Collaborators and Competitors Negotiating in Gains and Losses

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ABSTRACT

Collaborators and Competitors Negotiating in Gains and Losses

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The economy is driven by everyday negotiations between sellers and buyers. Electronic Negotiation Systems (ENSs) are embedded with features and methods that help users better manage their negotiation processes, and work with their counterparts in order to achieve superior outcomes. As ENSs inevitably mediate the information exchange, the representation of this information plays a crucial role in decision support. Still, there is a lack of empirical research on ENSs, especially on the impact of information framing on the process, as well as on the outcomes of interactions. Research in this area is further complicated when the interactions of users with dissimilar motivations are taken into account. This project aims at investigating *how framing by the ENS impacts the negotiation process and outcomes for different motivational orientations.* It proposes a research framework that examines the effects of ENS framing of outcomes (i.e., as gains or losses) and motivational orientation (i.e., competitive or collaborative) on the negotiation process and consequences at the dyadic and individual levels.

An experimental 2X2 factor design was used to test the underlying hypotheses, which: (1) examined the outcomes (i.e., higher joint outcome and contract balance) and the process (i.e., greater number of offers and cooperativeness) affected by different ENS frames for different motivational orientations; (2) contrasted the difference between the gain and loss frames for collaborative and

competitive dyads; and (3) detailed the impact of ENS framing and motivational orientation on individual perceptions (i.e., cognitive effort, discussion climate, outcome satisfaction and relationship). The experiments were conducted in two environments (laboratory with 276 and quasi-field with 490 participants) to increase external validity of the results. In general, the findings showed that: (1) collaborative dyads have higher joint outcome in the loss than gain frame, while the opposite was found for competitive ones (i.e., higher joint outcome in the gain rather than loss frame); (2) the impacts of ENS framing was stronger for collaborative dyads; (3) loss frame caused less disparities in terms of number of offers and joint outcome between the two orientations; and (4) negotiators did not perceive any differences of framing despite the dissimilarities in objective measures (e.g., joint outcome and number of offers).

Table of Contents

List of Figures

List of Tables

1 Introduction

Globalization trends and advancements in information communications have engendered greater dependency on technology to mediate human-to-human interaction, especially when transacting in virtual marketplaces. For example, from the consumer's perspective, eBay allows market participants to sell goods through an English auction, and it also provides a text communication medium for users who wish to engage in bilateral negotiations. Unwant'd encourages users to gain value by swapping goods with others via posted messages. From the organizational perspective, supply chain management systems incorporate negotiation and auction modules that allow suppliers and buyers to manage contracting (Eng 2004). Project management systems allow managers negotiate optimal solutions for internal resource allocation (Boehm and Ross 1989).

In any marketplace, mechanisms are employed to help distribute the resources. One such mechanism is negotiation; it requires two or more parties to reach an agreement by consensus. Electronic Negotiation Systems (ENSs) support the parties' discussions and other activities required for arriving at a settlement; they facilitate negotiations by guiding the decision-making process (Keersten and Lai 2007).

Research on negotiation has drawn on two rich traditions: one of a motivational and the other of a cognitive perspective (Carnevale and Pruitt 1992).

The *motivational perspective* describes negotiators as having different social motives that influence their behavior and negotiation outcomes (Dawes 1980). The motives are classified based on the value that an individual places on the interest and outcome for self and the collective (McClintock 1977). Two types of motivational orientations constitute the focus of this work: the *competitive orientation* describes those

who seek to maximize one's own gains regardless of the cost to the other parties, while the *collaborative orientation* defines those who strive to maximize one's own gains as well as those of the others. Individual differences (e.g., inherent disposition) and the context (e.g., business negotiation versus family conflict) have been shown to influence the motivational orientations adopted by negotiators (Bazerman, Curhan et al. 2000; De Dreu, Weingart et al. 2000). In online trading, for example, members of a partnership network, who are known to each other, see one another as collaborators and search for mutually beneficial solutions (Powell 1990). This is also true for organizations negotiating the allocation of resources. These organizations must take into account future dealings with their counterparts (Poole and DeSanctis 1990). In large markets of strangers, future relationships are of little concern as the emphasis is placed on the immediate transaction (Soh and Markus 2002). As a consequence, where the focus is on singular transactions, the participants often adopt a competitive orientation, centering only on their own gains.

Collaborative and competitive orientations provide an important basis for research because they show different social motives that underline trade. The pairing of these fundamentally different orientations creates dyadic compositions that lead to different behaviors and outcomes. Overall collaborative dyads demand less, concede more and have a higher rate of agreement; while competitive dyads are more contentious, and they can jostle each other towards a high quality settlement (De Dreu, Weingart et al. 2000).

The cognitive perspective examines how people make decisions. Decision theory points to deficiencies and judgment biases resulting from mental shortcuts taken by negotiators to manage information. Rooted in Kahneman and Tversky's (1979) prospect

theory, Neale and Bazerman (1985) have explained that the bias derived from the framing of potential outcomes in negotiations is based on the individual's conception of the outcome in terms of gains or losses, depending on some point of reference. For example, when selling a car that was bought for $10,000 three years ago, in the gain frame, one may evaluate a potential buyer's offer of $4,000 as a gain relative to $0. However, in the loss frame, one can also perceive the same offer as a loss of $6,000 relative to the car's original price. Research shows that negotiators with the gain frame are less resistant to concessions, make fewer demands and settle more easily compared to those with a loss frame (Carnevale and Pruitt 1992).

Until recently, these two perspectives of behavioral research have existed independently of each other. The integration of both perspectives, suggested by many researchers, can paint a richer picture to describe negotiation behaviors and outcomes (Carnevale and Pruitt 1992; Bazerman, Curhan et al. 2000; De Dreu and Carnevale 2003). Studies that examined social motives and outcome frames have reported mixed results. De Dreu, Carnevale et al. (1995) have argued that collaborative negotiators operating in the loss frame are more likely to reach higher joint outcomes than those negotiating in the gain frame. The reason is that the loss frame prevents negotiators from accepting any solution, and this resistance to concessions pushes them to agreements that can yield greater benefits for both sides. However, Olekalns (1994; 1997) has suggested that the cognitive barrier imposed by the loss frame is difficult to overcome, even for collaborative dyads. Negotiations in the loss frame fail more often than those conducted in the gain frame.

ENSs mediate the interaction between negotiators through structuring the process, displaying information, and providing support tools. Therefore, the system necessarily frames outcome information as it is displayed to the user. This begs the question as to what framing effect the system would have on the process and outcome of negotiation.

Beginning with a prescriptive view, ENSs were first built to improve economic and other outcomes, as well as bring satisfaction to the users (Jelassi and Foroughi 1989; Rangaswamy and Shell 1997). They were designed to help users surpass their limited computational abilities (Foroughi, Perkins et al. 1995). The use of these systems has been studied with contingency theories (Keersten and Lai 2007). For example, the task-technology fit model has been applied to explain that the increased performance from ENS usage is the result of a fit between the characteristics of the task and the features of the system. These studies suggested that: (1) decision support features enabled greater efficiency (i.e. joint gains) for integrative tasks as opposed to highly divergence tasks (Delaney, Foroughi et al. 1997); (2) rich communication features allowed for greater satisfaction with the outcome for conflict tasks (Suh 1999); and (3) increased software assistance (i.e., evaluation and suggestion of offers by the ENS) permitted negotiators to tackle cognitively complex tasks (Chen, Kersten et al. 2005).

As ENS researchers aim to provide users with better systems to negotiate, the concern is on how the conflict is framed through the system, and how this framing of information affects the interaction between negotiators and their counterparts. More specifically, this thesis addresses the following question:

How does the framing by the ENS impact the negotiation process and outcome for different motivational orientations?

The objective of this work is to explore and answer this question by integrating both motivational and cognitive theories, as well as relating them to the assessment of ENS at the dyadic and individual levels. Two experimental settings (laboratory and quasi-field) were used to: (1) examine the outcomes (i.e., joint outcome and contract balance) and the process variables (i.e., number of offers and cooperativeness), (2) contrast the difference between the gain and loss frames for collaborative and competitive orientations, and (3) detail the impact of ENS framing and motivational orientation on individual perceptions (i.e., cognitive effort, discussion climate, outcome satisfaction and relationship).

The rest of the thesis is divided into eight sections. The first three sections review the literature on motivational orientation, ENSs and outcome framing in negotiation, - the three areas which form the premise of the research question. Specifically, Section 2 examines and summaries research on the motivational orientations. It reviews empirical studies on the antecedents driving motivational orientation and the influence of collaborative and competitive orientation on the negotiation process and outcome. Section 3 describes ENSs, the various supports that such systems provide, along with the theories and approaches used to assess them. This section also points to the deficiencies in ENS research and the need to incorporate behavioral theories in studying negotiations. Section 4 discusses outcome framing in negotiation and the implication of ENS display on the framing of outcomes. It explores the concept of framing outcomes, not solely through the business or social problem (i.e., the case describing the decision dilemma), as it has been previously done by Bazerman, Magliozzi et al. (1985), but also through the information presented by the system over the entire process.

The next two sections describe the research framework and methodology employed to answer the question. In essence, Section 5 illustrates the research framework and hypotheses related to motivational orientation and ENS framing of outcomes. Section 6 details the methodology, which includes the operationalization of treatment and dependent variables, and the experimental design (i.e., the description of the participants, case, procedures and materials for the experiments, laboratory and quasi-field settings, and three pretests).

The last sections present the findings and answer the research question. Section 7 presents the results from the laboratory and quasi-field experiments. Section 8 discusses the findings in relation to the literature and ENS design. Section 9 illustrates the value of the findings for: (1) assisting ENS designers in developing systems that are better aligned to different orientations; (2) giving IS researchers a deeper understanding of the interplay between motivational orientation and framing as well as methodological consideration of combining laboratory and quasi-field settings; and (3) helping negotiators in obtaining greater mutual benefits.

2   Motivational Orientation

The interest in motivational orientation derives from the fundamental question of whether humans act on behalf of their own self-interest or pursue a more prosocial motive toward the well-being of the collective. The concerns for self and for the others have been addressed mostly in behavioral research in negotiations (De Dreu, Giebels et al. 1998). Early works have aimed at understanding why, under similar circumstances, some negotiators were friendly and accommodating, while others were contentious and unyielding. Their investigation into the argumentations and persuasions used in communication exchanges had led them to ascertain that behavior is influenced by the motivational orientation of the negotiators.

Motivational orientation is defined as the social motives that govern people's values for outcome distribution between self and another (McClintock 1977). The findings from this area of research have provided insight into different orientations and their likelihood of achieved certain economic and social outcomes. The *competitive orientation* (also known as individualistic) refers to individuals who have the sole goal of maximizing their own gains, whereas the *collaborative orientation* describes those who are interested in maximizing not only their own gains, but also those of their counterparts (Pruitt and Rubin 1986). Other orientations have also been studied and described, but competitive and collaborative orientations are the main focus of this work.

The focus of this section is on motivational orientation and its role in negotiators' behaviors. Section 2.1 describes the origins of research in motivational orientation, and the competing theories that explain the various orientations. Section 2.2 integrates key reviews on motivational orientations up to the 1990s and shows the antecedents,

moderators and outcomes of the collaborative and competitive orientations. Recent empirical studies are presented in Section 2.3. The experiments described in this section illustrate the influence of motivational orientation on the process along with the role of technology in moderating this influence. Section 2.4 presents an overview of the current perspective on of motivational orientation together with a discussion on research directions to advance understanding in this area. This section also projects the potential contributions of motivational research in describing functioning of firms in markets and networks.

2.1 Foundation of Social Motive Research

Negotiation as a mixed-motive interaction was first described by Schelling (1960), who showed that two or more parties need to be simultaneously governed by motives to cooperate and compete with each other. In essence, each party competes to obtain a larger distribution of resources, while all parties need to cooperate in order to arrive at an agreement. Nevertheless, economists and operation researchers have argued that in bargaining situations, individuals follow a competitive orientation that drives them to seek only benefits for themselves (von Neumann and Morgenstern 1947; Rapoport 1968). Negotiators will only behave collaboratively if it yields higher benefit for them in the long-run, implying that their true orientation is a competitive one.

To prove this point game theory experiments using the prisoner dilemma have been conducted. They showed that, at first, participants behaved competitively with their opponents. When the games were repeated, they moved to a more collaborative strategy, which generated more revenue. However, at the end they went back to a competitive orientation in hopes of benefiting from a collaborative opponent (see Axelrod 1997 for a

review on the prisoner dilemma game and strategies taken by participants). Economists claim that rationally bounded negotiators are inherently competitive, and therefore the negotiators are willing to cooperate as long as the results bring more value to them. Under such an assumption, negotiators have only one motive, which is to maximize self-gains, thus, collaboration is in fact part of competition.

Alternatively, psychologists study negotiations that are complex and from which participants are generally not driven by a single wish of utility maximization. They disagree with the use of a single, competitive motive to describe the complex interaction between participants. They view competitive and collaborative orientations as governed by very different social motives that serve to explain different behaviors and outcomes (Thompson 1990). They allude to cooperative choices that individuals make in social dilemma, e.g., their response to an offer made in the ultimatum game (cf. Dawes 1980). Furthermore, situational factors can sway people's motives, such as when subjects in a laboratory experiment are placed under different sanction systems (e.g., an ethical or business dilemma), which affect their motives to behave cooperatively or competitively (Tenbrunsel and Messick 1999).

