team engage in coalition formation with each other, they would also sense the disruption of the group process in reaching internal alignment and in turn perceive lower group cohesion and feel less satisfied, in this case, the perceived group cohesion and satisfaction as reported by the two actual subjects cannot be expected to exhibit direct correlation with the extent of coalition formation between them. That explains why we have not explicitly tested the mediating role of coalition formation in modeling the impact of the decision support on these outcomes. It is definitely possible though for future research to address this limitation and thus enhancing our proposition. Besides the future research opportunities based on the aforementioned limitations of the study, yet another future research direction relates to the "unexpected" factor we singled out from our empirical investigation, that is the process conflict introduced by negotiating team members' differing appropriation of system features. The process conflict has likely sculpted the experimental results as we elaborated in the prior discussion. Future research could either suppress this factor by enforcing faithful appropriation of system features by all users or incorporate this factor into the research model and then measure it properly to account for its effect.

5.7. Revisiting Cultural Diversity

For cultural diversity, we have examined two discrete settings: cultural homogeneity versus cultural heterogeneity. Nonetheless, as far as a three-member group is concerned, three levels of cultural diversity can be visualized: culturally homogenous, moderately heterogeneous and completely heterogeneous. It is homogenous when all three members are from the same cultural background, moderately heterogeneous when two of the members are from the same background but the third from a different one; the group is considered completely heterogeneous when the three members are from three different cultural backgrounds. The discrimination based on these three levels is straightforward and adequate in a three-member group. However, as group size increases, the discrete treatment may not be appropriate. Instead, a <u>spectrum</u> concerning the degree of heterogeneity is necessary (see Figure 5.10). It is to note that in this presentation, homogeneous condition corresponds to "zero" point of the spectrum. Also, as the group size increases, the spectrum logically becomes "lengthened".
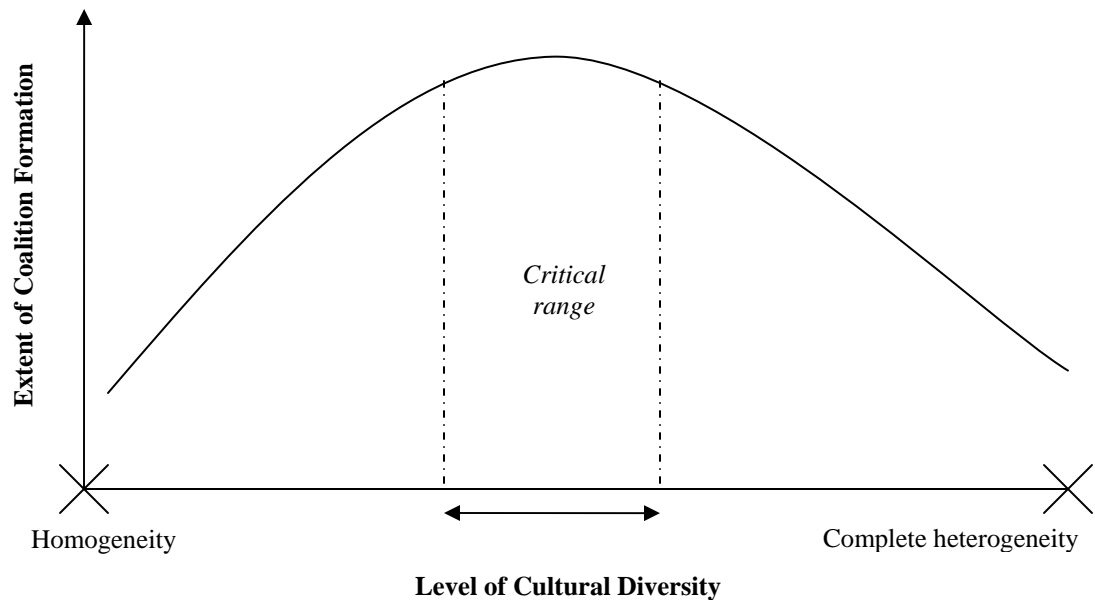
Figure 5.10: Extent of coalition formation in relation to cultural diversity.

While we hypothesized that the extent of coalition formation is higher in groups with cultural heterogeneity than in those with cultural homogeneity, we were making the proposition and subsequently testing the proposition on moderate (instead of complete) cultural heterogeneity versus cultural homogeneity. In line with the portrait in Figure 5.10, we postulate that the extent of coalition formation is not monotonously increasing or decreasing with heterogeneity level, but rather, the general relationship resembles a bell shape. Before reaching a certain value (or range) of heterogeneity, there is a positive gradient. Nevertheless, after this certain point or range, the extent of coalition formation will be decreasing as a function of heterogeneity. Accordingly, there is a critical value or range of values in which the peak of coalition formation can be observed. This conceptualization remains to be empirically tested in future research. However, the rationale is straightforward. Take the three-member group for instance: when the group is

completely heterogeneous in terms of culture, the likelihood of coalition formation is lower than for a group which is moderately heterogeneous, because the cultural faultline divides the group into three individuals, with no definitive clue for any subgrouping among the members.

CHAPTER 6. THE GROUP NEGOTIATION SETTING

6.1. Introduction

In contrast to bilateral multiparty negotiation, multilateral negotiation involves multiple "sides" representing unique interests and interacting with one another. To focus our effort on investigating decision support for the level-1 negotiation amongst the multiple sides, we zoom in to the scope of group negotiation for the current empirical study. Despite the pervasiveness of group negotiation in practice, prior research on the decision support for negotiation shows a skewed focus on the dyadic setting. Literature points out that the translation from dyadic negotiation to group negotiation is not straightforward (e.g., Mannix et al. 1989). Accordingly, the decision support for group negotiation also warrants separate treatment. Evidently, negotiations are increasingly conducted over computer networks. In this light, we are motivated to conceptualize, design and implement decision support for online group negotiation, the details of which are presented in Section 2 of the study.

Group negotiation is defined as a decision-making process in which three or more persons, representing their own interests, make decisions about how to resolve conflicting preferences (Bazerman et al. 1988). Group negotiation is marked with higher degree of complexity as compared to dyadic negotiation (Polzer et al. 1995), thus imposing greater information processing demands on negotiators (Bazerman et al. 1988). On the other hand, negotiators are limited information processing systems (Bazerman & Neale 1983, Bazerman et al. 1985). While coping with information overload, they are likely to rely on

heuristics (i.e., simplifying strategies) as heuristics allow them to simplify their decisions (Neale & Bazerman 1991). Bazerman and Tenbrunsel (1998) contend that heuristics may lead people away from optimal decisions. In the context of group negotiation, complexity related to multiple parties represents the intrinsic complexity (Kramer 1991a). When it is beyond the negotiators' capacity and capability to process information related to the multiple parties, they are likely to resort to heuristics. Forming coalitions to reduce the number of parties to an agreement is a viable simplifying strategy (Bazerman et al. 2000) in this regard. As coalition is deemed a major variable in understanding and explaining group negotiation (DuPont 1996), we are motivated to examine the efficacy of the decision support in reducing the extent of coalition formation in online group negotiation and consequently improving negotiation outcomes. Sections 3-5 of the study present the theoretical modeling and the empirical testing thereof. The empirical results are then discussed in Section 6, where theoretical and practical implications of the study are drawn, the limitations and future research opportunities are also highlighted.

6.2. Conceptualization, Design and Implementation of Decision Support for Online Group Negotiation

In order to deliver system that adds gaugeable value to the negotiation process, the design of the system should be "linked to a conceptual framework of negotiation that categorizes various structures under which negotiations take place and stipulates criteria for evaluating outcomes" (Rangaswamy & Shell 1997 p. 1148). A most important characteristic that defines negotiation is its being mixed-motive. Negotiators inevitably compete with one another as resources are scarce but they also need to cooperate in order

to avoid impasse and to increase the availability of resources. A negotiation episode usually unfolds with exchange of offers (including counteroffers) amongst negotiators (Lewicki et al. 2006, Pruitt & Carnevale 2003). From the perspective of an individual negotiator, he relates to the offers in two distinct manners. He makes offers that represent his own positions and he also receives offers from the opponents. As both activities are essential in a negotiator's undertaking of the negotiation task and both are demanding in terms of information processing, they both merit decision support.

A negotiator makes offers that represent his positions on the negotiated issues. In order to make informed offers, the negotiator needs to be aware of his preference structure while making such decisions. Although the preference structure should have been elicited from the negotiator himself, without any external aid, to be accurately aware of the exact structure during the negotiation process could turn out intractable, especially if the negotiation involves multiple issues. While the offers that the negotiator makes before a final agreement can be numerous, the latest offer that has been made at any point of time constitutes an important anchor for the current offer making. In fact, the comparison between the anchor and any alternative offer under consideration keeps track of the concession that a negotiator is to make, be it forward or backward. In view of such information need, a decision support component is envisioned, with the label of "alternative evaluation tool" (AET). It provides evaluation of any alternative offer in light of the negotiator's preference structure and keeps track of the latest offer made by the negotiator for the account of concession making.

A negotiator also receives offers from his opponents in the negotiation. In a group setting, processing the opponents' offers is a nontrivial task as there are multiple opponents involved; this is especially true when the negotiation involves multiple issues. It is also a critical task for only when it is done properly can the conflicting preferences between the negotiator and the opponents be surfaced realistically, which is in turn a prerequisite to their efficient and effective resolution. Upon receiving offers from the opponents, the negotiator needs first to extract the offer information from the negotiation conversation, then to collate the information, and last to represent the information in contrast to his own position, so that a holistic picture of what each party wants is in sight. In view of such information need, another decision support component is envisioned, with the label of "conflict detection tool" (CDT). It extracts, collates, and represents the opponents' offer information against the negotiator's own position. Ultimately, at the backdrop of representing what each party wants, it should reflect the difference of the negotiator's vis-à-vis the opponents' preferences, thus facilitating integration between them.

Thus far, the conceptual design of the decision support for group negotiation has been outlined, revolving around two decision support components—AET and CDT—that address the making and receiving of offers by group negotiators respectively. As for the practical design and implementation of the decision support, we resort to the cognitive fit theory of Vessey (1991). The theory postulates that spatial and symbolic task solutions are best facilitated with graphical and tabular representations respectively. Spatial tasks assess the problem area as a whole rather than as discrete data values; requiring making

associations or perceiving relationships in the data. Symbolic tasks involve extracting and acting on discrete data values.

As conceptualized, AET provides evaluation of any alternative offer under a focal negotiator's consideration in light of his preference structure and keeps track of the latest offer made by the negotiator for the account of concession making. The preference structure involves a mapping from the issue options under negotiation to the utility values they bear for the focal negotiator. Extracting and assessing any issue option is a symbolic task and is best facilitated with tabular representation. The focal negotiator's referencing the latest offer made as an anchor for the current offer (concession) making involves projecting associations, which is spatial in nature and best facilitated with graphical representation. A prototype for the AET is developed accordingly, as shown in Figure 6.1.
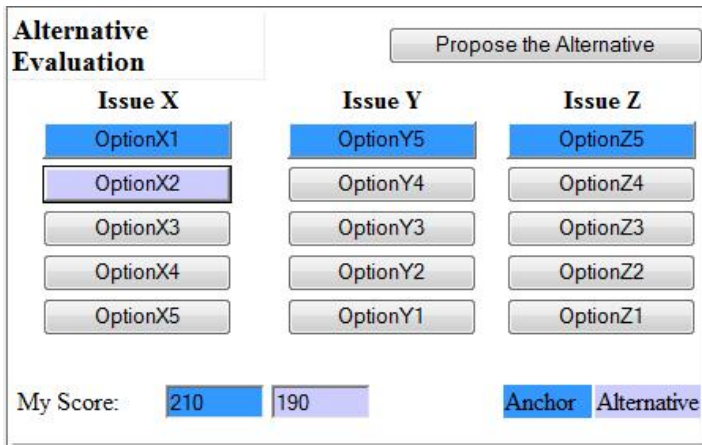
Figure 6.1: Alternative evaluation tool (AET).

As shown, a tabular format is utilized to organize the representation of the issues and options under negotiation. The options of each issue are organized into a single column in

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the order of decreasing preference from the perspective of the focal negotiator. With the best possible offer as the initial anchor, the focal negotiator can evaluate any other alternative by clicking on the corresponding option buttons. Color code is introduced here to project the comparison between the anchor and the alternative offers, in this case, "Option X1, Option Y5, Option Z5" versus "Option X2, Option Y5, Option Z5". The utility scores for both the anchor and the alternative offers are updated in real-time with the selection of options: 210 versus 190 for the current selection. With the aforementioned mechanism, the focal negotiator has accurate evaluation of any alternative offer in line with his preference structure. With the latest offer made tracked as the anchor, the negotiator also keeps account of the concession he is to make with any alternative offer. In this case, the negotiator is conveyed the message that a concession on "Issue X" from "Option X1" to "Option X2" results in a utility score drop from 210 to 190. When the negotiator confirms the alternative offer that he is to make, he just needs to click the "Propose the Alternative" button, and the currently selected alternative offer will be communicated to the opponents through the chat facility. A complete picture of the online group negotiation support after the click of the "Propose the Alternative" button is shown in Figure 6.2. It can be seen that the anchor has been updated to the latest offer made. The latest offer made by the negotiator is also reflected in the CDT. This is to ensure that the holistic picture CDT represents of what each party wants is up-to-date, on part of the focal negotiator himself.

Figure 6.2: A complete picture of the online group negotiation support.

As conceptualized, CDT extracts, collates, and represents the opponents' offers. Extracting and collating the opponents' offer information is largely logistic and beyond the scope of our design consideration. The major concern is representing the opponents' offer information against the focal negotiator's position, which should ultimately reflect the difference in their preferences so that the difference can be integrated. The task of perceiving difference is spatial in nature and best facilitated with graphical representation. In the background though, the focal negotiator is extracting and assessing discrete issue options as proposed by the opponents as well, which is a symbolic task and best facilitated with tabular representation. A prototype for the CDT is developed accordingly, as shown in Figure 6.3.
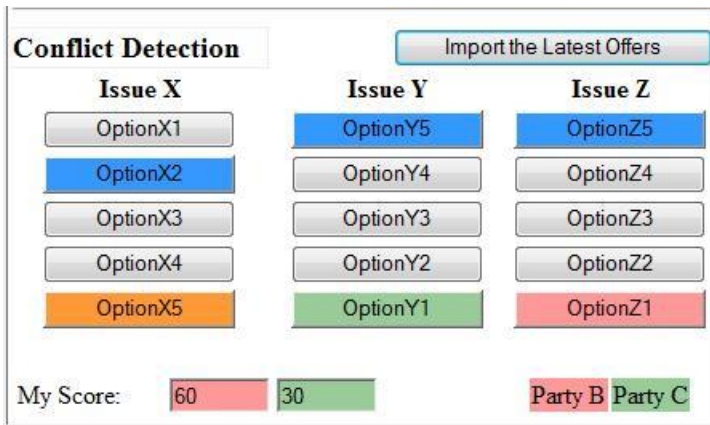
Figure 6.3: Conflict detection tool (CDT).

It is shown in Figure 6.2 that after Party A proposes an offer, both Party B and Party C also propose their offers. Now Party A has the choice of commanding CDT to represent B's and C's offers. He can do so by clicking on the "Import the Latest Offers" button embedded in the CDT section. Figure 6.3 then shows the resulted state from such an action. As shown, for the CDT, the issues and options under negotiation are organized in an identical manner to the AET. Color code is introduced again to project the comparison between the focal negotiator's and the opponents' offers, with a unique color being associated with each negotiator: blue with the focal negotiation (Party A), red with Party B and green with Party C. When the opponents' offers on a certain issue overlap, yet a different color—orange—is used for the representation. The current state of the CDT conveys the message to the focal negotiator that Party B wants a different option for Issue Z, Party C a different option for Issue Y, and both B and C want the same option for Issue X that is different from the focal negotiator's position. It should be noted that when an option offered by the opponents overlaps with that wanted by the focal negotiator, the option remains blue (i.e., the anchor color for the focal negotiator). The rationale is that the CDT focuses on representing the differing preferences of the negotiators and hence

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facilitates the integration amongst them. As shown, the CDT also conveys the respective utility scores of the opponents' offers for the focal negotiator.

6.3. Research Model and Hypotheses

In this section, we put forward the research model and hypotheses concerning the efficacy of the conceptualized, designed and implemented decision support for online group negotiation process and outcomes. Coalition formation remains the central mechanism through which the decision support impacts upon various aspects of negotiation outcomes as it is a major variable in understanding and explaining the negotiations (DuPont 1996). In group negotiation that is a level-1 negotiation, negotiators come with their unique interests. The interest alignment theory is most applicable to this context in anticipating a negotiator's choice of coalition partners. The theory suggests that negotiators with compatible interests are more likely to form coalitions than those with incompatible interests and to the extent that a coalition is more persuasive than an individual negotiator, the coalition is more likely to secure what it members want (Polzer et al. 1998). Notwithstanding that interest alignment is a good predictor of coalition choices, we contend that the underlying factor that drives coalition formation at the first place is the inherent complexity of group negotiation, that is the complexity related to the multiple parties. Coalition formation helps to simplify group negotiation by reducing the number of parties to an agreement (Bazerman et al. 2000). We then posit that with appropriate decision support in place expanding the cognitive limits of group negotiators, they resort less to the simplifying strategy of coalition formation. The extent of coalition formation in turn has consequences for various aspects of group negotiation outcomes.