Most importantly, negotiation experiments on motivational orientation have demonstrated that different social motives result in different behaviors and outcomes (De Dreu, Weingart et al. 2000). In these studies, participants were separated into competitive and collaborative orientations through instructional manipulation, reward structure or psychological assessment. Collaborative dyads, in general, obtained more agreements than either competitive or mixed dyads, even in repeated games. The difference in outcome is attributed to the openness of collaborative dyads to exchange information,

which can lead to solutions that benefit both sides - a behavior that competitive dyads had trouble adopting despite the predictions from game theory (De Dreu and Carnevale 2003).

Motivation orientations have provided a stable predictor of outcome, much more than the strategy-based models from game theory (Rhoades and Carnevale 1999). Essentially, negotiators may vary their plans and actions to attain their goals, but rarely vary the goals. The two main premises for motivational orientations are: the theory of cooperation and competition (Deutsch 1949) and the dual concern model (Pruitt and Rubin 1986), both of which examine negotiators' social motives as the substrate for behavior, but draw separate conclusions on outcomes (De Dreu, Weingart et al. 2000).

2.1.1 Theory of Cooperation and Competition

The theory of cooperation and competition has been first proposed by Deutsch (1949), who hypothesized that bargainers are driven into two general social motives, which are based on their preference of outcome for self and others. On one side of the spectrum, the *proself* (or egoistic) motivated negotiators are those who try to maximize their own outcome, and on the other side, the *prosocial* negotiators aim to maximize the group's outcome (McClintock 1977). Researchers later divided the two sides into motivational orientations relative to their goals regarding the other party. Figure 1 shows the breakdown:

- *Altruistic* negotiators are at the extreme end of the prosocial orientation. They are concerned with the group's outcome to the extent that they place greater emphasis on the preference of the other than on that of their own. Altruists are rarely found

in the conflict literature as they avoid representation of their interest and simply concede to the wishes of the other (Thompson 2007).

- *Cooperative* negotiators are also prosocially oriented. They care for the preference of the group, in the sense that, they seek to pursue a united group goal that encompasses benefits for all sides.

- *Competitive* bargainers, which are labeled as individualistic by McClintock (1977), have a proself orientation. They aim to pursue their own interest regardless of the group.

- *Extreme competitive* bargainers, which in the original model McClintock (1977) simply called competitive, are the extreme end of the proself orientation. In fact, they view negotiations as a distributive situation, where the gains of one party necessarily imply losses for the other. Extreme competitive negotiators not only try to maximize their own outcome, but also minimize the others' gains.
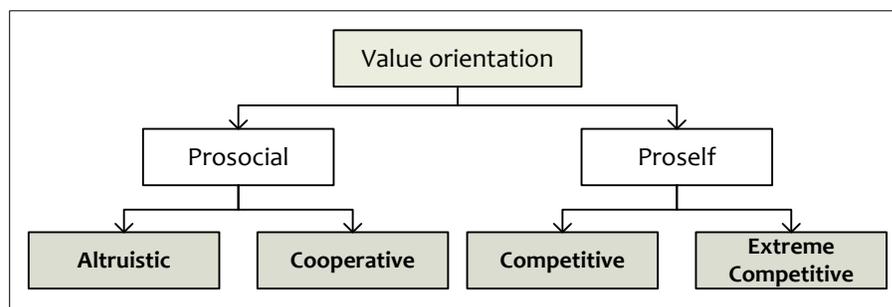
Figure 1 Value orientation based on McClintock (1977)

Studies relating personal traits to the four orientations showed that these orientations are in part derived from an individual's innate characteristics (Hermann and Kogan 1977) and the situation that the individual encounters (De Dreu and McCusker

1997). When prosocial and proself orientations were manipulated through the use of monetary incentives and/or instructions, the findings were mixed on which dyadic composition fairs best. In some cases, the results showed that prosocial groups (Weingart, Bennett et al. 1993) or dyads (De Dreu, Giebels et al. 1998) engaged in more problem-solving behaviors and obtained greater joint outcome than those in proself treatments. Other experiments fell short of finding any differences (Weingart, Hyder et al. 1996), while O'Connor and Carnevale (1997) have reported that proself motivated negotiators achieved higher joint gains than prosocial negotiators.

2.1.2 Dual Concern Model

The dual concern model was proposed by Pruitt and Rubin (1986) to reconcile the works by Deutsch (1949) and Blake and Mouton (1964) on conflict styles derived from different intensity of concerns for self and others. Contrary to the theory of cooperation and competition, the dual concern model does not view the two concerns as dichotomous social motives, but rather orthogonal dimensions (De Dreu, Weingart et al. 2000). In fact, different orientations are proposed based on the various degrees of concerns.

- *Competitive* negotiators are similar to individualistic negotiators described in the theory of cooperation and competition. They express high concerns for their interests and none for those of the others.

- *Collaborative* negotiators are similar to cooperators. However, the model emphasizes equal importance for maximizing preferences of self as well as of the other. Collaborators aim to achieve high outcomes for themselves, but in a manner that is beneficial to both parties. This orientation is only possible in multi-issue negotiations, because it requires a focus on problem-solving behaviors that

aim to satisfy all parties without yielding to anyone's preferences (Pruitt 1981). A single issue negotiation implies that gains made by one side results in losses for the other side.

- *Accommodating* bargainers resemble the altruistic orientation. They place greater value on the concerns of the other rather than that of selves. They may view the situation from a distributive perspective (i.e., a gain by one side necessarily means a loss for the other), where they must sacrifice their interests for the other.

- *Avoiding* negotiators are neither proself nor prosocial. They are uninterested, afraid or unwilling to pursue negotiations because they are not motivated to achieve gains for themselves or the other through negotiation.

- *Compromising* negotiators have limited concerns for both sides and wish to achieve an agreement quickly. Their distributive frame of reference implies that outcomes should be split equally to satisfy both parties.

Figure 2 depicts the dual concern model that describes these motivational orientations along the two axes of concern.
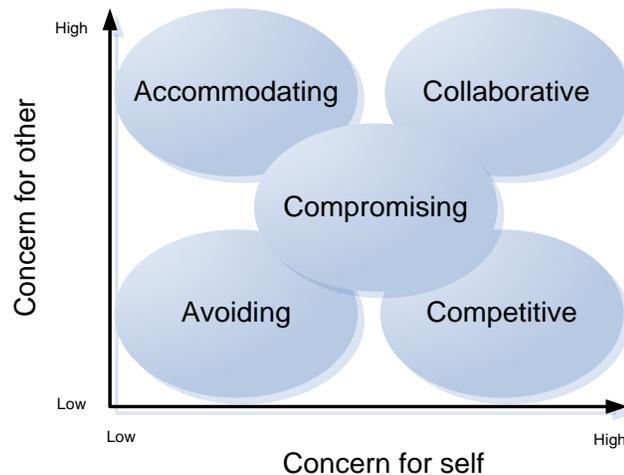
Figure 2 Dual concern model adapted from Kilmann and Thomas (1977)

13

The mixed findings vis-à-vis cooperators from previous works are explained by the model. When prosocially-oriented individuals exhibit low concern for selves (i.e., adopting an accommodating orientation), they yield easily to their opponents' preferences, and thus achieve lower joint outcomes. However, when prosocially-oriented individuals have high concern for selves (i.e., adopting a collaborative orientation) they are more resistant to concessions and engage in problem-solving behaviors, which can lead to higher joint gains.

Experimental manipulations of aspiration levels of subjects and social motives showed that, indeed, collaborative dyads produced higher joint gains than those who were competitive or accommodating (Carnevale and Lawler 1986). For example, when subjects were told that they must reach an explicit goal as well as continue a future relationship with their negotiating partners, they sought to understand the position and concerns of their counterparts. They also made concessions that enabled joint gains (Ben-Yoav and Pruitt 1984b).

Other studies suggested that, although orientations can be elicited by influencing the context of the negotiation, the extent to which individuals express concern for their own interest and that of the other varied greatly among individuals within a given orientation (Carnevale and Pruitt 1992). Psychometric studies on the dual concern model proposed that accommodating and avoiding orientations are closer to each other when compared to competitive vs. avoiding orientations. Factor analyses on self-reported assessment of the orientations showed that compromising is closer to collaborative than it is to avoiding, and avoiding is closer to collaborative than it is to competitive one (Rubin and Thomas 1976; Van de Vliert and Prien 1989). The above findings suggest that these

orientations are distinguishable, but not necessarily according to the intensity of concern theorized by the model.

Research on the predictability of motivational orientation, in terms of negotiation outcome and behavior, has generated much criticism (Thompson 1990). The areas of contentions are:

- The model neglects to consider the effect of the opponent's behavior on the characteristics exhibited by the various orientations (e.g., a collaborative individual may be able to search for better joint solutions with a collaborative partner than one who is avoiding, and in turn can produce a more favorable agreement).

- The axes of concern do not reflect other dimensions of the conflict, such as the individual's emotional state, degree of conflict or existing relationship between parties. For example, when bargainers are given a gift to put them in a good mood, they are more cooperative (Pruitt and Rubin 1986).

- The model assumes that behaviors associated with each orientation are static. It fails to explain how and why people change from one strategy to another during negotiation (Kilmann and Thomas 1977).

Although these are valid points, it is important to remember that the orientations are developed based on the motivations present in pre-negotiation, and they do not necessarily represent strategies implemented during negotiation. The effects of the counterpart and process occur after individuals have established their motives for the negotiation. As a consequence, motivational research hold the assumption that the negotiation is a goal-driven activity, which dictates behavior during the process and

affects the outcome (Brett, Shapiro et al. 1998). The motivational orientations describe expected behavior and possible outcomes associated with these behaviors, but the actual behavior is subject to other factors (e.g., the behavior of the opponent) that transpire in the negotiation. To address the shortcoming of motivational orientations, the findings from various reviews on motivational orientation are summarized to provide insights into the antecedents that influence social motives, and the moderators that impact different orientations during negotiation.

2.2 Review of Motivational Orientations up to the 1990s

Research in social motives has a long tradition in examining the effects of motivational orientation in decision-making. Deutsch (1958) started research in this area by using instructions to induce collaborative, competitive and extreme competitive orientations in order to observe how people negotiate. Over the years, there have been numerous laboratory experiments, surveys and field studies that examined the antecedents, moderators and outcomes associated with collaborative and competitive orientations. There have also been several meta-studies (i.e., Thompson 1990 covering more than 50 studies; Carnevale and Pruitt 1992; Bazerman, Curhan et al. 2000; De Dreu, Weingart et al. 2000), which presented a concise picture of relationships between variables that influence and interact with collaborative and competitive orientations. These meta-studies are discussed in this section.

2.2.1 Antecedents of Motivational Orientation

The most influential antecedents on social motives are the individual differences and the contextual dimensions that characterize a negotiation. In fact, individual differences and

contextual manipulations yield positive and significant effects on joint outcome, but no difference in effect size between the two antecedents, meaning that both antecedents are equally significant at inducing motivational orientation. Furthermore, other factors (such as task complexity) have failed to generate any difference between collaborative and competitive negotiators (De Dreu, Weingart et al. 2000).

The influence of **individual differences** has been argued to be the most relevant explanation for motivational orientation. It relates to the negotiators' predisposition towards one or several orientations, rather than their perception of the bargaining situation (Hermann and Kogan 1977). Kilmann and Thomas (1977) have claimed that people have various mixtures of the five orientations depicted in the dual concern model. The degree to which one orientation is favored is dependent on the negotiators' social values and their judgment of fairness and morality, which may stem from their culture (e.g., individualism fosters proself, whereas collectivism promotes prosocial orientation) and competitiveness (Thompson 1990; Bazerman, Curhan et al. 2000). Studies, which looked at the composition of the five orientations, showed that people often start with their predominant orientation, and they move to the next orientation if this first one proves unsuccessful. However, they are unable to adopt an orientation that is external to their inherent nature (Shell 2001).

Individual differences constitute one possible explanation for the orientation adopted by the negotiator; another one is the context (Carnevale and Probst 1998). For example, the same person may negotiate very differently when buying a car versus ensuring the safety of his or her child in a terrorist situation. The **contextual effects** are conceivably based on the individual's perception of threats and opportunities presented in

the conflict. Pinkley and Northcraft (1994) illustrated these as images being invoked, at some subconscious level, by particular schemata and scripts that represent reality. These guide individuals in their search for information, as well as the process and evaluation of this information. Consequently, the context can take multiple dimensions. But the important dimensions are those that relate to a goal, and bring about a direction or process for negotiators to formulate a plan towards achieving this goal.

The following key effects describing the negotiation context were proposed by Bazerman, Curhan et al. (2000):

(1) *Relational*: refers to the individual's focus on the ongoing relationship with the other party (Savage, Blair et al. 1989; Pinkley and Northcraft 1994; Bazerman, Curhan et al. 2000). Loewenstein, Thompson et al. (1989) demonstrated that the individuals' perceived relationship with the counterpart has a great impact on the adoption of a prosocial orientation. In laboratory experiments, Carnevale and Lawler (1986) manipulated the orientation through the context by giving subjects instructions to maximize the outcome of the counterpart, while Giebels, De Dreu et al. (2003) referred to the counterpart as the "partner" in the negotiation rather than the "opponent" to create strong social motives. Another contextual handling on this dimension involves leading subjects to expect future interactions with the counterpart (Ben-Yoav and Pruitt 1984b). Overall, an emphasis on the relational effect induces negotiators to be more concerned for the others.

(2) *Substantive*: describes the concern that the individual places on the economic aspects of the dispute (Savage, Blair et al. 1989; Pinkley and Northcraft 1994; Bazerman, Curhan et al. 2000). This represents the instrumental payoff of the

agreement. Thompson and Loewenstein (1992) reported that the more the parties focused on their substantive outcome, the more likely they were to assume a competitive orientation, and the more challenging it was for them to achieve an agreement. Emphasizing the substantive context, such as directing subjects to maximize their own gain may, therefore, increase proself motives. Other substantive type of contextual manipulations include explicitly setting high aspirations (Ben-Yoav and Pruitt 1984a) and applying constituency pressure for achieving large gains (Ben-Yoav and Pruitt 1984b). Any emphasis on the substantive effect promotes concern for self.

(3) *Divergent*: relates to the degree that individuals believe that the counterpart's interests are opposite to theirs (Thompson and Hastie 1990). A study of interpersonal conflict in IS development, determined that the stronger is the perception of disagreement (divergent interest), the greater is the assessment of interpersonal conflict, and the more difficult it is to consider the preference of the other party when searching for an agreement (Barki and Hartwick 2001). When subjects were told to view their counterpart as the "opponent", they developed a less prosocial orientation (Burnham, McCabe et al. 2000). Cognitive studies have shown that the more the negotiators enter a fixed-pie perception (i.e., your win is my loss) the more difficult it is for them to accurately assess the interests of the counterpart and find jointly beneficial solutions (Bazerman, Curhan et al. 2000). The importance placed on the divergent effect reduces concern for the other.

(4) *Emotional*: reflects the degree of concern that individuals have for the affective components of the negotiation problem. Here, the focus is on the feelings

involved in the dispute (Pinkley and Northcraft 1994; Barki and Hartwick 2001; Curhan, Elfenbein et al. 2005). The study of emotions is a growing area in negotiation research. Emotions and affect delineate feeling, moods and emotional state, which an individual experiences in response to the negotiation problem. In terms of conflict resolution, the more individuals focus on emotions the less they are able to concentrate on their own goals. In a study looking at the effect of emotional states, van Kleef, De Dreu et al. (2004) showed that negotiator who believed their opponents were angry with the dispute conceded more than those who did not receive any information on the emotional state of the opponent. This is due to the fact that participants used the emotion information to deduce the other's expectations and adjusted their demands accordingly.

When professional mediators in a family case used humor to lessen anger and overt hostility, disputants shifted their attention to each other's interests and applied problem solving behavior in the negotiation (Carnevale and Pruitt 1992). In general, emotional distress decreases concern for self as it removes focus on self-gain and places it onto the affective conflict with the counterpart (Curhan, Elfenbein et al. 2005).

Taken together, these contextual effects describe the antecedents that build the negotiator's orientation in pre-negotiation. They have been mapped onto the dual concern model to show their effect on the various concerns related to the different orientations (Gross and Guerrero 2000). Figure 3 summarizes the dimensions in respect to the dual concern model. The four contextual effects can drive individuals to adopt different orientations based on their assessment of the situation.

The substantive effect is indicative of negotiators who place importance on economic gains, such that an emphasis on this contextual effect leads to collaborative or competitive orientations. The relational effect is concerned with social ties, and an increase in this engenders accommodating and collaborative orientations. Negotiators who pay attention to the emotional effect are concentrated on the feelings involved, rather than the substantive outcome achieved (Pinkley and Northcraft 1994). The greater is the emotional toll of the negotiation, the more likely negotiators disengage from cognitive actions resulting in self-destructive choices (O'Connor and Carnevale 1997). The negotiators would choose to either forfeit their gains (i.e., adopt an accommodating orientation) or resist engaging in negotiations (i.e., adopt an avoiding orientation). As the divergence of interest is perceived to be high, negotiators tend to exhibit less concern for the other and follow a competitive or avoiding orientation (Bazerman, Curhan et al. 2000). Figure 3 shows that an increase along different contextual dimensions affects the concern for self and others, which in turn impacts different orientations.
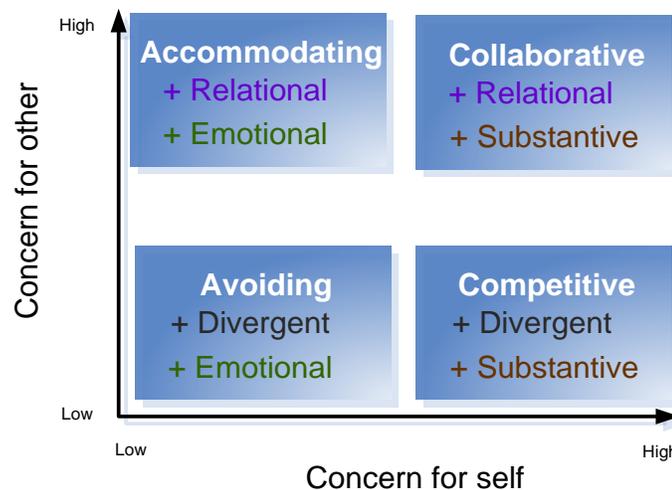
Figure 3 Mapping contextual effects to the dual concern model

The influence of the different contextual effects on orientations allows for greater understanding of discrepancies between one choice of orientation and another. This is especially the case for individuals who change orientations based on modification of the context among substantive, relational, divergent and emotional effects (Pinkley and Northcraft 1994; Bazerman, Curhan et al. 2000).

2.2.2 Dyadic Composition

Although negotiators can be classified into different orientations, the outcome is not necessarily implied solely by motivation. The dyadic composition has been found to promote or limit certain behaviors related to collaborative and competitive orientations. This explain why people often shift from one strategy to another despite their inherent orientation (Thompson 1990; Carnevale and Pruitt 1992; Bazerman, Curhan et al. 2000; De Dreu, Weingart et al. 2000).

The **dyadic composition** (or group composition in a few studies reviewed to by De Dreu, Weingart et al. 2000) describes the matching of collaboratively and competitively oriented individuals, and it allows for the interplay of different dynamics that contribute to diverse outcomes.

- For collaborative dyads, experimental results showed that rate of agreement was high, but the joint outcome was not necessarily so because negotiators tended to weaken their demand and conceded easily to a suboptimal solution for the sake of trying to please the other party. When prosocially inclined dyads resisted the urge to yield readily to the demands of the other by adopting high aspirations, they pushed each other towards better solutions.

- For competitive dyads, the challenge was to resist contentious behavior (i.e., a focus on mainly directing the other party to one's wishes) that ignites retaliation, which leads to deadlock in the experiments. Agreements with elevated joint outcomes were possible for competitive dyads, once negotiators were aware of the other party's interest and behaved more flexibly to maximize each other's needs. Rubin (1991) called this the *enlightened self-interest* based on postulations that competitive negotiators, who knew that the other party shared their orientation, realized that the best solution was to work together towards an efficient agreement.

- For mixed dyads, the expectation of researchers was that this would be the ideal situation for joint gains; whereby the collaborative individual would introduce elements of flexibility and cooperation, while the competitive counterpart would press the dyad to hold their interests firmly (Fisher and Ury 1981; Pruitt and Rubin 1986). However, the studies on mixed dyads have shown that mixed dyads produced poorer results than pure ones. The two main reasons are: (1) mixed composition prevented negotiators from sharing a similar mental image (i.e., cognitive mapping of important constructs that describe the negotiation situation) that would guide them towards an integrative solution (Bazerman, Curhan et al. 2000); (2) collaborative individuals tended to reciprocate contentious behavior initiated by the competitive counterpart, whereas competitive negotiators were less affected by the counterparts' cooperative behavior. The resistance exhibited by the competitive side was due to a perception of divergence of interest and reactive devaluation of the counterpart's proposal (Carnevale and Pruitt 1992).

2.2.3 Moderating Negotiations

The negotiation process is moderated by the rules of engagement dictated in the experimental design. These rules can be more favorable towards one orientation versus another. Three moderators have been found to greatly affect the different orientations: time pressure, handling of impasses and communication medium (De Dreu, Weingart et al. 2000).

As negotiations generally progress according to the two-phase model described by Walton and McKersie (1965), the first phase is spent on clarifying positions and demands, and the second is on finding integrative solutions that satisfy both parties. Reducing the time span disfavored competitive individuals who needed more time to enter the second phase. Time pressure affects problem-solving behavior that is mostly present in the second phase of negotiation, in which competitive negotiators enter later and thus lack time to find integrative solutions (Thompson 1990).

The handling of impasses has been reported to either encourage an agreement (i.e., no impasses allowed) or discourage one by implementing a walk-away value (e.g., a compromise "50-50 split" or the lowest agreement value from the sample). The first option favors competitive dyads as they are given more time to negotiate, whereas the second one reduces their gains as unresolved conflicts generally result in lower values (De Dreu, Weingart et al. 2000).

Collaborative individuals were found to be more affected by the communication medium. When negotiators were required to transmit offers through written messages, competitive dyads performed better than collaborative ones, however, this effect dissipated once negotiators communicated face-to-face. Collaborative dyads gained

advantage over competitive ones by openly revealing their interest to each other, but when the communication medium restricted direct communication this advantage was lost (Thompson and Hastie 1990).

2.2.4 Negotiation Outcome for Collaborators and Competitors

The negotiation outcomes have been assessed by economic measures such as joint outcome and number of agreements, while psychological measures reflected individual perceptions of the process and the counterpart.

Most studies on motivational orientation looked at joint outcome (i.e., the aggregation of gains by both sides) as the measure of performance (Carnevale and Pruitt 1992; Bazerman, Curhan et al. 2000; De Dreu, Weingart et al. 2000). More specifically, they found that collaborative dyads used less contentious behaviors and openly communicated their preferences with each other to reach more agreements, but not necessarily efficient ones.

Competitive dyads may have suffered from a "fixed-pie" bias leading to a vicious cycle of contentious behaviors that prevented constructive communication between the parties. In some occasions, against their bias, competitive dyads were able to move to an enlighten state of communication and worked together to reach jointly favorable solutions (Carnevale and Pruitt 1992).

Thompson (1990) has argued that, as important as it is to measure economic performance, individual perceptions are equally valid in determining the success of a negotiation and the possibility of future relationship between negotiators. She showed that perceptions do not necessarily reflect economic outcome achieved, instead they provide insight as to why the discrepancies exist between different orientations. Both

perception of the process (i.e., judgment of the fairness of the procedures, their expectations and perceived norms concerning appropriate behavior) and the counterpart (i.e., impression formed of the opponent in terms of trustworthiness and fairness) are deemed more favorably by collaborative negotiators. Collaborators viewed the bargaining situation as more productive and their counterparts as more friendly to work with, when compared to competitors. These findings coincide with the expectation that collaborative negotiators have a vested interest to help the opponent and maximize both parties' welfare by behaving more cooperatively, which eventually influences their perceptions (Bazerman, Curhan et al. 2000).

2.2.5 Integrating Reviews on Motivational Orientation

Figure 4 summarizes the results obtained from the literature review. It points to the antecedents of motivational orientation and the moderators that impact the relationship between orientation and outcome.
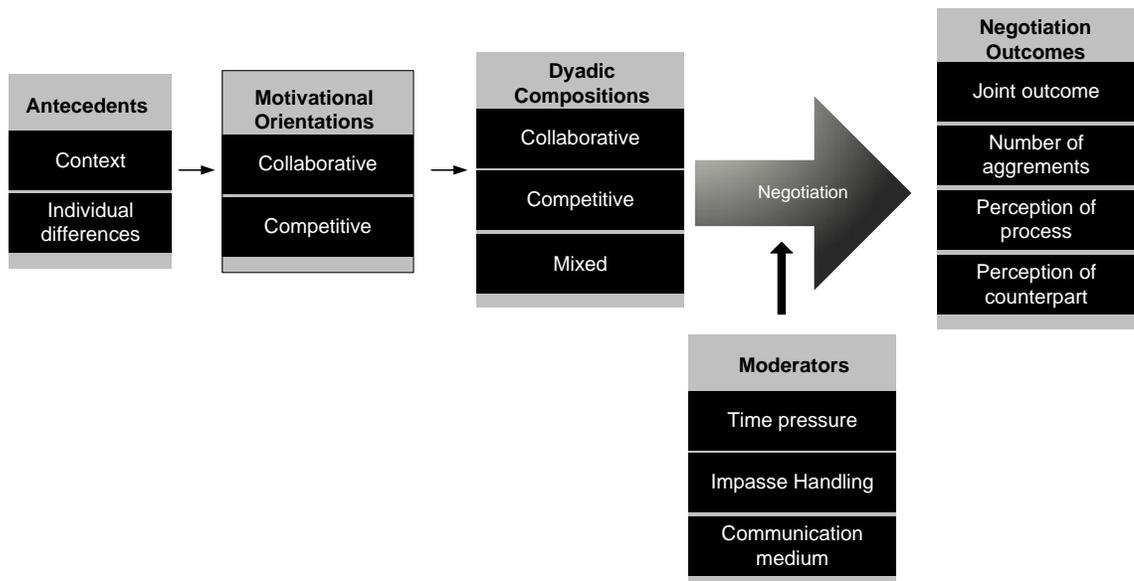
Figure 4 Antecedents, moderators and outcomes of motivational orientation

The key reviews on motivational studies up to the 1990s (Thompson 1990; Carnevale and Pruitt 1992; Bazerman, Curhan et al. 2000; De Dreu, Weingart et al. 2000) reveal that the antecedents leading to different orientations can come from individual differences or contextual effects. Based on collaborative and competitive orientations, three dyadic parings are possible: two of which are homogenous compositions of competitive and collaborative dyads, while the third one is a mix of a competitor with a collaborator. These dyad compositions play an important factor in the interaction between negotiators. The reviews showed that collaborative dyads were more agreeable, but they could settle easily with suboptimal solutions. Competitive dyads may not have reached as many agreements as collaborative ones, but their agreements tended to produce higher joint outcomes. Mixed dyads fared the worst, as collaborators and competitors were unable to influence each other with their strength for cooperation on one side and holding high aspiration on the other side.