The research model is depicted in Figure 6.4. The two decision support components—the conflict detection tool (CDT) and the alternative evaluation tool (AET)—are to take effect in distinct manners. While the availability of CDT is to impact upon the extent of coalition formation, the availability of AET, instead of effecting directly on the extent of coalition formation, is to moderate its consequences for the various negotiation outcomes, including joint outcome, perceived group climate, satisfaction, and negotiation length. Corresponding hypotheses are derived in the following sections.

```
                        ┌─────────────────────┐
                        │  Availability of AET │
                        └─────────────────────┘
                                  │  │
                                  ▼  ▼            ┌─────────────────────────┐
┌────────────────────┐   ┌──────────────────┐    │     Joint Outcome       │
│ Availability of CDT │──▶│    Extent of     │───▶└─────────────────────────┘
└────────────────────┘   │ Coalition Formation │  ┌─────────────────────────┐
                         └──────────────────┘    │ Perceived Group Climate │
                                                  └─────────────────────────┘
                                                  ┌─────────────────────────┐
                                                  │      Satisfaction       │
                                                  └─────────────────────────┘
                                                  ┌─────────────────────────┐
                                                  │    Negotiation Length   │
                                                  └─────────────────────────┘
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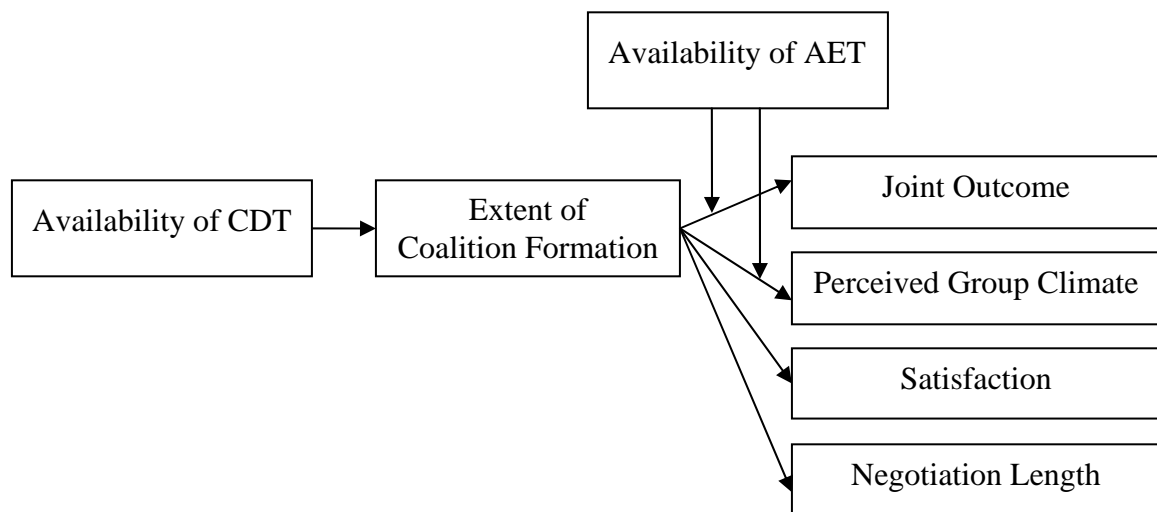
Figure 6.4: The research model.

While the literature does suggest possible causal relationships among the outcome variables, especially to satisfaction from the other three (e.g., Wang et al. 2010), it is not a major research question we aspire to answer in this thesis. Therefore, we have placed all the outcome variables in a parallel fashion in the model.

6.3.1. Decision Support and Extent of Coalition Formation

Both the conflict detection tool (CDT) and the alternative evaluation tool (AET) are intended to support group negotiators as external aid in their information processing. Nevertheless, their foci are different. Whereas the AET deals solely with a focal negotiator's making of own offers, the CDT is an interface that absorbs his opponents' offers and represents a holistic picture of what each party wants in the negotiation. In the midst of extracting, collating, and representing the opposing parties' offer information against his own position, CDT directly mitigates the focal negotiator's cognitive overload related to the multiple parties, and consequently renders coalition formation a less imperative simplifying strategy for the negotiator. We therefore hypothesize that the availability of CDT lowers the extent of coalition formation.

Hypothesis 1: The extent of coalition formation in group negotiation is lower when CDT is available than when it is not.

AET, on the other hand, does not address directly the complexity related to multiple parties. Its availability is then not expected to demotivate group negotiators from forming coalitions. We hence hypothesize that the availability of AET has no main effect on the extent of coalition formation.

Hypothesis 2: The extent of coalition formation in group negotiation does not differ when AET is available from when it is not.

6.3.2. Extent of Coalition Formation and Negotiation Outcomes

Coalition formation has been considered a defection at the group level (Mannix 1993). Clark et al. (2000) posit that when coalition formation divides a negotiation group, the processes that the negotiators typically go through to reach agreement are hindered as their interdependence is hurt. According to the group identification perspective, when parties identify with coalitions, intergroup processes occur between coalition and out-coalition camps (Polzer et al. 1995). Intergroup processes are characterized with higher level of competition, lower level of cooperation and trust (Brewer 1981), and less open information sharing (Kramer 1991a, Polzer 1993) than intragroup processes. Fundamentally, the formation of a coalition is aimed at claiming value for the coalition itself without regard for the out-coalition parties (Mannix 1993). Due to its defective function, coalition formation is associated with lower joint outcome (Van Beest et al. 2005, Van Beest et al. 2003), worse group climate as perceived by negotiators (cf. Hogg et al. 1990, Lau & Murnighan 1998) and their dissatisfaction (Thatcher et al. 2003). We contend that, the higher the extent of coalition formation, the worse the consequences. We have the following hypotheses:

Hypothesis 3: The extent of coalition formation is negatively related to the joint outcome achieved in group negotiation.

Hypothesis 4: The extent of coalition formation is negatively related to negotiators' perceived group climate in group negotiation.

Hypothesis 5: The extent of coalition formation is negatively related to negotiators' satisfaction in group negotiation.

A consequence of coalition formation less documented in the literature relates to the length of negotiation, which is also an important indicator of negotiation performance, particularly in terms of task efficiency. When group negotiators engage in coalition formation, the cognitive process is admittedly simplified; however, the divide-and-conquer strategy results in at least two sub-negotiations, one amongst the coalition parties and the other between the coalition and out-coalition camps. As more agreements are to be reached, the overall negotiation session is expected to be longer. And the greater the negotiators' engagement in coalition formation (i.e., the extent thereof), the more extra length it will take. We have the following hypothesis:

Hypothesis 6: The extent of coalition formation is positively related to the length of group negotiation.

6.3.3. The Moderating Effect of Availability of AET

While AET may not have direct impact on the extent of coalition formation, it is capable of moderating the consequences of coalition formation. Multiple parties in negotiation often induce multiple issues (Najam 2001), yet a distinct aspect of complexity. Without any external assistance, a simplifying strategy to address the complexity related to multiple issues is the employment of agendas (Plott & Levine 1978) that triggers sequential consideration of issues. The approach does make the multiple issues at hand more tractable. However, it forgoes the potential benefit of tradeoffs, in which a negotiator may concede on his low-priority issues in exchange for the opponents' concessions on his higher-priority issues (Pruitt 1983). As AET enables negotiators to evaluate and propose multi-issue offers with ease, it is less imperative for negotiators to

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tackle issues sequentially. Simultaneous consideration of issues in turn promotes the practice of tradeoffs between issues and options (Jelassi & Jones 1988). With a given extent of coalition formation, the practice of tradeoffs empowered by AET should translate to higher joint outcome achieved in group negotiation as it is capable of unlocking the integrative potential across issues and options (Thompson 2001). Not only that, negotiators should perceive better group climate for a more cooperative and problem-solving atmosphere is projected. In other words, the negative effect of coalition formation on the negotiation outcomes is lighter when AET is available. We have the following hypotheses:

Hypothesis 7: The negative effect of coalition formation on joint outcome achieved in group negotiation is lower when AET is available than when it is not.

Hypothesis 8: The negative effect of coalition formation on negotiators' perceived group climate in group negotiation is lower when AET is available than when it is not.

6.4. Research Method

A laboratory experiment was conducted to verify the proposed research model and hypotheses. A 2x2 factorial design was adopted for the experiment, in line with the two independent variables in the research model (i.e., availability of AET and availability of CDT), resulting in four experimental conditions (see Figure 6.5 for the detailed allocation of sessions to each condition). A total of two hundred and forty-three students were recruited from a large university in Singapore as subjects, making up eighty-one group negotiation sessions (with three subjects in each session). A small fixed amount of cash, 5 Singapore dollars, was given to each subject in appreciation of their voluntary

participation. A performance bonus of 20 Singapore dollars was awarded to the top 5% performers whose corresponding sessions achieved the highest joint outcomes in each of the four experimental conditions.

Availability of AET	Yes	21 sessions	20 sessions
	No	20 sessions	20 sessions
		Yes	No

Availability of CDT

Figure 6.5: The 2x2 factorial design.

6.4.1. Manipulation of Independent Variables

As both AET and CDT are intended as decision support components for online group negotiation, the online platform is first established in all the four experimental conditions. The online platform provides chat facility (as shown on the left side of Figure 6.2) to enable electronic communication between negotiators. When the condition dictates the availability of AET, the component as shown in Figure 6.1 is availed as decision support to the subjects. When the condition dictates the availability of CDT, the component as shown in Figure 6.3 is availed. In the condition where both tools are available, the decision support section in the online platform appears as shown on the right side of Figure 6.2.

6.4.2. Measurement of Extent of Coalition Formation

The measurement of coalition formation in the prior literature has been focused on the outcome of who forms coalition with whom and how they allocate resources within

themselves (see Murnighan 1978 for a comprehensive review). Coalition formation connotes not only an end state though, but also an influence tactic used along negotiation process. In negotiation scenarios where a binding coalition formation is not possible due to communication constraint, measurement of coalition formation as end state alone would not be fruitful. A more dynamic positioning of coalition formation as an influence tactic is deemed appropriate. It is also in line with our conceptualization of coalition formation as a simplifying strategy to address the complexity related to multiple parties in group negotiation. The coalition tactic of obtaining/using the aid of others to help persuade/pressure a target to comply (Yukl & Falbe 1990) can be multifaceted. A comprehensive measurement should account for all related aspects.

A coalition tactic could be employed for both winning and blocking purposes (Najam 2001). A winning coalition is one that has the majority of power in deciding on a settlement (Caplow 1956). A blocking coalition is one that possesses so much power that their refusal is sufficient to prevent a certain settlement (Sebenius 1991). A coalition tactic could be manifested at different times as well. Stevenson et al. (1985) postulate that the formation of a coalition is preceded by negotiators' interaction around issues, which reveals the compatibility of interests amongst them and hence latent coalitions. A coalition is considered formed only when joint action is taken by the latent coalition parties. Two stages are thus relevant as far as the employment of coalition tactics is concerned: latent-coalition stage and actual-coalition stage. In the latent-coalition stage, coalition tactics are manifested as the backing up of each other's preferences. Once joint

action is taken, any tactic exhibited by coalition parties at the backdrop of their coalition formation is under the cover of the actual-coalition stage.

Stevenson et al. (1985) suggest that the formation of a coalition invokes response from the out-coalition parties, which moderates the turnout of the coalition. Regardless of the coalition turnout, we posit that the response from the out-coalition parties also contributes to the extent of coalition formation. Intuitively, the more the out-coalition parties respond to and negotiate with the coalition as an entity, the more salient the notion of in-group versus out-group gets to be. The evidence of higher in-group cohesiveness in presence of conflict with out-groups (cf. Sherif et al. 1961, Gorum & Bornstein 2000) supports the intuition. Consequently, greater extent of coalition formation is perceived and is bound to impose effect on the negotiation process and outcomes. In this light, the response from out-coalition parties is incorporated into our measurement of the extent of coalition formation as anti-coalition tactic.

In view of the multiple facets that contribute to the extent of coalition formation, we contend that only a formative measurement is appropriate. According to the literature, a formative construct is composed of multiple measures (MacCallum & Browne 1993), and changes in the measures cause changes in the formative construct (Jarvis et al. 2003). In our case, the extent of coalition formation, as a formative construct, is a composite of six measures; all of them cause positive changes in the underlying construct (see Figure 6.6). The six measures can be derived by frequency analysis, for which, we simply count the

number of times that a particular tactic is used. We then sum up the frequencies of all the tactics, arriving at an index that proximately reflects the extent of coalition formation.
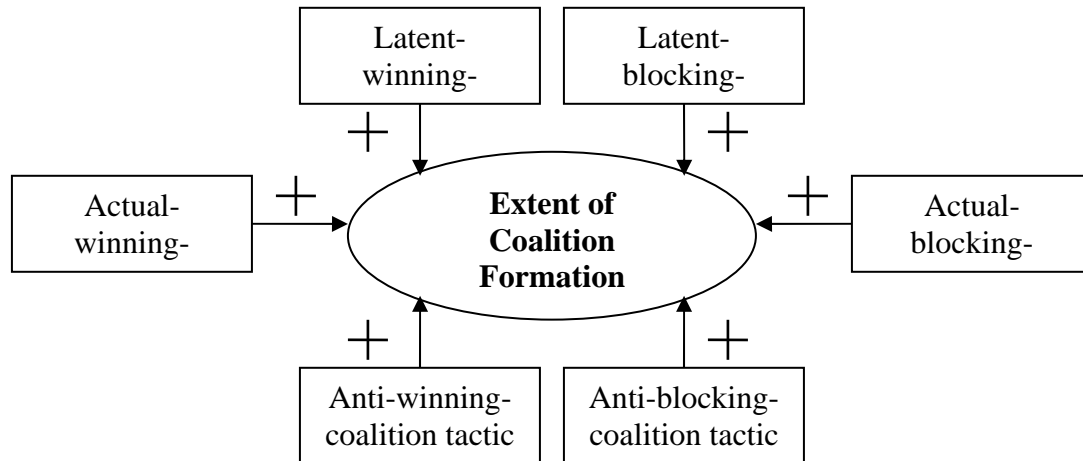
Figure 6.6: The formative measurement for the extent of coalition formation.

6.4.3. Measurement of Outcome Variables

There are four outcome variables to measure in the study: joint outcome, perceived group climate, satisfaction, and negotiation length. Joint outcome is to be calculated as the sum of utility values achieved from the final agreement for all the parties involved, which is a standardized approach in the negotiation literature. For the measurement of perceived group climate, we adapt two extant scales found in Beersma and De Dreu (2002) and Jones (1988). Subjects are to rate their agreement with the following statements regarding the negotiation process: "the atmosphere was agreeable," "I felt comfortable," "the others were considerate," and "the others were cooperative." For the measurement of negotiators' satisfaction, we adapt the scale suggested by Novemsky and Schweitzer (2004). Subjects are to rate their agreement with the following statements: "I am satisfied with my negotiation outcome (i.e., the agreement reached)," and "I am satisfied with the