The moderators of time pressure, impasse handling and communication medium were shown to affect the dyadic compositions differently (De Dreu, Weingart et al. 2000). An increase in time pressure favored collaborative dyads as they had an inherent objective for cooperation, while a restrictive communication medium reduced the collaborative dyads' abilities to openly reveal their preferences. Depending on the method used to handle impasses, the outcomes for each orientation varied greatly. The negotiated outcomes have mostly been based on objective measures such as the number of agreements and joint outcome of the dyad. Thompson (1990), however, espoused the view that individual perceptions (such as perception of the process and counterpart) may

be more important to establishing future relationships; hence they should also be assessed.

Despite the comprehensive analysis of works on orientation, the reviewers pointed to deficiencies in these studies, in terms of characterizing the process or the influence of technology. For example, it is unclear what types of interactions bring each orientation to favorable or unfavorable consequences.

2.3 Recent Studies on Motivational Orientations

The present review, based on experiments published in 1993 and later, examines the effects of different combinations of orientations (i.e., dyadic or group compositions) on the process and outcomes. The review details the activities in the negotiation process that allow different dyadic compositions to reach greater joint outcomes. It also highlights works that involve electronic negotiation. Eighteen empirical studies on motivational orientation, from 1993 on, show that different motivational compositions affect the process activities and sequences of these activities. Based on the different dyadic compositions, this section also presents the key characteristics of the process that lead to different individual and dyadic outcomes, as well as the moderators that influence the process.

2.3.1 Dyad Composition

Overall, three types of dyadic (or group) compositions are formed from different methods of inducing or selecting for collaborative and competitive orientations: homogenous collaborative and competitive dyads, and mixed dyads. These orientations were most often paired in homogenous dyads or group to draw conclusions on the impact of

motivation. For example, collaborative dyads were shown to arrive at more agreements, which were not necessarily better than those achieved by competitive dyads (Olekalns and Smith 2003a; Schei, Rognes et al. 2006). Other studies found that collaborative dyads performed better because they could introduce many issues in the discussion that would allow for integrative agreements (Weingart, Bennett et al. 1993; Schei and Rognes 2003; Beersma and De Dreu 2005)

Mixed compositions of competitive and collaborative individuals introduced additional conflict to the dynamics of the dyad (Olekalns and Smith 2003b; Schei and Rognes 2003; Olekalns and Smith 2005; Schei, Rognes et al. 2006). Mixed dyads generally performed worst because they lacked a common understanding of the bargaining situation. In addition, the contract balance (i.e., the difference between gains of one side compare to the other) was found to be low in mixed dyads because competitors took advantage of the openness of collaborative negotiators (Schei and Rognes 2003).

2.3.2 Negotiation Process

Earlier reviews have explained that collaborative dyads tended to yield to each other's interests leading them to suboptimal gains, whereas competitive dyads were inclined towards contentious behaviors that prevented them from reaching agreements (Thompson 1990; De Dreu, Weingart et al. 2000). The present literature review examines the process in more detail to highlight activities and sequences of activities that characterize the different dyad compositions. In most of the process analyses, the exchange between the parties was broken down into integrative or distributive activities.

Integrative activities describe actions that promote problem-solving and joint gains. These activities allow for the creation of value for both parties such as (1) *process management*, which seeks to strengthen the underlying relationship between parties by supporting the other's argument and introducing new issues; (2) *priority information*, which is directly divulging information on one's needs and interests; and (3) *multi-issue offer*, which consists of making offers on more than one issue at once to find mutual benefits.

Distributive activities direct negotiations towards solely self gains, i.e. claiming value for selves. Distributive activities are: (i) *contention*, which demands the other party to concede his/her needs; (ii) *positional information*, which serves to strengthen one's own position; and (iii) *proposal modification*, which consists of changing the other's offer and focusing the discussion on a single issue exchange (Olekalns and Smith 1999; 2003a; 2003b).

In a series of experiments, Olekalns and Smith (1999; 2003a; 2003b) examined the use of these activities in pure dyadic and mixed dyadic compositions. They found that pure dyads achieved higher joint gains due to their goal congruency, but required a combination of integrative and distributive activities as well as different sequences of activities to reach this effect. In collaborative dyads, negotiators who used priority information and process management obtained higher joint gains, than those who engaged in contention and proposal modification. In competitive dyads, negotiators used multi-issue offers to indirectly show their preference to the other party as well as positional information, but those who employed contention and proposal modification also obtained poor results. Mixed dyads focused on distributive activities, in particular on

positional information, and used few integrative activities, which caused them to obtain inferior results compared to those obtained by pure dyads.

The **activity-based sequence,** in Olekalns and Smith's (1999; 2003a; 2003b) experiments also differed between dyads. In collaborative dyads the parties trusted each other and reciprocated integrative activities to coordinate offers and obtained high gains, while the parties in competitive dyads had a tendency to behave contentiously and followed a non-reciprocal sequence that combined integrative and distributive activities. Therefore, collaborative negotiators were susceptible to mutuality and reciprocity what enabled them to trust and coordinate integrative activities. Conversely, competitive negotiators who deviated from reciprocity of contentious activities by breaking the distributive cycle with integrative cycle were able to reach favorable joint outcomes.

These finding were confirmed by Schei, Rognes et al. (2006), who examined the sequence in terms of three **phases**. They found that if competitive dyads were able to move to integrative activities in the final stage of negotiation, then they could obtain higher joint gains. While collaborative dyads did not necessarily achieve better economic results, they reported greater outcome satisfaction. Again, mixed dyads performed the worst because their behaviors were centered on distributive activities.

The inclination towards different types of negotiation activities by different orientations can be seen early on, even in pre-negotiation stage. De Dreu and Boles (1998) studied pre-negotiation and found that social values influence cognition in terms of selection and recall of distributive and integrative activities. In essence, collaboratively oriented individuals selected and recalled integrative activities more often than distributive ones, as opposed to competitively oriented individuals who leaned more

towards distributive activities. Interestingly, integrative activities were judged to be the most appropriate by both orientations as they acknowledged that negotiation requires cooperation to be successful. The difference in mindsets between collaborative and competitive individuals persisted even to post-negotiation tasks. Although collaborative groups performed better in negotiations by engaging in more integrative activities to reach a larger number of agreements, they failed to outperform competitive groups in divergent post-negotiation tasks (i.e., those that did not require joint decision-making), which indicates that the behaviors and attitudes adopted during negotiation endure into post-negotiation (Beersma and De Dreu 2005).

Even though mixed dyads were theorized by Lax and Sebenius (1986) and Thompson (1990) to produce the best outcome, seventeen out of the eighteen[1] studies showed that pure dyads achieved better outcomes (e.g., joint gains and satisfaction with outcome). Pure dyads had comparable cognitive representation of the negotiation that enabled them to better communicate with each other, and they even reported a greater perception of the counterpart and the process (Olekalns and Smith 2005). Moreover, in the experiments, collaborative dyads that engaged in competitive behaviors (i.e., contention and proposal modification) fare poorly, but those who made efforts to directly communicate their preferences (i.e., priority information) and to handle information sharing (i.e., process management) were rewarded with superior outcomes and reported better relationships with their counterparts. Competitive dyads succeeded when they engaged in a mix of distributive and integrative activities; that is, they first stated their positions (i.e., positional information) and then indirectly divulged their preferences (e.g.,

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[1] With the exception of the study by Olekalns, Smith et al. (1996) that had a very small sample seize and used repeated measures. The authors further acknowledged these factors to have affected the results.

through offer-making) (Olekalns and Smith 1999; Olekalns and Smith 2003a; Olekalns and Smith 2003b; Olekalns and Smith 2005).

2.3.3 Moderators of the Process

In the post1993 experiments, additional moderators of the process were introduced, including technology and characteristics of the task. Experimental designs that promoted distributive activities were more damaging on competitive dyads as they fostered contentious behavior (Weingart, Bennett et al. 1993). Although four out of the eighteen studies employed technology to mediate the negotiation process (De Dreu and Van Lange 1995, in the third experiment; Jain and Solomon 2000; Montoya-Weiss, Massey et al. 2001; Trötschel and Gollwitzer 2007), only two highlighted the effect of technology on negotiation, showing that the communication medium and system features affected motivational orientations (Jain and Solomon 2000; Montoya-Weiss, Massey et al. 2001).

In their meta-analysis, De Dreu, Weingart et al. (2000) found that difference of task (e.g., business or political scenarios) failed to induce any difference between collaborative and competitive negotiators as previously expected from Tenbrunsel and Messick (1999). As moderator to the negotiation process, cognitive biases derived from the outcome framing (Olekalns 1994; Olekalns 1997; Trötschel and Gollwitzer 2007) strongly interacted with different motivational orientations.

Studies with different experimental **protocols** suggested that collaborative dyads perform better with those that require increased efforts to resist yielding. On the other hand, rules which promote distributive activities were found most harmful to competitive dyads. When the experimental protocol was designed to test the effect of issue consideration (i.e., single issue vs. multi-issue offers), Weingart, Bennett et al. (1993)

reported that multi-issue offers produced better results than single issue offers for both collaborative and competitive dyads. However, collaborative dyads reciprocated concessions to overcome the lack of tradeoffs in single issue negotiations. In group negotiations of three similarly orientated members, the implementation of majority or unanimity decision rules impacted the group structures differently (Beersma and De Dreu 2002). Collaborative groups achieved better results in terms of joint gains and perception of process with unanimity rule, a protocol that forced them to work together; whereas competitive groups needed a protocol that would mitigate their difference of opinion and impose a decision, such as the majority rule.

In a series of experiments, De Dreu, Beersma et al. (2006) induced epistemic motivation, which is the desire to develop and hold accurate and well-informed conclusions about the world, by requiring subjects to put greater efforts into negotiations. They found that epistemic motivation increased joint outcome (i.e., gains and efficiency), perceptions of the process and the counterpart for collaborative dyads only, but had no effect on competitive dyads. In fact, this supports past finding that collaborative dyads need to resist yielding and search of joint improvements (Ben-Yoav and Pruitt 1984b).

The studies that employed **technology** to mediate negotiation also showed that different motivational orientations reacted differently to the technology. When appropriation support (i.e., that helped mixed groups to negotiate and develop a business strategy) was added to a groupware, the system increased decision quality for less motivated orientations, such as avoiding and compromising (Montoya-Weiss, Massey et al. 2001). In an experiment to study the influence of the communication medium, Jain and Solomon (2000) suggested that collaborative dyads are most affected by a reduction

of media richness. Collaborative dyads had more trouble communicating their preference through electronic messaging, and thus they reported a poorer perception of the process with electronic messaging compared to face-to-face and with competitive dyads. The authors suggested that motivational orientation is not only influenced by the communication medium, but also by the decision support provided by the ENS. As of yet, little is known about the moderation effects of decision support on different motivational orientations.

In an experiment using a software agent as a counterpart that was neither collaborative nor competitive, De Dreu and Van Lange (1995) found that collaborators were more responsive to the counterpart and had a better perception of the opponent. Competitors, in contrast, only made concessions when initiated and met by the other side. The results supported the expectation that prosocial-oriented individuals reciprocate the counterpart's level of demand and concession.

In an effort to merge various research streams from the cognitive perspective, different **outcome frames** (i.e., in terms of losses and gains) have been studied along with collaborative and competitive orientations. De Dreu, Van Lange et al. (1995) cited an unpublished study by Carnvale, De Dreu et al. (1994) that reported collaborative dyads achieving better joint outcomes with a loss frame than a gain frame. However, Olekalns (1994; 1997) observed contradicting results. She saw that collaborative and competitive dyads had difficulties overcoming the cognitive barriers of a loss frame. She indicated that when collaborative dyads were placed in a loss frame the task required more cognitive effort, because the loss frame promoted selfish actions, which conflicted with prosocial motives. In contrast, Trötschel and Gollwitzer (2007) showed that

prosocial goal intentions (i.e., specifying the desire for participants to reach a prosocial outcome) reduced the negative effect of a loss frame and produced higher joint gains. Furthermore, when implementation intentions (i.e., specifying a plan to obtaining the desired goal) were added to goal intentions in the protocol, negotiators surpassed the barrier of a loss frame and achieved results similar to those in a gain frame. The researchers found that implementation intention moderates the middle and later phase of negotiation by engendering integrative activities.

2.3.4 Review of Studies on Motivational Orientation

The review of literature on experiments shows similar results with those described in Section 2.2. However, studies, which examined the negotiation process, provided greater descriptive analysis of the activities and sequence of activities. These allowed collaborative and competitive dyads to obtain high joint gains and equity. Outcome frame and technology were demonstrated to be important moderators on the negotiation process. Figure 5 shows the different dyadic compositions and diverse negotiation activities that define the negotiation process.

Negotiation process

Dyadic Compositions	Integrative Activities	Distributive Activities	Negotiation Outcomes
Collaborative	Process management	Contention	Joint outcome
Competitive	Priority infomration	Positioning information	Number of agreement
Mixed	Multi-issue offer	Proposal modification	Perception of process
			Perception of counterpart

Sequence
Phases
Activity-based

Moderators
Protocol
Technology
Outcome frame

Figure 5 Reviews of process, moderators and outcomes of dyadic structure

Collaborative dyads were found to engage in reciprocally integrative activities that enabled them to obtain greater joint gains, compared with those who followed a non-reciprocal sequence of mixed activities. As competitive dyads tended to start with distributive activities, they needed to break the cycle of contention by engaging in integrative activities towards the end of negotiations to achieve the same results as high performing collaborators (Olekalns and Smith 1999; Olekalns and Smith 2003b).

The moderating effect of technology was examined mostly by comparing face-to-face communication with electronic text communication. In those experiments, collaborative dyads had more difficulty revealing their preference through electronic messaging than in person. They reported an inferior perception of the counterpart and process with electronic negotiation (Jain and Solomon 2000). Similarly to Section 2.2, the negotiation protocol was found to moderate the process. Experiments looking at

outcome frames illustrated the potential of framing to differently affect collaborative and competitive dyads. Competitive dyads appeared to benefit from a gain frame, while collaborative dyads seemed to perform better in a loss frame (Carnevale, De Dreu et al. 1994).

Although the experiments provided a better understanding of the process for collaborators and competitors, none of the studies reported the effect of decision support by an ENS on enhancing or inhibiting negotiation activities. Furthermore, the studies that relate outcome framing to motivational orientation had a small sample size and showed mixed results (Olekalns 1994; 1997). The use of outcome framing to help collaborative and competitive dyads reach better results is still unclear.

The empirical studies examined are summarized in Table 1.

Table 1 Studies of motivational orientation[2]

Authors	Motivation orientation	Moderators and case	Process and outcome	Comments
Weingart et al. (1993)	**Group composition**: either competitor or collaborators	- **Issue consideration**: sequential vs. simultaneous issue consideration - *Case: four party 5 issue negotiation*	- *Joint outcome* (best for collaborators and simultaneous issue consideration) - *Process:* (1) collaborators were more trusting and less argumentative (2) simultaneous issue consideration allow for more exchange of information and greater insight into the preference of the other parties (3) logrolling was done mostly with two issues at a time.	- Study the impact of motivational orientation and issue consideration - Motivational orientation affect coordination of behavior: collaborators match the other party and competitors remain the same - Collaborators can reciprocate concessions to overcome sequential limitations - Structure of the decision process can improve decision making

Olekalns (1994)	**Dyad composition**: pairing of negotiators with same or different motivational orientations: competitor and cooperator	- **Outcome frame** (negotiator's conceptualization of potential outcomes in either gain or losses)
		  o Manipulated using different profit schedules (profit or cost)
		- **Pay-off structure** (the allowance of the negotiation problem for trade-offs, possible by variable-sum and not possible by fixed-sum)
		  o Manipulated using different pairing of profit schedules
		- *Case: negotiate broker profit schedule with 4 issues*
			- *Individual and joint outcome* :
			  o No real difference when partner is of the same frame (gain with gain or loss with loss), but with different framed partners gain frame is advantaged
			  o Cooperator got better results in gain frame than in loss, but competitors were less affected by outcome frame
			  o These differences are only seen in variable-sum pay-off as fixed-sum does not allow for trade-off that provide integrative solutions
				- Test the effects of situational cues such as motivational orientation, pairing of opponent and pay-off schedule on outcome frames
				- Results show that variable-sum pay-off is best for reaching integrative agreements, gain frame negotiators do better than loss frame especially when paired with loss frame opponent, cooperative orientation are able to reap the benefits of gain frame and variable-sum
				- No difference in performance between gain or loss frame for competitors
				- Congruency among: gain frame, cooperative pairing and variable-sum vs. loss frame competitive paring and fixed-sum

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[2] In this table, the various orientations are described based on the following definition: *collaborative* (or cooperative) is to maximize ones and other's welfare, *competitive* (or individualistic) is only to maximize one's welfare and *extreme competitive* is to minimize the gain of the other while maximizing one's gains.

Authors	Motivation orientation	Moderators and case	Process and outcome	Comments

De Dreu and Van Lange (1995)	**Dyad composition**: pairing of negotiators with same or different motivational orientations: competitors, extreme-competitor and cooperator	- **Computer counterpart** acted as buyer (made the first offer in the mid-range)
		- *Case: buy-sell negotiation with a computer for 3 issues*
			- *Number of agreements*: no agreements reached after 7 rounds
			- *Process*
			  o *Level of demand*: same for all at the first 2 rounds, but collaborators decreased demand more rapidly as negotiation progressed
			  o *Level of concession*: collaborators started with higher levels of concession and leveled off, while the competitors made consistent lower levels of concession
			- *Perceived opponent to be more fair and considerate*: collaborators had better perception than competitors
				- Computer mediated negotiation with a agent partner that was neither cooperative nor competitive to observe the effect of social value orientation on process and perception of opponent
				- Social value orientation affects cognition, motivation and behavior
				- Collaborators were more responsive to the opponent that the others
				- Competitors differ from extreme-competitors by making more cooperative offers if it is met by the opponent
				- All three types engage in logrolling

Olekalns et al. (1996)	**Dyad composition**: pairing of negotiators with same or different motivational orientations: competitors and collaborators	- *Case: buy-sell negotiation case with 5 issues*	- Confounding effects from role and order of negotiation
			- *Joint outcome*:
			  o Competitors had a constant contentious behavior and obtain the worst outcome
			  o Individualists with collaborators got the best results (mixed dyad)
			  o Collaborators with collaborators were second
				- Look at the effect of dyad structure on outcome, and the negotiators' ability to maximize outcome is dependent on the congruence of their goals with that of their partner
				- Dyad structure plays and important role on behavior and outcome.
				- Collaborators will adapt their behavior to their partners
				- Individualist can adapt to partner but less than collaborators
				- Competitors don't adapt their behavior
				- Small sample size (36 students negotiated with all three orientations) and effects of confounding variables could have affect the conclusions

Authors	Motivation orientation	Moderators and case	Process and outcome	Comments

Olekalns (1997)	**Dyad composition**: pairing of negotiators with same or different motivational orientations: competitors and collaborators	- **Outcome frame** (negotiator's conceptualization of potential outcomes in either gain or losses)
		  o Manipulated using different profit schedules (profit or cost)
		- **Pay-off structure** (the allowance of the negotiation problem for trade-offs, possible by variable-sum and not possible by fixed-sum)
		  o Manipulated using different pairing of profit schedules
		- **Settlement rule** (alteration to market dynamics by having either no settlement vs. BATNA)
		  o Manipulated using negotiation protocol
		- *Case: negotiate broker profit schedule with 4 issues*
			1. Study
			- *Outcomes* were sign. lower for loss frame negotiators especially if their partner shared this frame, but when off-set by a gain frame partner or one that was cooperative, they were able to increase profits.
			- *Concession rate* was most sign. by cooperative, gain frame partners.
			2. Study
			- *Outcomes* were worst for individualistic, loss frame negotiators with a loss frame or individualistic partner.
			- *Concession rate* was affected by settlement rule. No settlement pushed collaborators to make smaller concessions
				- Examine the effects of situational cues over cognitive factors
				- Same loss frame presented a challenge for the dyad, but is helped with cooperative motives
				- Mixed frame dyads allow loss frame negotiator to reap benefit from gain frame negotiator or via a cooperative partner
				- A cooperative gain frame provided with similar partner obtained high outcomes when no settlement was given upon impasse
				- When in variable-sum conditions the results are very mixed due to the cognitive effort required by the ill-structured problem. Additional ambiguity (cooperative and gain-frame) create more confusion
				- Concession rate was not differentiated between logrolling or unilateral concession

Authors	Motivation orientation	Moderators and case	Process and outcome	Comments

De Dreu and Boles (1998)	**Dyad composition**: pairing of negotiators with different motivational orientations: competitors, collaborators and collaborators		- 1. Study: Selection of cooperative, neutral or competitive strategies in pre-negotiation
			- 2. Study: Selection, recall, and rate competitive and cooperative strategies in pre-negotiation
			- *Process*:
			  o *Cooperative strategies* (most often selected by collaborators)
			  o *Competitive strategies* (most often selected by individualist and competitors)
			  o *Cooperative strategies* was judge most appropriate by all three (case and social setting)
				- Study the effects of motivation on cognition in pre-negotiation
				- Motivation and cognition work together to direct behavior
				- Social value influence cognition (selection, recall and judgment of appropriate strategies)

Jain and Solomon (1999)	**Dyad composition**: pairing of negotiators with same orientations: Used only clearly distinguishable competitors and collaborators	- **Communication channel**: Face-to-face (f2f) vs. electronic meeting system (EMS) - *Case: two plant manager negotiating 4 issues*	- *Effectiveness of communication* (f2f was sign. better than EMS; competitors were sign. better than collaborators) - *Satisfaction with outcome* no effect - *Perception of group process* (f2f was sign. better than EMS; weak indication that collaborators benefit more from f2f than EMS)	- 2X2 design: conflict style (collaborating or competing), communication medium (f2f or EMS) - Looked only at perceptions (no mention of economic performance) - Authors concluded that the DSS is what brings benefits to NSS, the limited communication channel (EMS) adds little value (group memory or anonymity)

Authors	Motivation orientation	Moderators and case	Process and outcome	Comments

Olekalns and Smith (1999)	**Dyad composition**: pairing of negotiators with same or different motivational orientations: competitors and collaborators	- *Case: employment contract with 8 issues*	- *Types of strategies*:
			  o Collaborators use mostly relationship-focus strategies related to the process such as restructuring (asking the opponent for more information and trying to expand the parameters of exchange)
			  o Competitors use a mix between relationship and task focus (priority information and concession)
			  o Mixed dyads use mostly a task-focused strategy, positional information that is more related to distributive bargaining
			- *Joint outcome:* pure dyads achieved better outcomes
			- The sequence of activities were also different between dyads
				- Markov chain analysis was used to determine the frequency and sequence of negotiation strategies with different dyad structures
				- Dyad structure affects how people respond to strategies
				- Small sample size of 45 dyads and only 39 reached agreements.
				- Distinction between different activities is not clear.
				- Negotiators' ability to maximize outcome is dependent on the congruence of their goals with that of their partner

Montoya-Weiss et al. (2001)	**Group composition**: all groups consist of mixed orientations based on inherent conflict styles (adapted Rahim 1983 instrument)	- **Appropriation support** (temporal coordination mechanism) - *Case: develop a business strategy (required decision consensus on plan) with five diverse members*	- *Decision quality* (only competing and collaborating individuals had a positive effect on performance)	- Examine the interaction between appropriation support and various conflict style in a mixed structure - Appropriation support only helped avoiding and compromising styles - Competing and collaborating styles showed a positive effect on performance without the need of appropriation support - Accommodating style has a negative effect, but appropriation support did not moderate this - No description of the mix of styles in the group or their interactions

Authors	Motivation orientation	Moderators and case	Process and outcome	Comments
Beersma and De Dreu (2002)	**Group composition**: pairing of negotiators with same orientation: competitors and collaborators	- **Task structure** (symmetric…no majority interest vs. asymmetric…compatible interest for majority) - **Decision rule** (unanimity vs. majority) - *Case: negotiate market of three merchants discussing 3 issues*	- *Process:* Integrative behavior (more for symmetric task structure, majority rule and cooperative groups) - *Joint outcome* (more for symmetric task structure, cooperative groups) - *Group climate* (more for symmetric task, majority rule and cooperative groups)	- 2X2X2 design: social motives (cooperative or competitive), task structure (symmetric or asymmetric), decision rule (majority or unanimity) - Contingency among social motives, task structure and decision rule - Competitive + asymmetric task structure + unanimity rule leads to distributive behavior, lower joint outcome and negative group climate - Competitors do better with majority rule, while collaborators with unanimity rule - No effect between decision rule and task structure

Olekalns and Smith (2003a)	**Dyad composition**: pairing of negotiators with same or different motivational orientations: competitors and collaborators	- *Case: 5 issue negotiation with same type of distribution for both cases*	- *Number of agreements* all 34 dyads reached an agreement for collaborators and only 27 dyads reached an agreement for individualists
			 - *Type of strategies*
			    o Competitors who used multi-issue offers, positional arguments got better *joint outcomes*, then when they engaged in substantiation, demand and proposal modification
			    o Collaborators used priority information and process management got higher joint gains, while those who engage in substantiation and proposal modification got low gains.
				- Markov chain analysis was used to determine the frequency and sequence of negotiation strategies with different dyad structures
				 - Dyad structure in terms of motivational orientation affect strategic choices and sequences of action that result in different levels of joint gains
				 - Individualist use multi-issue offers to indirectly exchange information about their priorities for issues, whereas collaborators use direct communication of preferences
				 - Collaborators also need to work at process management that allows them to see greater possibilities for join improvement
				 - Reciprocity is important for collaborators and not form individualists

Authors	Motivation orientation	Moderators and case	Process and outcome	Comments

Olekalns and Smith (2003b)	**Dyad composition**: pairing of negotiators with same orientations: competitors and collaborators	- *Case: either a union or a two country negotiation*	- *Joint outcome*: no significant difference between dyads
			- *Type of strategy*:
			  o Distributive strategies (contention and proposal modification were all associated with low gains in all dyads)
			  o Cooperative negotiators used process management (moving to new issues and expanding the process) and priority information (tell the other their preference for issues) to improve gains in pure and mixed dyads
			  o Competitive dyads that achieve high joint gains were difficult to predict
			- *Strategy sequence*
			  o Reciprocity was important in cooperative dyads but not in competitive dyads
				- Markov chain analysis was used to determine the frequency and sequence of negotiation strategies with different dyad structure
				- Social motives assume that negotiations are goal-driven activities, such that different dyad structures require different strategies to achieve high joint outcome.
				- Cooperative negotiators are susceptible to mutuality and thus reciprocity enables them to trust and coordinate integrative strategies
				- Competitive negotiators need to deviate from reciprocating contentious strategies, so they need non-reciprocating sequences of strategies

Schei and Rognes (2003)	**Dyad composition**: pairing of negotiators with same or different motivational orientations: competitors (i.e., individualist) and collaborators	- **Knowledge of opponent**
		  o Pure dyads CC and II
		  o Mixed dyads CI (only cooperator knows individualist's orientation) and IC (vice versa)
		- *Case: buy-sell case with 3 issues*
			- *Joint outcome* (CC= CI> IC=II)
			- *Integrative activities* (CC and CI increase their integrative activities in phase III, everyone started at about the same level of integrative activities)
			- *Individual outcome* (Individualist in IC got the most from knowing about the opponent)
				- Examine the effect of dyad structure and knowledge of opponent on process and outcome
				- CC and CI were able to increase integrative activities in the last phase to increase joint outcome.
				- Individualists can exploit collaborators when they know about their orientation.