negotiation process." 7-point Likert scale is used for the measurement of both variables. As we are modeling the whole phenomenon at the negotiation group level, the individual responses to each questionnaire item are added up to derive the group value. Negotiation length is to be measured as the total number of utterances made during the negotiation session, except for those out of procedural behaviors (i.e., behaviors having nothing to do with the substance of the negotiation, see Hopmann 2002). Compared to negotiation time measurement in terms of hour/minute/second, we contend that the negotiation length measurement better reflects the efforts spent and hence the efficiency of the negotiation, as the latter filters out the activity time that has nothing to do with the substance of the negotiation. A similar measurement approach is adopted by Van Beest et al. (2004b).

6.4.4. Pilot Test

It is suggested in the literature (Neuman 2003) that during the planning phase for experimental research, the researcher should devote serious effort to pilot testing any apparatus (e.g., computers, video cameras, tape recorders, etc.) that will be used in the treatment situation; after the pilot tests, the researcher should interview the pilot subjects to uncover aspects of the experiment that need refinement.

In this light, a pilot study was conducted before the large-scale experiment that was designed to test the proposed effectiveness of the alternative evaluation tool (AET) and the conflict detection tool (CDT). As for any pilot study, the purpose was to verify the feasibility of the experiment design, including in this case the robustness of the system that we conceptualized, designed and implemented from scratch.

To minimize the manpower involvement for the pilot study, we administered only the full-function system that avails both AET and CDT. Again, the objective is to make sure that the functions of both components and their interconnection work correctly and robustly. 15 subjects were recruited for the pilot study, which formed 5 negotiation sessions with 3 negotiators for each. All the subjects were undergraduate students in a large university of Singapore. For the pilot study, there was no monetary incentive for the subjects as all of them were close friends of the experimenter. They were clearly briefed though that their goal was to maximize their individual outcomes. However, in the meantime, they were reminded that to nurture a long-term relationship with the other two owners, they would want to as much as possible achieve a win-win agreement. The subjects turned out to be reasonably serious about the task at hand.

The system was proven robust even with 15 subjects accessing the system that includes the webpage and the database simultaneously. As theoretically speaking, the subjects were not "forced" to use the AET and the CDT, we were also interested to find out the extent to which subjects actually made use of the system features. The pilot turnout was satisfactory in that all the subjects made use of the features on a regular basis during the negotiation process. Specifically, the subjects did employ the AET to propose packaged offers, and when the opposing parties proposed new packaged offers, the subjects were likely to invoke the CDT to "import" and subsequently represent the offers for them.

The most important finding from the pilot study concerns the negotiation task. The original task we tested in the pilot study was directly taken from prior literature without

much adaptation. It is known as the task of Towers Market, developed by Beggs et al. (1989) and used by subsequent empirical studies including Weingart et al. (1993) and Brett et al. (2003). The task scenario is as follows:

The owners of a bakery, a grocery, and a flower shop are planning to rent a single market together in which each store would be separate, but common areas would be shared. Before they actually do so, they have to reach agreement on three issues: the design of the market, the temperature in the market and the distribution of rental costs among the three of them. For each issue, there are five possible options on which they could agree. As the three owners would be participating in the negotiation, we address them as Bakery, Grocery, and Florist respectively for easy reference. The preference structures of the three owners differ as shown in Table 6.1, and that is why negotiation is needed so that they can reach an agreement.

Table 6.1: Preference structures of the Towers Market task.

Design	Temperature	Distribution of Rental Cost
Bakery		
Design B (200)	20C (50)	Distribution 2 (100)
Design A (150)	18C (37.5)	Distribution 1 (75)
Design C (100)	16C (25)	Distribution 4 (50)
Design E (50)	14C (12.5)	Distribution 5 (25)
Design D (0)	12C (0)	Distribution 3 (0)
Grocery		
Design D (50)	20C (100)	Distribution 3 (200)
Design E (37.5)	18C (75)	Distribution 5 (150)
Design C (25)	16C (50)	Distribution 4 (100)
Design A (12.5)	14C (25)	Distribution 1 (50)
Design B (0)	12C (0)	Distribution 2 (0)
Florist		
Design D (100)	12C (200)	Distribution 2 (50)
Design E (75)	14C (150)	Distribution 1 (37.5)
Design C (50)	16C (100)	Distribution 4 (25)
Design A (25)	18C (50)	Distribution 5 (12.5)
Design B (0)	20C (0)	Distribution 3 (0)

With this negotiation task, the behaviors exhibited by pilot subjects have the following characteristics. There was minimum persuasive behavior throughout the negotiation process. Persuasive behavior is exhibited when a negotiator tries to affect the behavior of opposing parties through the use of factual evidence and logical arguments to bolster his/her position and attack targets' position (see Hopmann 2002). Persuasive behavior is clearly an essential aspect of any negotiation and the minimum presence of it is an indication of low mundane realism (see Norman 2003 for the definition). We speculate that the negotiation task context is irrelevant to the pilot subjects' everyday life, and that is why they were unlikely to employ factual evidence and logical arguments in support of their positions or in attack of the opposing parties'. The sessions mostly ended up more like a collaborative game of mathematical problem solving than like a negotiation. What exacerbated the problem is the preference structure that comes with a neat pattern. It is

therefore not uneasy for the subjects to decipher the secret to the "best" outcome as intended by the experimenter. The speculation can be backed up by the fact that 4 out of the 5 negotiation sessions in the pilot test reached the most integrative agreement. To address the aforementioned issues, we decided on two adjustments for the actual experiment. First, we adopted a negotiation task context that is closer to the subjects' everyday life. Second, we modified the preference structure so that its pattern is less visible to the subjects.

6.4.5. Experimental Task and Procedure

Negotiation sessions in all the four experimental conditions performed the same negotiation task. It is a multi-issue group negotiation task, adapted from the Towers Market task developed by Beggs et al. (1989). While the structure of the Towers Market task (in terms of negotiators' preferences) is retained for the current study, the context is changed, based upon the findings from the pilot test. The new context of group travel negotiation is believed to be more relevant to the subjects as all of them are students. The negotiation task assumes a scenario where three parties are to travel together, "together" meaning that they have to travel to the same destination, stay with the same accommodation, and embrace the same travel style. Accordingly, the parties need to reach agreement on three issues—destination, accommodation, and travel style—before they set out to travel together. Utility values are predefined in such a way that each party has a unique preference structure and different weights are assigned to the issues for different parties, making mutually beneficial tradeoffs possible. As per Beersma and De

Dreu's (2002) characterization, the negotiation task is symmetrical and hence there is no a priori coalition. The preference structures for the three parties are depicted in Table 6.2.

Table 6.2: Preference structures of the experimental task.

Destination	Accommodation	Travel Style
Party A		
Hong Kong (120)	Guesthouse (30)	Free & Easy (60)
Tokyo (100)	Hostel (25)	Packaged Free & Easy (35)
Beijing (60)	Bed & Breakfast (15)	Package (no meals or tour guide) (25)
Seoul (40)	Hotel (10)	Package (meals) (15)
Melbourne (0)	Villa (0)	Package (meals and tour guide) (0)
Party B		
Melbourne (60)	Villa (120)	Free & Easy (30)
Seoul (40)	Hotel (90)	Packaged Free & Easy (25)
Beijing (30)	Bed & Breakfast (70)	Package (no meals or tour guide) (20)
Tokyo (10)	Hostel (20)	Package (meals) (15)
Hong Kong (0)	Guesthouse (0)	Package (meals and tour guide) (0)
Party C		
Melbourne (30)	Guesthouse (60)	Package (meals and tour guide) (120)
Beijing (20)	Hostel (50)	Package (meals) (80)
Seoul (15)	Bed & Breakfast (25)	Package (no meals or tour guide) (60)
Tokyo (5)	Hotel (15)	Packaged Free & Easy (40)
Hong Kong (0)	Villa (0)	Free & Easy (0)

All the subjects registered for the experiment online whereby they were asked to sign up for a particular timeslot and also to complete a pre-experiment questionnaire intended to solicit their demographic information. The subjects would then participate in their registered timeslots. The experiment was conducted in a computer laboratory. Upon arrival, the subjects were randomly assigned to the four experimental conditions, three roles of the negotiation scenario, as well as the specific negotiation sessions. Each subject was then provided with a handout of general instruction, case description (including private information for the assigned role such as the preference structure) and training

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material for the designated condition of system support. The subjects were given sufficient time to go through the handout and encouraged to clarify any doubt they had. The subjects then proceeded to log into the system with the assigned account number, which would lead them to the corresponding online platform, role setting, and negotiation session. Once the subjects found all their session partners connected, they could start the negotiation. The communication was strictly through the electronic channel of the online platform. Subjects assigned to a same session were intentionally seated apart to avoid any other form of communication between them. The experiment coordinator oversaw the sessions to make sure that all regulations were properly observed. There was no time limit imposed upon the negotiation sessions. The closure of any session was symbolized by the three parties all agreeing to one common settlement. Upon settlement, the subjects were directed to complete a post-experiment questionnaire online after which they were fed back with confirmation that they had successfully completed the experiment. Before leaving the laboratory, the subjects were reminded explicitly not to reveal any detail of this experiment to any others.

6.5. Data Analysis

First of all, some background information about the subjects is reported as follows. The 243 subjects were recruited from seven faculties/schools in the university, representing diverse academic backgrounds. Among the subjects 137 (56.38%) are male and 106 (43.62%) are female. Most subjects (98.35%) are aged below 30. No significant difference is found in either gender or age distribution across the four experimental conditions. More than 90% of the subjects have at least 4 years of experience in using

computer. All of the subjects use instant messenger software in their daily life. Nearly three quarters of the subjects use instant messenger as often as a few times a day. Another quarter of the subjects use instant messenger a few times a week. Again, there is no significant difference across the four experimental conditions as regards these few aspects. The majority of the subjects have never used any negotiation support system or decision support system before. Out of the eleven subjects who do have such experience, more than half of them have used it for less than three times. For those who have used it for four times or more, the systems they indicated are closer to the definition of general decision support system than to that of specialized negotiation support system. As the system design employs different colors, the subjects' ability of distinguishing the involved colors is calibrated. Three subjects are found to have difficulty distinguishing the colors. The three sessions they participated in are therefore removed from the final data set used for analysis. The actual number of sessions for each experimental condition that are taken into data analysis is shown in Figure 6.7.

Availability of AET	Yes	20 sessions	20 sessions
	No	18 sessions	20 sessions
		Yes	No

Availability of CDT

Figure 6.7: Actual number of sessions used for data analysis.

In line with the formative measurement scheme for the extent of coalition formation (as shown in Figure 6.6), the coding scheme as shown in Table 6.3 was devised for the frequency analysis. Petter et al. (2007) note that internal consistency or reliability is

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unimportant for a formative construct because measures are examining different facets of the construct, but it is critical to ensure that the entire domain of a formative construct is captured (i.e., content validity, see Straub et al. 2004). The content validity of our measurement is ensured through comprehensive literature review. The frequency analysis was carried out on the transcripts of the negotiation sessions. A random sample of 25% of the transcripts was drawn to establish inter-coder reliability in the application of the coding scheme. Each of these transcripts was coded by two different coders. A Cohen's Kappa of 94.17% suggests satisfactory inter-coder reliability (Cohen 1960).

Table 6.3: The coding scheme.

Category of Tactic	Description	Example
Latent-Winning-Coalition Tactic	Latent coalition parties backing up each other in the projection of their preferences	"I agree with A on that issue."
Actual-Winning-Coalition Tactic	Exhibition by coalition parties during the actual winning coalition stage	"Both A and I want this option for that issue."
Latent-Blocking-Coalition Tactic	Latent coalition parties backing up each other in the objection to out-coalition party's preferences	"Like A, I do not like that option either."
Actual-Blocking-Coalition Tactic	Exhibition by coalition parties during the actual blocking coalition stage	"Both A and I hate to have this option for that issue."
Anti-Winning-Coalition Tactic	Exhibition by out-coalition party during the actual winning coalition stage	"Both of you, is it possible to consider some other options?"
Anti-Blocking-Coalition Tactic	Exhibition by out-coalition party during the actual blocking coalition stage	"Both of you, you know it is really important for me to have this option."
Non-Coalition-Related Tactic	Behavior not under any of the above categories	"Let's all make our first offers, shall we?"

PLS is used to test the proposed research model. The measurement model is first assessed. As only perceived group climate and satisfaction are measured through subjects' response to questionnaire items, only the loadings and cross-loadings of measurement items for these two constructs are shown in Table 6.4. With loadings above 0.8, the items load heavily on their respective constructs, suggesting adequate reliability of the individual items. It is also seen that the loadings of items on their respective constructs are higher than loadings of other items on these constructs and the loadings of these items on the other constructs, lending evidence to discriminant validity. In the last two columns of Table 6.5, the AVE and the corresponding square roots of the constructs and the correlations between the constructs are represented. The adequate discriminant validity is further evidenced as the square root of the AVE of each construct is greater than the correlation between the two constructs (Barclay et al. 1995). The AVE of both constructs exceeding the threshold of 0.5 also establishes their convergent validity (Chau 1997). The high composite reliability and Cronbach's Alpha statistics (as shown in Table 6.5) suggest satisfactory internal consistency of the constructs.

Table 6.4: Loadings and cross-loadings of measurement items.

	Perceived Group Climate	**Satisfaction**
Climate1	**0.898**	0.623
Climate2	**0.870**	0.652
Climate3	**0.894**	0.635
Climate4	**0.855**	0.585
Satisfaction1	0.599	**0.949**
Satisfaction2	0.745	**0.903**

Table 6.5: Internal consistency and discriminant validity of constructs.

	Composite Reliability	Cronbach's Alpha	Perceived Group Climate	Satisfaction
Perceived Group Climate	0.932	0.903	Sqrt(0.774) = 0.880	0.711
Satisfaction	0.924	0.839	0.711	Sqrt(0.859) = 0.927

Bootstrap resampling is then performed on the structural model to examine path significance, while PLS algorithm is executed to examine the path weights. A number of at least 1000 samples is advocated in the literature, in order to construct accurate confidence intervals (Efron & Tibshirani 1993). We therefore proceed with 1000 bootstrap samples. The results of the structural model analysis are captured in Figure 6.8.
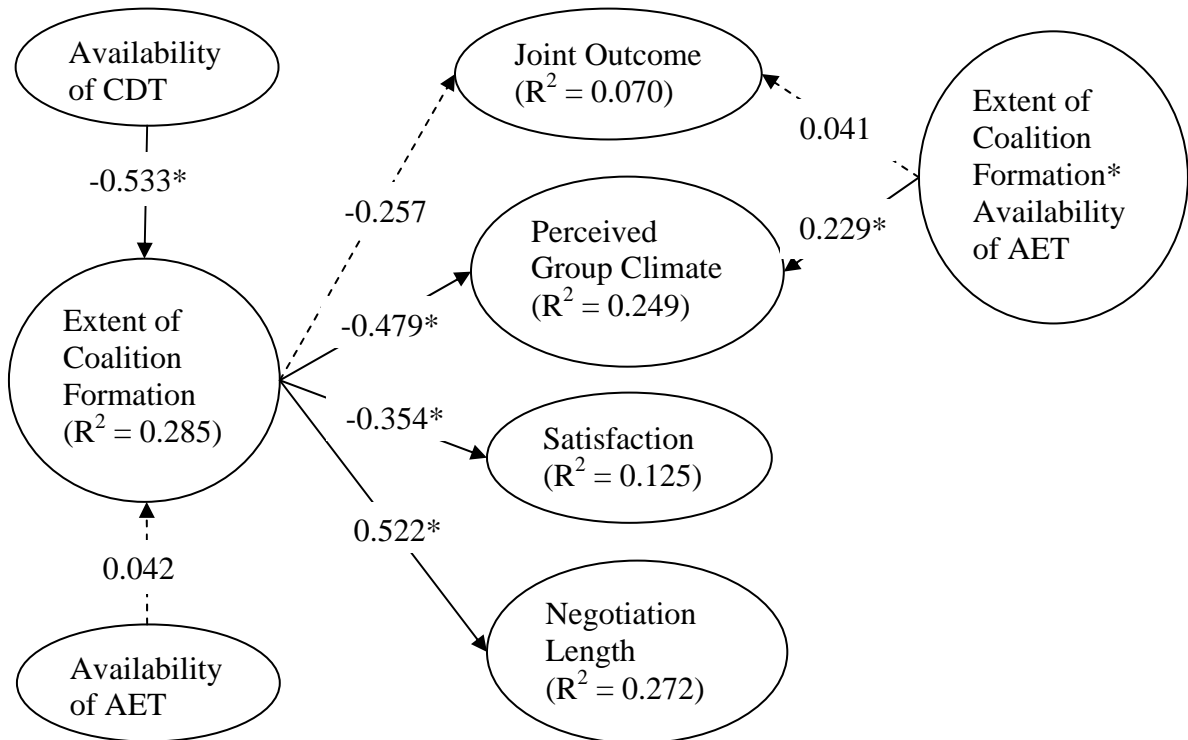

Figure 6.8: Results of the structural model analysis.

To simplify the presentation of the results, we have omitted the paths from the availability of AET to joint outcome and perceived group climate as the main effect is not hypothesized. However, it should be noted that in the analysis of interaction effect, the interacting constructs and their product term are all included in the regression model. Results show that the availability of CDT has a significant and negative impact upon the extent of coalition formation (path coefficient = -0.533; T-statistic = 9.084; $p < 0.001$). As the availability of CDT is coded as 0 when CDT is not available and 1 when available, the negative path coefficient suggests that the extent of coalition formation is lower when CDT is available. Hypothesis 1 is thus supported. The availability of AET is shown to have no main effect on the extent of coalition formation (path coefficient = 0.042; T-statistic = 0.426; $p > 0.05$). Hypothesis 2 is then also supported. The extent of coalition formation is in turn found to impose significant effect on perceived group climate (path coefficient = -0.479; T-statistic = 4.828; $p < 0.001$), satisfaction (path coefficient = -0.354; T-statistic = 5.291; $p < 0.001$), and negotiation length (path coefficient = 0.522; T-statistic = 4.744; $p < 0.001$), in the hypothesized direction. Hypothesis 4, 5, and 6 are all supported. The negative effect of the extent of coalition formation on joint outcome is insignificant though (path coefficient = -0.257; T-statistic = 1.590; $p > 0.05$). Hypothesis 3 is hence not supported.

The interaction term of the extent of coalition formation and the availability of AET is found to have a significant and positive impact upon perceived group climate (path coefficient = 0.229; T-statistic = 2.021; $p < 0.05$). Taking in all relevant path weights to construct a regression model, we find that a unit increase of the extent of coalition

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formation decreases perceived group climate by 0.479 when AET is not available, whereas the decrease drops to 0.250 when AET is available. The negative impact of the extent of coalition formation on perceived group climate is indeed lower when AET is available. Support is then lent to hypothesis 8. The moderating effect of AET on joint outcome is not evident in the collected data. Although the valence of the interaction term is as hypothesized, it turns out insignificant (path coefficient = 0.041; T-statistic = 0.213; p > 0.05). Therefore, hypothesis 7 is not supported.

6.6. Discussion

The hypotheses testing results are summarized in Table 6.6. In this section, we discuss the empirical results and derive the theoretical and practical implications of the study.

Table 6.6: Results of hypotheses testing.

#	Hypothesis	Supported?
1	The extent of coalition formation in group negotiation is lower when CDT is available than when it is not.	Yes
2	The extent of coalition formation in group negotiation does not differ when AET is available from when it is not.	Yes
3	The extent of coalition formation is negatively related to joint outcome achieved in group negotiation.	No
4	The extent of coalition formation is negatively related to negotiators' perceived group climate in group negotiation.	Yes
5	The extent of coalition formation is negatively related to negotiators' satisfaction in group negotiation.	Yes
6	The extent of coalition formation is positively related to the length of group negotiation.	Yes
7	The negative effect of coalition formation on joint outcome achieved in group negotiation is lower when AET is available than when it is not.	No
8	The negative effect of coalition formation on negotiators' perceived group climate in group negotiation is lower when AET is available than when it is not.	Yes

The hypothesis testing result confirms the efficacy of the conflict detection tool (CDT) in subduing the extent of coalition formation. The extent does not differ though when the alternative evaluation tool (AET) is available from when it is not. The findings collectively corroborate the conceptualization of coalition formation as a simplifying strategy employed by negotiators to address the complexity related to multiple parties. Essentially, while CDT eases the negotiators' cognitive load related to multiple parties, coalition formation is less relied on; since AET does not tackle the party complexity directly, its availability barely alters how much negotiators resort to coalition formation. With lower extent of coalition formation in group negotiation, better outcomes can be expected, as the corresponding hypotheses are supported, including better group climate as perceived by negotiators, higher level of satisfaction, and shorter negotiation sessions. The results hence not only confirm the defective functions of coalition formation but more importantly alarm the importance of managing coalition formation in group negotiation.

The consequence of coalition formation for joint outcome is not evident in the collected data. We reasoned that the higher the extent of coalition formation, the more prominent the intergroup processes that are characterized with more competition and less cooperation. Conversely, with lower extent of coalition formation, the negotiation process should feature less competition and more cooperation, which should then lead to higher joint outcome. Nevertheless, the dual concern theory suggests that cooperation only results in higher joint outcome when coupled with high resistance to yielding; when cooperation is paired with low resistance to yielding, parties may too easily concede and

settle on a compromise that does not realize the integrative potential (Pruitt & Rubin 1986). In retrospection, we speculate that although the level of cooperation could be higher with lower extent of coalition formation, the resistances to yielding were mixed across sessions, and that is why the path from the extent of coalition formation to joint outcome turned out insignificant.

The efficacy of AET has been found in moderating the negative consequence of coalition formation for negotiators' perception of group climate. It then affirms that as AET facilitates the practice of tradeoffs through supporting simultaneous consideration of issues, it does promote a more cooperative and problem-solving atmosphere, thus bettering group climate as perceived by negotiators. AET has not been found to significantly moderate the negative consequence of coalition formation for joint outcome. The interpretation would have been elusive even if the moderation effect were to be statistically supported, owing to the insignificant main effect of the extent of coalition formation on joint outcome. Notwithstanding this, the reason why AET's effect on joint outcome is absent is possibly that the practicing of tradeoffs has not materialized into joint gain. It could be that tradeoffs initiated are not reciprocated. It could also be that the tradeoffs practiced are not profitable in nature, for example, a negotiator could have conceded on his high-priority issues in exchange for the opponents' concessions on his lower-priority issues.

The theoretical implications of the study are multifold. To our best knowledge, this is the first information systems research study that proposes holistic decision support for online group negotiation. In their seminal theory of negotiation support systems, Lim and

Benbasat (1993) envisioned both decision support and electronic communication as the building blocks. Nonetheless, they did not get into specific decision support that is fitting. Furthermore, the boundary condition of their theory is clearly spelt out as dyadic negotiation settings. While Swaab et al. (2002) zoomed into the specific role of visualization support for group negotiation, the paper lacked the perspective of a complete decision support solution for group negotiation. In our study, starting with conceptualizing the distinct activities of group negotiators, we proposed decision support components that will meet the needs of these activities respectively. With the favorable findings on the efficacy of our proposed decision support, the solution is therefore not only theoretically complete but also practically utilitarian. It then provides a tested approach to future innovation along this line. The decision support although proposed from scratch, turns out demonstrating continuity from prior literature on dyadic negotiation settings, in which a decision aid that supports alternative evaluation was widely incorporated (e.g., Foroughi et al. 1995, Delaney et al. 1997). It addresses the complexity related to multiples issues in negotiation, in a similar manner to the alternative evaluation tool (AET). A decision aid resembling the conflict detection tool (CDT) is hardly found in prior literature though. The absence is after all reasonable since CDT is intended to address the complexity related to multiple parties, which is less relevant to the dyadic settings. With the continuity, our study plays an integral part in building up the negotiation support research tradition.

In examining the efficacy of the proposed decision support, we have taken a cognitive processes perspective on group negotiation. The theoretical underpinning is that with

external information processing capacity and capability, group negotiators resort less to simplifying strategies (i.e., heuristics) that could lead them away from optimal decisions. We singled out coalition formation as the simplifying strategy that negotiators are most likely to employ in tackling the intrinsic complexity of group negotiation, i.e., the complexity related to multiple parties. Our study represents a first attempt of conceptualizing coalition formation as a heuristic used in group negotiation while establishing a nomological network around it. Although Bazerman et al. (2000) brought up the notion of forming coalitions to simplify group negotiation, they did not put in place a theory of such coalition formation. Our finding that the availability of CDT has a main effect on the extent of coalition formation, but not the AET, confirms not only our conceptualization of coalition formation as a heuristic to address the complexity related to multiple parties, but also our proposition that given the appropriate decision support, the extent of coalition formation can be subdued. As a heuristic, coalition formation is proved defective in nature as it incurs negative consequences for the various negotiation outcomes, which in turn affirms the productivity of managing coalition formation in group negotiation. Because of the exploratory nature of this work, the measurement scheme of the extent of coalition formation is not available off-the-shelf. We then proposed an original formative measurement that operationalizes the construct in terms of negotiators' employment of coalition-related tactics during group negotiation process. Collectively, the conceptualization, modeling, measurement scheme, and empirical verification as regards this construct add to the repository of both coalition and group negotiation research.