Authors	Motivation orientation	Moderators and case	Process and outcome	Comments
Beersma and De Dreu (2005)	**Group composition**: pairing of negotiators with same orientation: competitors and collaborators	- **Task** (negotiation or no negotiation) - **Task type** (divergent vs. convergent) - *Case: negotiate market of three merchants discussing 3 issues*	- Prosocial groups engage in more *integrative behavior*, more *number of agreements*, and *higher joint outcome*; than proself group - Prosocial groups perform better on convergent post-negotiation task, but not on divergent post-negotiation tasks.	- 2X2X2 design: social motives (prosocial or proself), negotiation (yes or no), task type (divergent or convergent) - Propose a contingency framework between social motives and task characteristics (convergent vs. divergent) - Behaviors and attitudes adopted during negotiation persist to post-negotiation activities.
Olekalns and Smith (2005)	**Dyad composition**: pairing of negotiators with same or different motivational orientations: competitors and collaborators	- *Case: two merchant negotiation with 4 issues*	- *Perceived fairness*: higher for pure dyads - *Relationship*: higher for pure dyads - *Flexibility*: adapt to the other's needs is important for individualist dyads and mixed, but is counterproductive for cooperative dyads	- Mental maps were used to understand negotiators cognitive representation of the negotiations - Negotiators that share the same motivational orientation report a more positive negotiation experience - Dyad structure affects their cognition (mental maps) and their negotiation experience
De Dreu et al. (2006)	1. & 2. Study - Collaborators (instructions- "think of the other as your partner") - Competitors (instructions- "think of the other as your opponent") 3. Study - **Dyad composition**: pairing of negotiators with same orientation - Collaborators and competitors (induced using a list of cooperative tactics)	- **Epistemic motivation** (desire to develop and hold accurate and well-informed conclusions about the world) o Manipulated using process accountability (PA) by suggesting a post-negotiation interview with an experienced negotiator and psychologist on negotiation behavior and asking the subject to take notes during the process	1. Study - *Competitive strategies* were recalled by competitors (PA) - *Cooperative strategies* were recalled by collaborators (PA) 2. Study - *Joint outcome* PA only influenced cooperators - *Perceived cooperative-trust* PA only influenced cooperative negotiators 3. Study - *Perceived cooperative-trust* PA only influenced collaborators - *Problem-solving behavior* PA only influenced collaborators - *Joint outcome* PA only influenced collaborators	- Study the interaction of motivational orientation and epistemic motivation on cognition, perception, process and outcome - Epistemic motivation and social motivation impact cognitive heuristics (recall of strategies) - Epistemic motivation moderates the effect of social motivation on joint outcome for only cooperative negotiators - Epistemic motivation influences cooperative negotiators by increasing cooperative-trust, problem-solving, joint outcome - Structure model show that perceived cooperative-trust leads to problem-solving, joint outcome

Authors	Motivation orientation	Moderators and case	Process and outcome	Comments
Schei et al. (2006)	**Group composition** (different mixtures of orientation based on dominant, majority, minority and not present): competitors and collaborators	- *Case: negotiate business partnership with three members over 5 issues*	- *Group outcome* (joint outcome and Pareto efficiency greatest for pure individualist groups) - *Satisfaction with outcome* (greatest for pure collaborators) - *Process activities* (pure individualist groups moved from distributive to integrative activities at the end of negotiation, pure cooperative groups were never very integrative or distributive)	- Examine the effect of group structure on process and outcome - Individualist groups can reach high joint outcomes when they start out in distributive phase and move to integrative ones (enlighten individualists) - Cooperative group did worst because little effort was made towards integrative activities - Need to hinder parties from making inferior compromises - Mixed groups did worst by mainly using distributive activities
Trötschel and Gollwitzer (2007)	**Dyad composition**: pairing of prosocial and proself	- **Outcome frame** (negotiator's conceptualization of potential outcomes in either gain or losses) o Manipulated using endowment of regions on an island. *Gain frame* starts off with no regions and *loss frame* starts off with possession of all regions. - **Goal intention** (specify a desired end point, which can be a behavior or outcome) Manipulated using instructions: "I want to find a fair solution!"	1. Study - *Joint outcomes* were sign. different between gain and loss frame negotiators, whereby loss frame were more resistant to concessions and obtained higher profits - *Equity* (contract balance) was increased as from control to goal intention and most sign. to implementation intention - implementation intention negotiators to achieve high outcomes, but gain frame negotiators simply claimed regions that were best for them through distribution	- Examine if cooperative strategies (goal and implementation intentions) facilitate the attainment of cooperative goals when negotiators are biased by a loss frame and competitive motives. - 1. Study shows that prosocial implementation intentions reduce the inequality of mixed frame negotiations with same preferences. - 2. Study shows that prosocial implementation intention mitigates the effect of loss frame and produces results similar to gain frame by logrolling strategy.

Authors	Motivation orientation	Moderators and case	Process and outcome	Comments
Trötschel and Gollwitzer (2007) continue		- **implementation intention** (specify a when, where and how of acting on one's goal intention) o Manipulated using instructions from goal intention plus: "And If I receive a proposal on how to share the island, then I will make a fair counterproposal!" - *Case: two neighboring countries negotiate the division of 25 different regions on an island (1. Study both sides share same preferences, 2. Study have different preferences)* - *Case: two heirs negotiate the distribution of stocks bequeathed from a distant relative (3. Study have different preferences)*	2. Study - *Joint outcomes* were best for gain frame (proself) and worst for loss frame (proself). The prosocial goal intention increased joint outcomes in a loss frame, but the barrier of a loss frame was most sign. reduced by prosocial implementation intention (they achieved results similar to gain frame negotiators). *Logrolling strategy* was mostly used by prosocial 3. Study - *Joint outcomes* were sign. different in loss frame from control to prosocial goal intention and mostly to prosocial implementation intention. There is no difference among the three treatments in a gain frame - *Logrolling strategy* was mostly used by prosocial implementation intention negotiators towards the middle and end of negotiations. At the start, participants only behave according to the outcome frame	- 3. Study shows that prosocial implementation intention is only beneficial in loss frame situations and logrolling occurs only towards the middle and end of negotiations. - The authors hypothesize that prosocial implementation intention guides behavior and reduces cognitive resources that can be focused on discovering integrative solutions. The authors did not compare results to explicit prosocial manipulations to see if beyond asking for a fair solution, participants needed to maximize the welfare for themselves and the opponent.

2.4 Summary of Motivational Orientations

Based on the theory of cooperation and competition (Deutsch 1949), the dual concern model (Pruitt and Rubin 1986) depicts various motivational orientations based on the extent to which negotiators care about their own or the counterpart's interests. However, this review of motivational studies suggests that negotiators typically hold either collaborative motives aimed to create value for both parties, or competitive motives focused on claiming value for oneself (De Dreu, Weingart et al. 2000). Experiments on motivational orientations demonstrated that:

(1) Contextual effects and individual differences are antecedents to competitive and collaborative orientations.

(2) The various dyadic compositions derived from the pairing of orientations provide an indication of possible activities undertaken by the negotiators (Olekalns and Smith 1999; Olekalns and Smith 2003; Olekalns and Smith 2003). However, the protocol (Weingart, Bennett et al. 1993), technology (Jain and Solomon 2000; Montoya-Weiss, Massey et al. 2001), and outcome frames play a pivotal role in promoting continuation of or shift in activities (Olekalns 1994; Olekalns 1997; Trötschel and Gollwitzer 2007).

(3) Economic outcomes are not necessarily mirrored by individual perceptions, the psychological assessments are also important to evaluating negotiation success (Thompson and Hastie 1990; Bazerman, Curhan et al. 2000).

At present, only a handful of studies have examined the impact of technology on motivational orientation, and more specifically little is known on the effect of decision support of ENS in this regard (Jain and Solomon 2000). Initial works on outcome frames

and motivational orientations point to the need for integrating these two areas of study (De Dreu, Carnevale et al. 1995).

Furthermore, motivational orientation can be taken to a firm level by looking at inter-firm relationships between trading partners or it can be taken to an individual level by studying how people choose to divide resources based on their social motives.

From the economic literature, inter-firm relationship are assumed to be based on transactions that are the result of loose collections of self-interested firms, who uphold impersonal, arm's length ties, and constantly shift to new exchange partners to capture market gains generated by newcomers and avoid commitments or social attachments (Wilson 1989). However, the concept that economic actions are embedded in social structure has gained popularity with organization theorists, who consider that not all economic actions necessarily occur in competitive markets, but that some take place in stable networks of exchange partners who have close social relationships among them (Powell 1990). Case studies of supply chain partnerships have shown that trust and personal ties are far more valuable than explicit contracts that require high monitoring cost (Dore 1983). Firms sacrifice immediate gains in the market for long-term relationships that lead to future economic opportunities provided by network alliances. Therefore, studies on collaborative and competitive orientations can contribute to understanding firm level transactions.

3 Electronic Negotiation Systems

The economy is largely driven by everyday negotiations between sellers and buyers. Complex forms of electronic commerce require widespread systems that cover decision, communication, knowledge support and even automation of the process (Keersten and Lai 2007). ENSs are embedded with features and methods to help users better manage the process and work with their counterparts in order to achieve superior outcomes. They have the potential to reduce transaction and coordination costs often associated with face-to-face negotiations, to allow for greater participation in the marketplace, and, thus, to foster economic growth (Kersten 2003). Furthermore, governments and financial institutions have a vested interest in research associated with electronic exchange systems as these systems have regulatory and transactional implications on the market infrastructure (Bakos 1998).

Over the years, the application of ENS has largely been limited to research and training. For example, Inspire[3] system has been helping people test and practice their negotiation skills for more than ten years (Kersten and Noronha 1999). This ENS allows anyone around the world to sign up and experiment with electronic negotiations by anonymously exchanging offer packages consisting of multiple issues over the maximum course of three weeks. Results from data collected in these negotiations showed that gender, experience and culture play a vital role in participants' perception of system success (Vetschera, Kersten et al. 2004).

Governments and international organizations employ decision support systems in order to aid the resolution of highly complex conflicts among interest groups and

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[3] http://www.interneg.org/inspire

countries. For example, in light of decision support, Regional Air Pollution INformation and Simulation (RAINS) system provides a framework for the analysis of strategies to reduce emissions of air pollutants (Amann, Bertok et al. 1999) and helps countries negotiate a contract on the anthropogenic driving forces of emissions causing air pollution. Software agents for negotiation support have been proposed to help resolve boundary conflicts in marine forecasting in Australia. The agents represent regional offices that are responsible for all forecast policies in their jurisdiction. When inconsistencies in forecast policies arise at the boundary, agents are dispatched to negotiate the dispute quickly in order to avoid fatal consequences in critical weather events (San Pedro, Burstein et al. 2004).

ENSs benefit electronic commerce with communication and decision types of services at the enterprise and individual levels. SAP[4], a business IT solution provider, implements a negotiation module to track procurement proposals in supply chain management. eBay is partnered with squaretrade[5] for after-sales service, such as disputes between buyers and sellers. The online resolution service helps parties identify the issues of concern and advise them on how to enter direct negotiations to settle their disagreements. If a settlement cannot be reached, the parties may hire a professional mediator via the system.