The empirical results of the current study have provided preliminary evidence of the efficacy of the proposed decision support on coalition dynamics and ultimately on online group negotiation outcomes. The practical implication thereof extends as broad as the scope of online group negotiation per se. To practitioners at large who need to manage group negotiation, the moral of the study is that the employment of coalition formation as a cognitive simplifying strategy should be attended to as it holds the ultimate negotiation outcomes at stake; and the good news is that the resort to coalition formation and its consequences can indeed be shaped with appropriate decision support in place.

The study has the following limitations, which opens up avenues for future research. First, the conceptualization, design and implementation of the online group negotiation support are focused in the stage of "negotiation dance" (see Lim 1999 for a discussion on the multiple stages of a negotiation episode). While we believe that a focused approach is appropriate to kick a start in this arena, future research on supporting the other stages of group negotiation is undoubtedly a welcome. Second, as far as the characteristic of multiple parties is concerned, the empirical testing has looked solely into the simple model of three parties. Apparently as more negotiating parties get involved, the negotiation dynamics would further complicate. Although we conjecture that as higher complexity is introduced with more parties, the need for and the efficacy of the proposed decision support would only be more pronounced, future research is still much wanted to address the uniqueness of more-than-three-party negotiation and to corroborate the current findings. Third, we examined coalition formation as the central process mechanism because of the importance credited to it in understanding and explaining

group negotiation. It is by no means the only valid process mechanism though. Future research that investigates other process mechanisms will definitely add to the scholarship of group negotiation so that we can support it and manage it even more effectively.

6.7. Revisiting the Role of the Excluded Players

When there is coalition formation in group negotiation, it is natural that some party (parties) is (are) excluded from the coalition. In coalition literature, the "excluded player" is used to describe such parties. The excluded player represents an important aspect of coalition dynamics. Stevenson et al. (1985) in their process view of coalition development highlight that response of the excluded parties moderates whether the joint action of coalition parties turns into formalized coalition or dormant coalition. While we have pointed out earlier both in theoretical and empirical discourse that the out-coalition party (i.e. the excluded player) plays a part in the coalition formation dynamics in a group negotiation, the study has thus far addressed the coalition formation phenomenon mainly from the perspective of the (latent) coalition parties. Specifically, we posit that the availability of the conflict detection tool (CDT) addresses the complexity related to multiple parties and thus demotivating negotiators from forming coalitions to simplify the group negotiation. On the other hand, when a coalition forms, the outcome of the excluded players can be jeopardized, and this is likely to invoke their response towards the coalition formation. It is indeed possible for the excluded players to subdue a coalition by devising effective strategies, thus bettering their own outcome and possibly the joint outcome as well. In this light, we revisit the role of the excluded players in coalition dynamics and subsequently in negotiation outcomes.

The literature has long pointed out that structurally a group negotiation task can be either symmetrical or asymmetrical (e.g., Murnighan 1978). It is symmetrical when each party meets with the same number of parties that oppose as well as support his or her preferences, and asymmetrical when a majority of parties has compatible preferences which are incompatible with those of the minority. For example, a three-person negotiation session (A, B, and C) has to negotiate a joint decision about issues X, Y, and Z. There can be two typical situations. On one hand, A and B may agree on all of the three issues, while C disagrees on all. This is "asymmetrical"; A and B in this case may find it lucrative to form a coalition across all the issues to achieve better outcomes at the expense of C (see Beersma & De Dreu 2002). Apparently in the asymmetrical situation, it is very difficult for C (the excluded player on all issues) to turn the adverse coalition formation between A and B around as there is no accessible leverage. On the other hand, A and B may agree on issue X while C disagrees, B and C may agree on issue Y while A disagrees, and A and C may agree on issue Z while B disagrees. In such a "symmetrical" situation, a stable coalition does not exist as far as the compatibility of overall interests is concerned. Coalition is still a viable mechanism though as far as each individual issue is concerned. The excluded players with respect to the individual issues in this case do have the leverage to turn the adverse coalition formation around and better their negotiation outcomes.

It is worth mentioning that the implicit antecedent of coalition formation in group negotiation as we have discussed so far is interest alignment. This differs from the prior

study on bilateral inter-team negotiation support in which the antecedent was cultural diversity that operated through the mechanism of group faultline when members of a negotiating team are guided with the same interest. In a group negotiation context, the multiple sides negotiate with distinct interests. According to Polzer et al. (1998), in multi-issue multiparty negotiation, subsets of parties often have compatible interests on one or more issues. Polzer et al. (1995) explains that holding the distribution of preferences constant across possible negotiation opponents, it is more likely that parties will share compatible preference in multiparty than in dyadic negotiations. In this case, they can band together to influence the incompatible party. Specifically, they may form coalition to influence another party to consent to an agreement more favorable to the subset. Literature suggests that parties who discover compatible interests not only can but also are likely to form coalitions, adding to their bargaining strength over the issues on which their compatibility is based (Mannix et al. 1994, Murnighan & Brass 1991). To the extent that multiple parties can be more persuasive than a single party, compatibility should help parties achieve their desired outcomes. Polzer et al. (1998) posit that parties who have compatible interests will attain higher outcomes on the issues on which their interests are compatible than will those who have incompatible interests. As far as coalition is concerned, the proposition is that parties whose interests are compatible will be more likely to form coalitions than will parties whose interests are not compatible.

In our recently elaborated empirical study on decision support for online group negotiation, the negotiation task we employed for the experiment is characterized as a symmetrical situation. Although there is no stable coalition across all issues, coalition

formation proves a viable mechanism as far as reaching agreement on each individual issue is concerned. On the other hand, it is possible for the excluded players with respect to the individual issues to turn adverse coalitions around, as the symmetrical situation gives them leverage. In order to illustrate the case more efficiently, we simplify the negotiation task into a reduced form as follows (see Table 6.7):

Table 6.7: Reduced form of the negotiation task.

Issue Party	X	Y	Z
A	1	4	2
B	2	1	4
C	4	2	1

Note: The cell number represents the highest possible utility of the issue to the party and the number structure collectively reflects parties' priorities across issues.

Reddish number indicates that the corresponding party is the excluded player on the corresponding issue.

Take party C for an example. C is implicitly the exclude player on issue X. On the other hand, X is obviously the issue of highest priority for C. In the sense, C does not have sufficient power to fight over X within the concern of this issue itself should A and B insist on their compatible position. However, C can possibly offer a trade to either A or B. If the trade is attractive enough, A or B may be willing to deviate from the compatibility coalition and to side with C on this particular issue which marks the successful turnaround of C's excluded position. It should be noted that party C's turnaround on issue X in this case is not only favorable in terms of C's individual outcome, but also the multiple parties' joint outcome as the utility of X for C exceeds the summed utility for both A and B. To the extent that A and B who have compatible interest on X have a high possibility of securing their preference (as their combined power is stronger than the

excluded player), the key to unlocking the integrative potential around issue X lies with the excluded player, that is party C. The group negotiation task itself is cognitively loaded though. The process for the excluded players to accomplish the said turnaround is cognitively complex as well. There are a few critical stages involved in this process (see Table 6.8).

Table 6.8: Cognitive stages of the excluded players (party C's case).

#	Stage	Description
1	Beware	C realizes that A and B form a (latent^) compatibility coalition on issue X; consequently, C has low power on this issue;
2	Decide	C decides that he/she will not surrender to the compatibility coalition as issue X is the most important to him/her;
3	Strategize	C works out an effective strategy to dissolve the coalition between A and B: essentially C has to offer enticing trade to either A or B;
4	Implement	C implements the tradeoff with either A or B and secures his/her position on issue X for the time being, which is subject to subsequent dynamics of the negotiation.

^"latent" indicates that A and B have not yet resorted to explicit coalition actions.

There are a few critical elements associated with the four stages. For stage 1—the *beware* stage, we believe that the earlier that party C is alerted of the (latent) compatibility coalition, the higher the chance that the subsequent stages come to pass, as the earlier the stage, the more the alternative strategies that are available to C. For instance, if C realizes the fact right from the start, he/she would be able to trade off issue Y for X with A or issue Z for X with B, given the excluded positions of party A and B over the issues of Y and Z respectively. If C realizes the fact after the position for issue Y is fixed according to the compatibility between B and C, it will be difficult for C to deviate from it without any negative consequence caused. In this case, the more feasible strategy would be for C to trade off issue Z for X with B. But apparently, the likelihood of success is lower as

there is only one alternative. The situation would be similar if C realizes the fact after the position for issue Z is fixed according to the compatibility between A and C. If C only realizes the fact after the positions for both issue Y and issue Z are fixed, C will be having a very hard time to fight over issue X without deviating from the coalitions on issue Y and issue Z, in which case C will be left in a disadvantageous position. Furthermore, it adds to C's advantage if the compatibility coalition is identified in its latent status. If A and B have already resorted to explicit coalition actions, it is harder for C to dissolve the coalition as there will be switching cost involved for A and B. For the subsequent stages, the principle of "the earlier, the better" applies for the same rationale.

The reason why we single out stage 2—the *decide* stage—is that first party C may choose to act alternatively, i.e., to surrender to the coalition; second, the stage can have different aftermath. While C decides not to surrender to the coalition, he/she has an alternative option: he/she can simply (threaten to) block coalition decisions that run counter to his or her preferences, thereby steering the group process toward his or her preferred outcome (Miller 1985), without attempting to dissolve the coalition, which is not very effective if the coalition parties are as persistent; even if the coalition parties compromise to a certain extent, the integrative potential around this issue is hardly unlocked.

It is when C proceeds to stage 3—the *strategize* stage—where he/she attempts to dissolve the coalition by offering enticing trade to either of the coalition parties that fully unlocking the integrative potential is made possible and C has a higher possibility of securing his/her position on issue X as well. It is crucial that C offers enticing trade. In

the specific example, trading over issue Y is enticing to A as A is the excluded player on this issue while trading over issue Z is enticing to B based on the same rationale. On the other hand, trading over issue Y is not enticing to B, nor issue Z to A, as they are already part of the compatibility coalition on the issues which secures them desirable outcomes.

The transition to stage 4—the *implement* stage—is not guaranteed as it is subject to whether A or B reciprocates the trade offer from C. It is in turn subject to how enticing C's offer is towards either A or B. If either of the two parties reciprocates with C and the tradeoff prevails till agreement, the integrative potential unlocked through it will be reflected in the negotiation outcomes.

As shown, the cognitive process that the excluded players (in this illustrated case party C) go through to turn around the adverse coalition formation is nontrivial. We posit that the decision support for online group negotiation as we have conceptualized, designed and implemented assists in the excluded players' cognitive process as well. The following theoretical model (see Figure 6.9) gives an overview of the assisting effect.
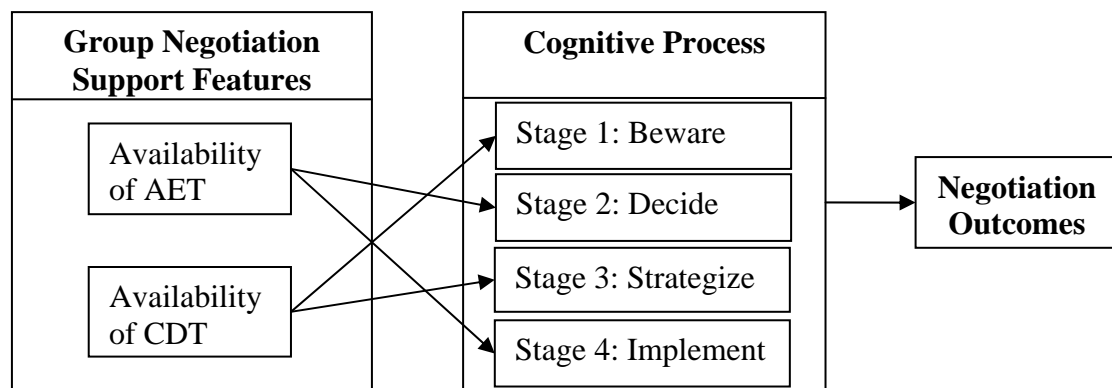
Figure 6.9: The theoretical model.

We posit that the alternative evaluation tool (AET) is of particular assistance to stage 2 and stage 4 of the cognitive process of the excluded players. Following the same illustration of party C, for the stage of decide, before proposing any offer through the system in response to the (latent) coalition, C will have gone through the alternative evaluation process. As it is highly visible to party C that surrendering to the compatibility coalition between A and B on issue X makes his/her own utility score plummet, he/she will be more conscious towards the decision and is hence less likely to surrender to the compatibility coalition without attempts of turning it around. We have the following proposition:

Proposition 1: The excluded players are less likely to surrender to compatibility coalition when they are assisted with AET than when they are not.

For the stage of implement, when tradeoff with either A or B proves possible, AET helps C to weigh the costs with regard to the trades C needs to offer to the two parties respectively in light of C's own preference structure. As AET makes the cost of a trade offer salient, party C is more likely to engage an overall more profitable tradeoff coalition. Hence the proposition:

Proposition 2: The excluded players are more likely to engage the more profitable tradeoff coalition when they are assisted with AET than when they are not.

While the conflict detection tool (CDT) is capable of extracting, collating, and representing the opposing parties' offer information, we posit that it provides particular

assistance to stage 1 and stage 3 of the cognitive process of the excluded players. Following the illustration of party C's case, for the stage of beware, once all the parties make their offers and the offers are represented on the CDT interface, the latent coalition between A and B on issue X will be salient to C. In this case, as long as negotiators use the system to propose offers and utilize CDT functionality in real-time, they are able to identify latent compatibility coalition between other parties with ease. While without CDT negotiators may still be able to discover the latent coalition, the discovery may be less timely. This is especially true when issues are negotiated sequentially. The latent compatibility coalitions may only be discovered when it is time to negotiate over the corresponding issues. We have the following proposition:

Proposition 3: Negotiators are more likely to identify latent compatibility coalition between other parties in a timely manner when they are assisted with CDT than when they are not.

For the stage of strategize, CDT helps party C to maintain a complete picture of all parties' preferences. It is thus easier for C to work out effective strategies to dissolve the compatibility coalition between A and B on issue X. As C is more aware of the overall need of party A and B, he/she is more likely to offer trades that are enticing to them. Hence the following proposition:

Proposition 4: The excluded players are more likely to offer trades that are enticing to the compatibility coalition parties when they are assisted with CDT than when they are not.

Last but not least, the extent to which the excluded players turn the adverse coalition formation around is related to negotiation outcomes, both at individual level and at aggregate level. In the particular scenario we have illustrated, successful turnaround of the excluded position is not only good for C in that he/she is able to secure the most important issue for the self, but also for the good of all (in terms of joint outcome) as integrative potential is being unlocked through the materialization of tradeoffs. Moreover, it is not only concerning party C, whose particular case we have used to illustrate the theoretical framework and propositions. The same applies to all the parties in this scenario as each of A, B, and C is the excluded player for one issue. Apparently, if all the three parties turn their respective adversity around, the final agreement reached would be most integrative.

It should be highlighted that only when the excluded players' turnaround of their positions are indeed successful, their individual outcomes and the joint outcome are affected in the posited direction. There are two checkpoints in this regard. First is whether the compatibility coalition is successfully dissolved and replaced by a tradeoff between the excluded player and either of the compatibility coalition parties. Second is whether the effect of the first checkpoint prevails and is carried into the final agreement. Only when both checkpoints are passed, we certify the turnaround of the excluded players successful. We have the following propositions as regards the successful turnaround:

Proposition 5: Successful turnaround of the excluded players is positively related to their individual outcomes achieved from the negotiation.

Proposition 6: Successful turnaround of the excluded players is positively related to the joint outcome achieved from the negotiation.

Our endeavor with the effect of the decision support for online group negotiation on the excluded players has to end in the conceptual stage for the current work. The main reason is that we are still contingent upon the method to segregate the excluded players' (e.g., party C's in the illustrated case) course for data collection and analysis; this is particularly challenging in the context of a symmetrical group negotiation task where each party is an excluded player over a certain issue. Compared to finding ways to distill the excluded players' course from the natural negotiation setting, our speculation is that it might be more fruitful to control the negotiation process so that the excluded players' course stands out systematically. We leave the empirical verification of the said phenomenon open for future research.

Despite the absence of empirical corroboration for our propositions, a strong theoretical support can be found in the research on minority influence. Moscovici (1976) argued that almost all truly innovative social influence starts with minorities, with the conflict initially engendered by minorities in groups eventually leading to innovation. The underlying rationale could be found in Nemeth (1986) who contended that compared to majorities, minorities create different cognitive processes in groups. Essentially, it is expected that the conflict in groups created by minority positions leads to more thorough and creative thought processes and, potentially, to better performance (De Dreu & West 2001, Nemeth & Kwan 1987). The excluded player in our studied context represents the

minority, and he/she holds the key to unlock the integrative potential of the negotiation

by turning his/her adversity (i.e., the opposing majority position) around.

CHAPTER 7. CONCLUSION OF THE THESIS

The thesis has essentially addressed decision support for online multiparty negotiation from a cognitive perspective with the main proposition that decision support expands negotiators' cognitive limit, such that negotiators resort less to the simplifying strategy of coalition formation, which in turn betters various aspects of negotiation outcomes. We acknowledge that multiparty negotiation could involve both level-1 negotiation (between negotiation sides) and level-2 negotiation (within a same side). It is our ultimate objective to support such multiparty negotiation. However, for the research program to be more manageable, we adopted the divide-and-conquer technique and conducted two empirical studies to address the distinct aspects of multiparty negotiation with such complexity.

In the first empirical study with the context of bilateral inter-team negotiation, we focused on conceptualizing, designing and implementing decision support for level-2 negotiation in a negotiating team. Theoretically, we discover that other than individual decision support for each negotiating team member, group decision support that structures the decision making in the negotiating team is also desirable to facilitate the team's pursuit of quality internal alignment. The Delphi technique is singled out as a fitting structure. With a prototype system that implements the proposed decision support, a laboratory experiment was conducted. The experimental results provide moderate evidence concerning the efficacy of the proposed decision support in subduing the extent of coalition formation and improving the various aspects of negotiation outcomes.

The second empirical study was conducted to answer the same set of research questions in the context of multilateral negotiation. Decision support was conceptualized, designed and implemented for level-1 group negotiation. Theoretically, we discover that two decision support components, the alternative evaluation tool (AET) and the conflict detection tool (CDT) are desirable to assist the pursuit of quality agreement in a group negotiation. With a prototype system that implements the proposed decision support, a laboratory experiment was conducted. The experimental results provide preliminary evidence concerning the efficacy of the proposed decision support in subduing the extent of coalition formation and improving the various aspects of negotiation outcomes.

A common finding of both empirical studies is that coalition formation is indeed an issue in different levels of multiparty negotiation and they do hold the ultimate negotiation outcomes at stake. The good news is that many a time, coalition formation is manageable. Despite the distinct antecedents of coalition choices that might be at work, an underlying drive for negotiators to resort to coalition formation at the first place is the complexity of the negotiation task demanding information processing that might be beyond the negotiators' capacity and capability. They then form coalitions to reduce the number of parties to an alignment or agreement so that the negotiation task is simplified. The antecedents, whether cultural diversity or interest alignment, only provide cues to negotiators on whom they should form coalitions with. Appropriate decision support is thus a feasible solution to manage coalition formation. While expanding the cognitive limits of negotiators, they find it less imperative to rely on coalition formation to simplify the negotiation task. It should be noted however that for both level-1 and level-2

negotiation, different features constitute appropriate decision support. While the Delphi technique is effective towards level-2 negotiation which is characterized with compatible interests, but incompatible cognitions on how to accomplish the task, it is not so for level-1 negotiation characterized with incompatible interests as reducing interaction among negotiators at this level is counterproductive to the achievement of integrative agreements. For level-1 negotiation, decision support should only assist the negotiators in processing the complex information related to multiple parties, while preserving the communication between the negotiators. By inference, in a more complex multiparty negotiation setting, e.g., multilateral inter-team negotiation, the decision support as proposed in both empirical studies can be integrated in facilitating both level-1 and level-2 negotiation at the same time.

It should be noted that following Keeney and Raiffa (1991) and Rangaswamy and Shell (1997), the current versions of the decision support for both levels of negotiation employ the restrictive assumption that all inventing and creating of issues has occurred. A further assumption we made is that the preference structures of all negotiators have been fixed. We have also implicitly adopted the multiple attribute value (MAV) approach (see Keeney & Raiffa 1976), assuming that the attributes of different alternatives under negotiation (i.e., the issues) can be structured and weighed, which implies that negotiators' preferences can be elicited and quantified. Admittedly, the elicitation and quantification of preference structures can be costly and may deter negotiators from using the decision support based upon it. A grand future research direction is then to assist negotiators' decision making even without the elicitation and quantification of their

preferences. While the current thesis only deals with fixed preference structures of negotiators, it is not uncommon for negotiators to change their preferences along the negotiation process. Accordingly, the other promising future research opportunity is for decision support to accommodate changing preferences of negotiators, even without additional solicitation and quantification or the negotiators' explicit indication of them.

The findings of the thesis are of particular relevance to the practical area of e-commerce. An alternative to negotiation that has been resorted to in e-commerce in defining and redefining the terms of interdependence between trading parties is the auction mechanism. Notwithstanding that auctions meet specific needs well, for example, English auction secures best price for seller and reverse auction solicits best deal for buyer, circumstances abound where the auction formats are not adequate in closing a deal; auctions being held guilty of setting up win-lose relationship between trading parties remains a concern as well (Subramanian 2009). In fact, it is long foreseen that traditional e-commerce is progressing towards negotiated e-commerce that should be able to handle complex negotiation structures in business transactions (Moai.com 2000). Despite that online negotiation is possible, the state-of-the-art support is hardly beyond an electronic communication feature (e.g., instant messaging). Without appropriate decision support, the complexity of a negotiation between multiple parties concerning multiple issues can easily go beyond the cognitive limit of human negotiators. When negotiators resort to heuristics to resolve the cognitive overload, they may readily miss out the optimal deals. The proposed decision support would therefore be a definite plus to a negotiated e-commerce service as it is capable of improving negotiation process and ultimately trading

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outcomes. Maintaining that auction can still be viable at times, we envision that the provision of the decision support that facilitates complex negotiation involving multiple parties and issues could mount to competitive advantage for the first-moving e-commerce businesses against those without the provision.

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Appendix 1: Scripts for Confederates

M/F denotes confederate. Part 1 and 3 are used for warming up and concluding purpose; part 2 addresses the negotiation process. If the actual subjects look into the issues one by one, the confederate should try to bring them back on track to consider the whole package.

The scripts for conditions 5 and 6 with high degree of decision support are omitted as they are largely similar to the other conditions.

Condition 1: degree of decision support = low; cultural diversity = homogeneous.

(Role: seller)

Part	Scripts
1	*Introduction* M: Hi, all. This is XXX. Glad to work together with you. *Break the ice* M: So what are we supposed to do now? Ask the buyer for an offer? *Point to some direction* M: I think we should insist on the best offer we can get. What do you all think?
2	*Initiate an offer* M: We just tell them we want to sell at least 8000 turbochargers at price $224. We

	provide warranty as long as 1 year and deliver within 8 months. How?
	Respond to an offer
	M: I think we cannot accept their offer. The utility we get is too low. We should not get any offer scored less than 44, remember?
	Suggest compromise
	M: We are more concerned with a higher price and shorter warranty period, right? We may consider compromising a bit in quantity and delivery.
	M: How about reduce the quantity to middle point 6500, while make delivery faster by one month? See how they respond?
	Accept an offer
	M: It seems this is already the bottom line of the buyer side. I've computed the score, better than 44, shall we accept the offer?
3	*Conclude the negotiation*
	M: Good. We're done!

Condition 1: degree of decision support = low; cultural diversity = homogeneous.

(Role: buyer)

Part	Scripts
1	*Introduction*

	M: Hi, all. This is XXX. Glad to work together with you.
	Break the ice
	M: Hi all, so what are we supposed to do now? Give the seller an offer?
	Point to some direction
	M: I think we should insist on the best offer we can get. What do you all think?
2	*Initiate an offer*
	M: We just tell them we want to buy at most 5000 turbochargers at price $200. We require warranty as long as 4 year and delivery within 5 months. How?
	Respond to an offer
	M: I think we cannot accept their offer. The utility we get is too low. We should not get any offer scored less than 44, remember?
	Suggest compromise
	M: We are more concerned with a lower quantity and earlier delivery, right? We may consider compromising a bit in price and warranty period.
	M: How about raise price to middle point $212, while require warranty of 3 years? See how they respond?
	Accept an offer
	M: It seems this is already the bottom line at the seller side. I've computed the score, better than 44, shall we accept the offer?
3	*Conclude the negotiation*

	M: Good. We're done!

Condition 2: degree of decision support = low; cultural diversity = heterogeneous.

(Role: seller)

Part	Scripts
1	*Introduction* F: Halo, XXX here. Glad to work with u guy. *Break the ice* F: So what we supposed to do huh? Ask the buyer for an offer, izit? *Point to some direction* F: Me think we should die die get the best offer. Can or not huh?
2	*Initiate an offer* F: Actually, we can just tell them we want to sell at least 8000 turbochargers at price $224 lor. Also, we provide warranty as long as 1 year and deliver within 8 months. How ah? *Respond to an offer* F: WAH LIAO… me think their offer cannot make it one leh. The utility is too low. We should not get any offer scored less than 44 mah, correct or not? *Suggest compromise*

	F: Instructions say price and delivery very important wat. But we can actually give in a little bit in quantity and delivery lor.
	F: Me think can try reduce the quantity to middle point 6500 n make delivery faster by one month. See how first lor.
	Accept an offer
	F: Actually, their offer not that bad leh, dun think they'll give in any more. Our score not bad also, more than 44, I dun mind lar. What do you all think?
3	*Conclude the negotiation*
	F: Yeah! We r done! FINALLY…

Condition 2: degree of decision support = low; cultural diversity = heterogeneous.

(Role: buyer)

Part	Scripts
1	*Introduction*
	F: Halo, XXX here. Glad to work together with u guys.
	Break the ice
	F: So what we supposed to do huh? Give the seller an offer, izit?
	Point to some direction
	F: Me think we should die die get the best offer. Can or not huh?

2	*Initiate an offer*
	F: Actually, we can just tell them we want to buy at most 5000 turbochargers at price $200 lor. Also, we require warranty as long as 4 year and delivery within 5 months. How ah?
	Respond to an offer
	F: WAH LIAO… me think their offer cannot make it one leh. The utility is too low. We should not get any offer scored less than 44 mah, correct or not?
	Suggest compromise
	F: Instructions say quantity and delivery very important wat. But we can actually give in a little bit in price and warranty lor.
	F: Me think can try raise the price to middle point $212 n require warranty of 3 months. See how first lor.
	Accept an offer
	F: Actually, their offer not that bad leh, dun think they'll give in any more. Our score not bad also, more than 44, I dun mind lar. What do you all think?
3	*Conclude the negotiation*
	F: Yeah! We r done! FINALLY…

Condition 3: degree of decision support = medium; cultural diversity = homogeneous.

(Role: seller)

Part	Scripts
1	*Introduction* M: Hi, all. This is XXX. Nice to meet you and working together. *Break the ice* M: Hi all, so what are we supposed to do now? Give the buyer an offer? M: Hi all, how about asking a price from buyers first? *Point to some direction* M: I think we should insist on the best offer we can get. What do you all think?
2	*Initiate an offer* M: We just tell them we want to sell at least 8000 turbochargers at price \$224. We provide warranty as long as 1 year and deliver within 8 months. I check from the NegEvaluator, that this offer earns the highest utility score for us. How? M: I predict the best choice using NegGenerator system just now. And it suggests that we should take the offer that gives at least 8000 turbochargers at price \$224, and provides warranty as long as 1 year and deliver within 8 months. How? *Respond to an offer* M: I think we cannot accept their offer. By checking from NegEvaluator, I found that the utility they offer is too low. We should not get any offer scored less than 44, remember? M: I think this is an offer which we can accept by checking NegEvaluator.

	Whereas how about we suggest a higher price to see whether we can earn more profit?
	M: It seems that the offer gives a bit lower utility score from NegEvaluator than our expected. What's your opinion?
	Suggest compromise
	M: We are more concerned with a higher price and shorter warranty period, right? We may consider compromising a bit in quantity and delivery.
	M: We are more concerned with a higher price and shorter warranty period, right? Then how about we compromising a bit in quantity and delivery and ask them for higher price and short warranty period.
	M: How about reduce the quantity to middle point 6500, while make delivery faster by one month? See how they respond?
	M: I think the price now we offer is too high for buyers to accept comparing to the best offer from NegGenerator. How about we reduce the price a bit?
	Accept an offer
	M: It seems this is already the bottom line of the buyer side. By checking from NegEvaluator, our utility score is better than 44, shall we accept the offer?
	M: It seems this is the best offer we can get and also our buyers can accept by predicting from the NegGenerator, shall we accept this offer?
3	*Conclude the negotiation*

	M: Good. We're done!

Condition 3: degree of decision support = medium; cultural diversity = homogeneous.

(Role: buyer)

Part	Scripts
1	*Introduction* M: Hi, all. This is XXX. Nice to meet you and working together. *Break the ice* M: Hi all, so what are we supposed to do now? Give the sellers an offer? M: Hi all, how about asking a price from sellers first? *Point to some direction* M: I think we should insist on the best offer we can get. What do you all think?
2	*Initiate an offer* M: We just tell them we want to buy at least 8000 turbochargers at price $224. We provide warranty as long as 1 year and deliver within 8 months. I check from the NegEvaluator, that this offer earns the highest utility score for us. How? M: I predict the best choice using NegGenerator system just now. And it suggests that we should take the offer that gives at least 8000 turbochargers at price $224, and provides warranty as long as 1 year and deliver within 8 months. How?

Respond to an offer

M: I think we cannot accept their offer. By checking from NegEvaluator, I found that the utility they offer is too low. We should not get any offer scored less than 44, remember?

M: I think this is an offer which we can accept by checking NegEvaluator. Whereas how about we suggest a lower price to see whether we can earn more profit?

M: It seems that the offer gives a bit lower utility score from NegEvaluator than our expected. What's your opinion?

Suggest compromise

M: We are more concerned with a lower price and longer warranty period, right? We may consider compromising a bit in quantity and delivery.

M: We are more concerned with a lower price and longer warranty period, right? Then how about we compromising a bit in quantity and delivery and ask them for lower price and longer warranty period.

M: How about add the quantity to middle point 6500, while make delivery faster by one month? See how they respond?

M: I think the price now we offer is too low for sellers to accept comparing to the best offer from NegGenerator. How about we add the price a bit?

Accept an offer

M: It seems this is already the bottom line of the seller side. By checking from

	NegEvaluator, our utility score is better than 44, shall we accept the offer?
	M: It seems this is the best offer we can get and also our sellers can accept by predicting from the NegGenerator, shall we accept this offer?
3	*Conclude the negotiation* M: Good. We're done!

Condition 4: degree of decision support = medium; cultural diversity = heterogeneous.

(Role: seller)

Part	Scripts
1	*Introduction* F: Halo, XXX here. Nice to c u guys and working together. *Break the ice* F: Harlow… so what we supposed to do huh? Give the buyer an offer, izit? *Point to some direction* F: Me think we should die die get the best offer. Can or not huh? F: Can ask a price from buyers first?
2	*Initiate an offer* F: Actually, we can just tell them we want to sell at least 8000 turbochargers at

price $224 lor. Also, we provide warranty as long as 1 year and deliver within 8 months. Me check the NegEvaluator, and this offer earns the highest utility score for us. How ah?

F: Me predict the best choice using NegGenerator system just now. And suggests that should take the offer gives at least 8000 turbochargers at price $224, and provides warranty as long as 1 year and deliver within 8 months. How ah?

Respond to an offer

F: WAH LIAO… me think their offer cannot make it one leh. Me check NegEvaluator, and the utility score too low leh. We should not get any offer scored less than 44 mah, correct or not?

F: Me check NegEvaluator, and think it a price which we can accept leh. But can still give a higher price to see whether can earn more or not?

F: YAH LAO… Me check from NegEvaluator, and seems that price a bit lower than our expected. How ah?

Suggest compromise

F: Instructions say price and delivery very important wat. But we can actually give in a little bit in quantity and delivery lor.

F: NegEvaluator tell price and delivery very important wat, right? Then can compromising a bit in quantity and delivery and ask higher price and short warranty period for change?

F: Me think can try reduce the quantity to middle point 6500 n make delivery

	faster by one month. See how first lor.
	F: Me think the price now we offer too high for buyers to accept comparing to the best offer suggest by NegGenerator. How if we reduce a bit?
	Accept an offer
	F: Actually, their offer not that bad leh, dun think they'll give in any more. Me check the NegEvaluator, our utility score better than 44. Can accept the offer?
	F: Seems it the best offer can get and also buyers can accept by results from the NegGenerator, can accept the offer?
3	*Conclude the negotiation*
	F: Yeah! We r done! FINALLY…

Condition 4: degree of decision support = medium; cultural diversity = heterogeneous.

(Role: buyer)

Part	Scripts
1	*Introduction*
	F: Halo, XXX here. Nice to c u guys and working together.
	Break the ice
	F: Harlow… so what we supposed to do huh? Give the seller an offer, izit?

	Point to some direction
	F: Me think we should die die get the best offer. Can or not huh?
	F: Can ask a price from sellers first?
2	*Initiate an offer*
	F: Actually, we can just tell them we want to buy at most 8000 turbochargers at price $224 lor. Also, we provide warranty as long as 4 year and deliver within 8 months. Me check the NegEvaluator, and this offer earns the highest utility score for us. How ah?
	F: Me predict the best choice using NegGenerator system just now. And suggests that should take the offer gives at most 8000 turbochargers at price $224, and provides warranty as long as 4 year and deliver within 8 months. How ah?
	Respond to an offer
	F: WAH LIAO… me think their offer cannot make it one leh. Me check NegEvaluator, and the utility score too low leh. We should not get any offer scored less than 44 mah, correct or not?
	F: Me check NegEvaluator, and think it a price which we can accept leh. But can still give a lower price to see whether can earn more or not?
	F: YAH LAO… Me check from NegEvaluator, and seems that price a bit higher than our expected. How ah?
	Suggest compromise
	F: Instructions say price and delivery very important wat. But we can actually give

	in a little bit in quantity and delivery lor.
	F: NegEvaluator tell price and delivery very important wat, right? Then can compromising a bit in quantity and delivery and ask higher price and short warranty period for change?
	F: Me think can try reduce the quantity to middle point 6500 n make delivery faster by one month. See how first lor.
	F: Me think the price now we offer too low for sellers to accept comparing to the best offer suggest by NegGenerator. How if we add a bit?
	Accept an offer
	F: Actually, their offer not that bad leh, dun think they'll give in any more. Me check the NegEvaluator, our utility score better than 44. Can accept the offer?
	F: Seems it the best offer can get and also buyers can accept by results from the NegGenerator, can accept the offer?
3	*Conclude the negotiation* F: Yeah! We r done! FINALLY…

Appendix 2: Confederates' Offer Sequence

	Buyer		Seller	
	Price	**Warranty**	**Quantity**	**Delivery**
Round 1	200	4 years	8000	8 months
Round 2	204	4 years	7500	8 months
Round 3	208	4 years	7000	8 months
Round 4	208	3 years	7000	7 months
Round 5	212	3 years	6500	7 months
Round 6	216	3 years	6000	7 months
Round 7	216	2 years	6000	6 months
Round 8	220	2 years	5500	6 months
Round 9	224	2 years	5000	6 months
Round 10	224	1 years	5000	5 months