ENSs are comprised of a broad range of technologies that enable different aspects of the negotiation process and methods for resolving negotiation problems. A historical overview of ENSs starting with decision support to automated negotiations is presented in Section 3.1. Section 3.2 highlights general features used to support the various stages

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[4] http://www.sap.com/index.epx
[5] http://www.squaretrade.com

of negotiations and Section 3.3 reviews empirical studies of ENSs that focus on the cost-benefit framework, media richness theory and usage models. The discussion on ENSs is provided in Section 3.4 summarizing key issues of ENS research and areas that need more work.

3.1 Origins of Negotiation Systems

In the 1960s, the employment of quantitative methods of Management Science for building computerized systems for planning of projects and evaluation of choices led to the development of *decision support systems* (DSSs). The idea of providing information support for decision-making was aimed at helping managers enhance organizational operations (Davis 1974). One area suggested for improvement was negotiation, where face-to-face meetings often led to inefficient outcomes and could negatively impact relationships (Nyhart and Goeltner 1987). These early systems sought to simplify and structure complex negotiation problems.

In the context of negotiations, DSSs were standalone systems that helped users formalize their objectives and preferences, understand the problem structure, search for solutions, and conduct sensitivity analysis (Starke and Rangaswamy 2000). These systems assisted only a single party and did not facilitate the actual communication and interaction with others. NEGOPLAN is an example of DSS designed to aid users in their identification of underlying interest in the pre-negotiation stage and help them avoid potential anchoring and adjustment biases (Matwin, Szpakowics et al. 1989).

Progress in computer-based communication (i.e., local and wide area networks) led, in the early 1980s, to the development of software capable of facilitating negotiation. Models from case-based reasoning and process support systems gave negotiators the

means of communicating with each other and even allowed for mediation or post-settlement improvement (Jelassi and Foroughi 1989; Sycara 1991; Thiessen and Loucks 1992; Rangaswamy and Shell 1997).

The next step in the development of negotiation systems was the integration of software tools used in DSS and tools used for communication to create *negotiation support systems* (NSSs). These systems aimed at structuring the process and providing both sides with some understanding of the problem with the aid of mainframes and terminals for communication (Lim and Benbasat 1992).

The goals of NSSs are to: (1) help negotiators overcome cognitive limitations associated with face-to-face negotiations by focusing people's attention on the negotiation task and their interests; (2) generate options for joint gains (i.e. create value) by using objective modeling techniques to represent the problem; (3) enable negotiators to learn about preferences and discover solutions by re-structuring the problem from different perspectives; and (4) document the process for negotiators and researchers (Kersten 1985; Foroughi, Perkins et al. 1995; Starke and Rangaswamy 2000; Kersten 2003). For example, according to Rangaswamy and Shell (1997), NSS may help users define their goals, limitations and strategies in the pre-negotiation stage. In the exchange stage, NSSs, such as NEGO (Kersten 1985), can enable users to construct and evaluate proposals by the counterpart, as well as to detail the process for users to act strategically. In post-negotiation, users may benefit from models developed to verify Pareto optimal solutions and suggest improvements. The technology employed in these systems consisted mostly of software operating on local area networks (Foroughi, Perkins et al. 1995).

The advent of internet technologies encouraged developers to electronically link negotiation parties with each other, leading to the construction of ENSs. An ENS is essentially a type of web-based system, which enables interaction between negotiators and may include analytical capabilities, agents, etc. It is comprised of: DSS, NSS, *electronic negotiation table* (ENT), *negotiation assistant-agent* (NAA) and *negotiation software agent* (NSA). At first, the focus of ENS support centered more on electronic communication rather than on decision support. These communication-based systems (ENTs) are software applications, which allow users to undertake negotiation activities in virtual environments (Keersten and Lai 2007). Some ENTs have included information management that enables rapid search and analysis of discussions (Schoop and Quix 2001; Yuan, Head et al. 2003). ENTs are important in governing discussions between the parties, and thus play the role of helping to formulate opinions about the counterpart and prevent non-rational escalation of conflict (DeSanctis and Gallupe 1987).

In the mid-1990s, extensive research began on the use of software agents, the concept that originated in the area of Artificial Intelligence, in conducting negotiations. As users try to manage greater amounts of data, they are exacerbated by the problem of information overload (e.g., negotiators, who participate in many bilateral exchanges or discussions over a great number of issues, face analyzing a large number of alternatives). One possible solution is to use software in the form of an assistant-agent (NAA) that would provide timely, context-dependent advice and critique as a domain expert, while the negotiator still retained control over decision making. These agents generally use a knowledge-base and follow a protocol requiring them to read signals from the environment and parse these according to a collection of rules and/or mathematical

functions. The results are formed in terms of advice for the negotiator under a given circumstance (Negroponte 1997). For example, eAgora is a marketplace that offers an agent to help users configure and transact through multi-issue negotiations (Chen, Kersten et al. 2005). The eAgora NAA is used to gather preference information and reservation values from the user. The system guides the user through the exchange by generating possible offer packages, which can be proposed to the counterpart. The system also points out mistakes regarding offer preparation and selection.

Decision support is pushed even further with NSAs, which are programs that run continuously, autonomously with the assigned goal of negotiating on behalf of a human or artificial principal (Jennings 2001). NSAs can vary from agents with no intelligence to smart agents that exhibit learning behavior and decide when knowledge-based rules should be executed (Maes 1994). An early example of such technology is Tête-à-tête, a multi-agent system that allowed market participants to negotiate over multiple issues using argumentative style of negotiation and multi-attribute utility analysis (Chavez, Dreilinger et al. 1997). Experiments with NSAs have shown that these software agent systems function within well-defined contexts or environments. NSAs are most suitable for repetitive, routine and specified negotiations. In addition, automated negotiations can alter the negotiator's belief of control over the choice of tactics and decision processes, which could lead to negative perceived control and system anxiety (Yang, Lim et al. 2007)

ENSs can be differentiated by functionality and the degree of involvement in negotiation activities. The categorization of ENSs ranges from passive facilitation to active representation of the user. Kersten and Lai (2007) represented these theoretical

distinctions in a Venn diagram. Figure 6 shows the overlapping of models and technology that can range from Communication research to Management science to Artificial intelligence.
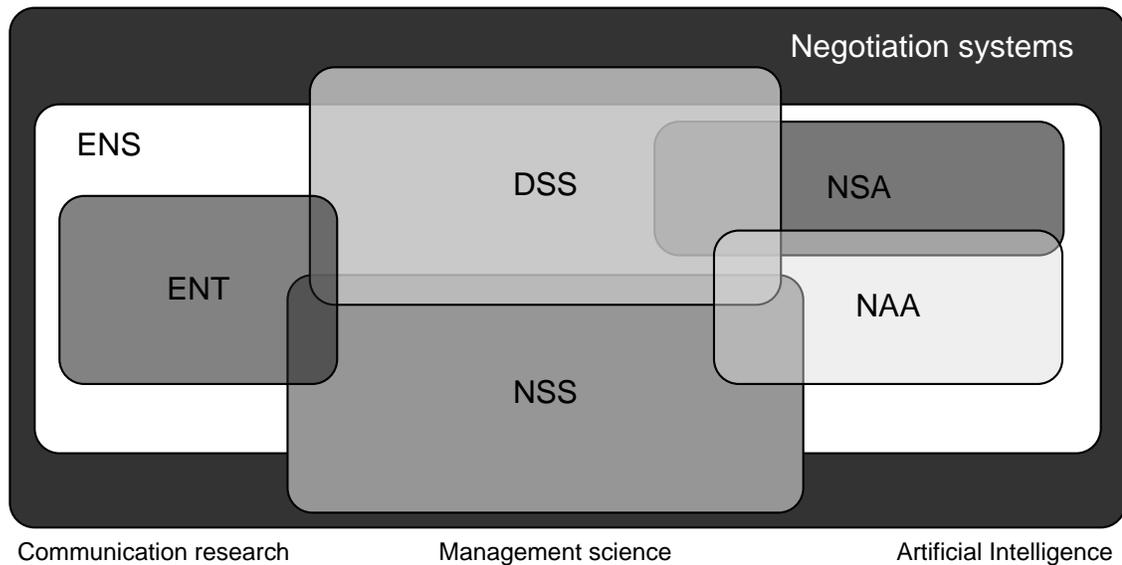
Figure 6 Negotiation systems adapted from Kersten and Lai (2007)

3.2 Negotiation Support

Negotiation systems are created to support human interaction through a distributed medium, with the exception of NSA that acts on behalf of the user. The classification of such systems can take many forms depending on the criteria, which can be based on the role played by the system, support of negotiation phases and system functionalities. Each criterion provides a different interpretation of negotiation support.

3.2.1 Role of Systems in Electronic Negotiation

The role played by the system focuses on the degree of intervention in the decision and exchange process (Keersten and Lai 2007). The system may serve as a:

- *Facilitator* that simply offers a medium for negotiators to communicate with each other. WebNS (Yuan, Head et al. 2003), SimpleNS (Kersten 2004) and the ENS by Doong and Lai (2007) are examples of systems that facilitate negotiation through different communication media (text, audio and video), formats (unstructured messages and offers), and structures (synchronous and asynchronous), respectively.

- *Supporter* that helps negotiators understand the problem and even gives one-sided advice during the exchange process. Negoist (Schoop 2003) aids negotiators formulate proposals by a document management system. The users can track the history of a negotiation through tags embedded in the context of the message. For quantitative support of offer generation, the agent in eAgora uses a rule-based expert system that takes into account past offers and concessions from both parties (Chen, Kersten et al. 2005).

- *Mediator* that gathers information from both sides and presents potential solutions. Once negotiators have reached an agreement, the Inspire system calculates the efficiency of the solution and, if possible, gives them the opportunity to improve the outcome (Kersten and Noronha 1999).

3.2.2 Negotiation Phases

The system support of phases is concentrated on the activities that are undertaken in different stages of negotiation. As a basic model, negotiation can be classified in three phases: pre-negotiation, conduct of negotiation and post-negotiation. Although some have suggested that these phases can be expanded (Raiffa 1982; Fang, Hipel et al. 1993; Kersten 2003), many negotiation systems have been built based on this three-phase

model (Rangaswamy and Shell 1997; Lo and Kersten 2003; De Moor and Weigand 2004).

(1) In pre-negotiation, negotiators start by determining their goals and objectives, and then they define the issues and alternatives. For example, Inspire uses tools such as preference elicitation and utility construction to help users determine the importance of issues and alternatives (Kersten and Noronha 1999). Negotiators who use systems aiding preparation phase have more realistic expectations, seek win-win solutions and produce better joint-outcomes than those who don't use such tools (Rangaswamy and Shell 1997).

(2) During the conduct of negotiation, two parties exchange information that allows for exploration of preferences, concessions and possibly leads to an accepted agreement. For example, Atin, a software agent that monitors negotiations in Inspire, supports negotiators during the exchange by offering helpful advice in case of stalemate (Lo and Kersten 2003).

(3) In post-negotiation (i.e., after an agreement is obtained), the verification and implementation of settlement terms is actualized and mediation may take place to suggest any improvement on the agreement. MeMo, a market system that helps people negotiate in different languages, automatically generates a contract that legitimizes the agreement reached during negotiation (De Moor and Weigand 2004).

3.2.3 System Functionalities

As the system functionalities mediate the communication channel and even re-structures the process, the negotiation game is changed along with the behaviors and outcomes

associated with the interaction. The classification in terms of system functionalities is an important but contentious endeavor. As some suggest a basic dichotomy of either decision or communication support to relate the general functionalities of an ENS (Lim and Benbasat 1992), others point to a finer grain of division that is based on twenty three functions (Keersten and Lai 2007). However, seven distinguished functionalities are described from key requirements set forth by researchers aimed at characterizing ENSs (Jelassi and Foroughi 1989; Lim and Benbasat 1992; Holsapple, Lai et al. 1996; Rangaswamy and Shell 1997; Shell 2001; Keersten and Lai 2007). These functions are presented in Table 2, which also shows the articles that describe them. In the table, each of the seven functionalities is discussed in more detail along with examples of ENSs that provide such functionalities.

Table 2 Functionalities supporting negotiation

Functionalities	*Authors*					
	Jelassi and Foroughi (1989)	Lim and Benbasat (1992)	Holsapple et al. (1996)	Rangaswamy and Shell (1997)	Starke and Rangaswamy (2000)	Kersten and Lai (2007)
Preference elicitation	X	X		X	X	X
Electronic communication		X	X		X	X
Information presentation			X			X
Process structure	X		X	X	X	X
Mediation	X		X	X	X	X
Assistance			X			X

As some negotiation systems are designed to analyze decisions, **preference elicitation** is a functionality of the system that helps individuals organize private information to specify the domain of negotiation (Rangaswamy and Shell 1997; Starke and Rangaswamy 2000). Preference elicitation takes the issues at stake and the options

that may be considered for each issue and allows individuals to construct a preference model through the assessment of these issues and options. Using the preference model, the system can represent the problem by identifying the negotiation space, and hence assist negotiators in their decision-making (Lim and Benbasat 1992).

Most authors listed in Table 2, with the exception of Holsapple, Lai et al. (1996), stress the importance of preference elicitation as the means to extract the parameters, which enable decision and knowledge support. For example, the additive scoring model, proposed by Keeney and Raiffa (1991), allows for the clarification of numerical information to represent preferences for Inspire, Aspire and eAgora systems. Once the preferences for issues and options are captured in numeric form, a utility function is created to help evaluate offers (Jelassi and Foroughi 1989). In Inspire, conjoint analysis is further performed to adjust the fit of the utility function to match the relative importance placed on the various offer packages (Kersten and Noronha 1999). However, some ENSs, such as Negoist that use document management for creating proposal, can also be considered a form of decision support (Schoop 2003).

The modeling of preferences can be of great value to decision-making. It introduces consistency and a certain degree of objectivity to prevent possible cognitive biases and limitations when dealing with multi-issue decisions. For a detail example of problem representation, Hill and Jones (1996) provided a working prototype to characterize the feasible settlement space and efficient frontiers shaped by the joint utility distribution of negotiators' utilities.

Electronic communication underlines the interaction between both sides (Starke and Rangaswamy 2000). It has a format and medium. ENSs that facilitate communication

often have an unstructured format for information exchange (e.g., SimpleNS allows users to freely exchange messages), while those that support negotiation impose some structure to allow for greater system intervention (e.g., eAgora uses structured offers to enable agent monitoring of offer exchange). Electronic communication is believed to shift attention from socio-emotional focus to one that is more objective and task-based, especially for team negotiations (Guo and Lim 2007). Electronic communication differs in terms of the medium that serves that information (Lim and Benbasat 1992). WebNS allows negotiators to choose among text, audio and video to discuss the conflict, but most ENSs employ only text communication (Yuan, Head et al. 2003). A further discussion on media richness of ENSs is found in Section 3.3.2.

Information presentation describes the manner in which the ENS displays information for input and output (Herniter, Carmel et al. 1990). Depending on the available data, negotiation process may be structured and represented in terms of graphs, tables, lists, text-boxes, etc. This presentation component is important to guide the interaction between the users and the system (Holsapple, Lai et al. 1996). The superiority of one type of information representation over another is beyond the scope of this project as it relates to interface design and usability research. To illustrate the differences between the systems and the relationship between the data and its presentation screenshots from four ENSs are shown in Table 3. As the information support increases, the type of information representation moves from text-box to table, to list, and to graph. This is consistent with the guidelines proposed by Herniter and Carmel (1990) on designing ENSs' interfaces.

Table 3 Types of information representation in ENSs

Information representation	Examples from ENSs[6]
Graphs serve mainly for pattern representation of offers (Weber, Kersten et al. 2005). For example, the history graph, from the perspective of one side, depicts the concessions made by both parties as they work towards an agreement.	
Tables permit the references and comparison of offers and messages (Herniter, Carmel et al. 1990). For example, offers made by different suppliers are compared based on three issues: processor and hard disk type and price.	
Lists allow for the selection of structured and semi-structured communication (Schoop 2003). For example, every option of an issue is predefined on a drop-down list that allows negotiators to structure their offers.	
Text-boxes are applied to unstructured communication (Koeszegi, Srnka et al. 2004). For example, in SimpleNS, negotiators are unrestricted in their communication. They are not obliged to discuss every issue at each offer.	

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[6] Courtesy of http://invite.concordia.ca

Process structure refers to the rules that govern the interactions between the system and the user, as well as those between the users (Holsapple, Lai et al. 1996). For example, it details how many offers are allowed on the table at a time, what can be added to the table, and under what circumstances users can interact. Process structure allows the system to manage a negotiation based on a set protocol. The protocol may be complex and based on many contextual elements that are permitted in the discussion process. For example, eAgora allows negotiators to add issues during negotiation and continuously redefine the problem, but process structure follows a sequential order for offer proposal. The protocols may be simple with few rules, such as WebNS where users are free to discuss any and all parts of the problem without any order for offer proposal. Protocols can also be implemented as templates, by means of which users enter information at each round of exchange (e.g., Negoist has predefined fields that guide negotiators in the drafting of a service contract). Bichler, Kersten et al. (2003) provided a more detailed analysis of the role of process structure in electronic negotiations.

Every ENS provides certain, albeit often limited, facilitating and mediating functions, e.g., offer notification, message organization, offer suggestion and/or critique, and search for efficient agreement improvements. A detailed specification of the **mediation** functionality is, however, necessary for ENSs which play the role of a third party in the conflict. The purpose of this function is to influence the process and guide parties to a solution (Rangaswamy and Shell 1997). Most often, mediation requires that both negotiators reveal their interests to the system so that it can search for an agreement (Keersten and Lai 2007). In Inspire, after a settlement is reached, the system calculates the efficiency of the solution based on the negotiators' utility and proposes more efficient

agreements if possible. Jelassi and Foroughi (1989) describe the value of mediation in greater lengths. They even contemplate the possibility of system use for arbitration and promotion of democracy. In another system (Lim and Yang 2008), mediation takes the form of a module that computes all possible solutions (given the reservation levels of the negotiators) and proposes these to the negotiators before they even start the conduct of negotiations. The purpose is to focus negotiation on a feasible space and reduce inefficiencies.

Assistant-agents were first studied in distributed Artificial Intelligence and multi-agent systems (Nunamaker, Dennis et al. 1991; Sycara 1991). The assistance function is performed by the software, which monitors user's actions through warnings, advises participants on offers received and suggests offers that they may send. Subsequently, the introduction of proactive software to electronic negotiation aimed to revolutionize the way exchanges are conducted online (Maes 1994). Unlike the mediation function, the assistant works for one side and does not receive information from the other side that is hidden from the assisted side. The NAAs, Aspire and eAgora (Lo and Kersten 2003; Chen, Kersten et al. 2005), employ a rule-based expert system to direct the assistant's behavior in helping negotiators, especially novices, manage complex negotiations.

As noted in the beginning of Section 3.2, the classification of ENSs can be a daunting task, which depends on the criteria used. Table 4 classifies the various ENSs discussed into system role, phase and function supported categories. It shows that as system involvement increases (from facilitate to mediate), phases and functions increase in number (e.g., from only the conduct of negotiation to all three phases) and complexity (e.g., from unstructured communication to structured offers).

Table 4 Classification of ENSs

System (Authors)	Role	Phase	Functions					
			Preference elicitation	Electronic communication	Problem presentation	Process structure	Mediation	Assistance
Inspire (Kersten and Noronha 1999)	support and mediate	▪ pre-negotiation ▪ conduct of negotiation ▪ post-negotiation	▪ additive scoring model ▪ conjoint analysis	▪ unstructured messages ▪ structured offers	▪ table ▪ list ▪ graph ▪ text box	sequential protocol	Pareto-efficient solutions	
Aspire (Lo and Kersten 2003)	support and mediate	▪ pre-negotiation ▪ conduct of negotiation ▪ post-negotiation	▪ additive scoring model ▪ conjoint analysis	▪ unstructured messages ▪ structured offers	▪ table ▪ list ▪ graph ▪ text box	sequential protocol	Pareto-efficient solutions	Rule-based expert system
Negoist (Schoop 2003)	support	▪ pre-negotiation ▪ conduct of negotiation ▪ post-negotiation		▪ semi-structured messages	▪ list ▪ text box	document management		
WebNS (Yuan, Head et al. 2003)	facilitate	▪ conduct of negotiation		▪ unstructured messages in text, audio and video	▪ text box			
MeMo (De Moor and Weigand 2004)	support	▪ pre-negotiation ▪ conduct of negotiation ▪ post-negotiation		▪ semi-structured messages	▪ list ▪ text box	document management		
SimpleNS (Kersten 2004)	facilitate	▪ conduct of negotiation		▪ unstructured messages	▪ list ▪ text box			
eAgora (Chen, Kersten et al. 2005)	support	▪ pre-negotiation ▪ conduct of negotiation	▪ additive scoring model	▪ unstructured messages ▪ structured offers	▪ table ▪ list ▪ text box	sequential protocol		Rule-based expert system
ENS (Doong and Lai 2007)	facilitate			▪ unstructured messages	▪ text box			
ENS (Lim and Yang 2008)	support and mediate	▪ pre-negotiation ▪ conduct of negotiation	▪ additive scoring model	▪ unstructured messages ▪ structured offers	▪ table ▪ list ▪ text box	sequential protocol	Calculate feasible space	

3.3 Assessment of Negotiation Systems

ENSs comprise a broad range of technologies, which enable different aspects of the negotiation processes, as well as methods to resolving negotiation problems. A review of empirical studies focusing on systems in bilateral negotiations and involving multiple issues implemented in business-to-business negotiations reveals twenty two journal publications that demonstrate the influence of the system on process and outcome variables. These studies may be summarized as involving five major components: (1) system, (2) process in which the system is involved, (3) perception of the system, (4) outcomes, and (5) moderators that affect the use of system. The studies showed that over the years research on negotiation systems has centered on:

(1) *Cost-benefit framework* to compare negotiation support technology with face-to-face exchange in terms of effort required in the process and the economic outcome (Jelassi and Foroughi 1989; Jones and Jelassi 1990; Foroughi, Perkins et al. 1995; Delaney, Foroughi et al. 1997; Rangaswamy and Shell 1997; Lim 2000).

(2) *Media richness theory* to examine different media (i.e., text, audio and video) of electronic communication in negotiations (Sheffield 1995; Croson 1999; Suh 1999; Mennecke, Valacich et al. 2000; Purdy, Nye et al. 2000; Foroughi, Perkins et al. 2001; Pesendorfer and Koeszegi 2006; Galin, Gross et al. 2007; Pesendorfer and Koeszegi 2007).

(3) *Usage model* following an IS perspective to establish links among process, outcome and system variables. (Kersten and Noronha 1999; Lim 2003; Koeszegi, Srnka et al. 2004; Vetschera, Kersten et al. 2004; Weber, Kersten et al. 2005; Doong and Lai 2006; Lim and Yang 2008).

3.3.1 Cost-Benefit Framework

Early computerized negotiation systems focused on supporting the decision-making process by helping negotiators reach efficient agreements. The early studies were not bounded by any underlying theory of assessment. Instead, the researchers' aim was to validate the advantage of computerized systems over face-to-face exchanges, whereby cognitive limitations of humans could be circumvented through decision models. These systems (DSSs) guided the users and helped them maintain high aspiration levels (Starke and Rangaswamy 2000). As described in Figure 7, DSSs and NSSs were evaluated on the benefits (in terms of negotiation outcomes) and the cost to the users (in terms of negotiation process).

The results from empirical testing of DSSs with face-to-face negotiations suggested that although joint outcome and contract balance were improved using the systems, the greater effort required (time required and the number of offers proposed) led users to report a decrease in outcome satisfaction and negative discussion climate. The results were also moderated by the conflict levels introduced in the experiments. DSSs were found mostly beneficial in low conflict situations where parties had convergent preferences for issues (Jones and Jelassi 1990; Delaney, Foroughi et al. 1997).

The integration of DSS with a communication tool into one system, a NSS, allowed the restructuring of the process. When compared to face-to-face negotiations, NSSs improved joint outcome and contract balance similar to DSSs. However, NSSs also increased outcome satisfaction, and the negotiation process required less effort (i.e., number of offers). The NSS users also reported a more positive discussion climate during the process when compared to DSS users (Delaney, Foroughi et al. 1997; Rangaswamy

and Shell 1997; Lim 2000). In fact, NSSs offered a kind of holistic support that restricted exchange and management of information to those activities which were relevant for decision-making (Rangaswamy and Shell 1997). This notion challenges the statement made by Lim and Benbasat (1992), who suggested that a NSS can be parsed into decision and communication support components and assessed along these two dimensions. The actual assessment follows more of a cost-benefit framework espoused by Payne et al. (1993), whereby an integrated system has the combined objective to maximize decision quality while minimizing the effort. In other words, studies on NSSs showed that their success is not only due to the decision and communication support, but to the restructuring of the process and reduction of effort. Studies have shown that NSSs increased the objective outcomes (e.g., joint outcome, contract balance, efficiency, etc, in Rangaswamy and Shell 1997; Lim 2000).

Dependent variables

Negotiation process
Time required
Offers (number & quality)
Discussion climate

Negotiation outcome
Joint outcome
Contract balance
Outcome satisfaction

DSS and NSS

Moderators
Conflict levels
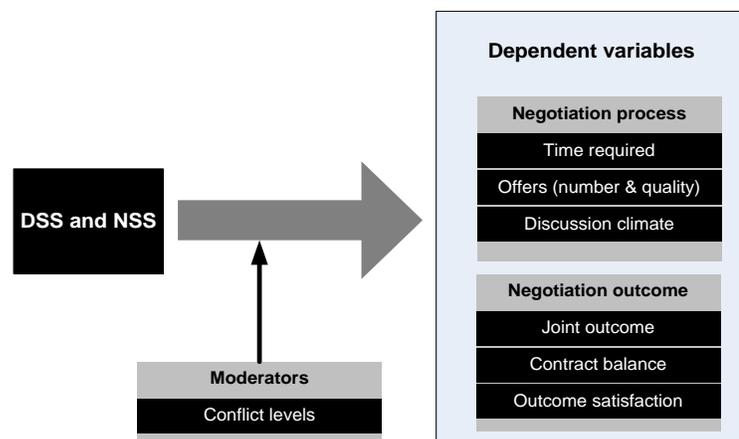
Figure 7 Cost-benefit framework assessments of DSS and NSS

3.3.2 Media Richness Theory

Once electronic communication allowed people to connect from different parts of the world, behavioural researchers began studying the use and role of ENSs. They focused their effort on the electronic medium by employing simple and popular communication

software in their research. This expanded ENS research from the DSS domain to the communication medium domain.

The use of functionally limited software that provides diverse channels for communication led to the interest of media richness theory as applied to negotiations research. Since different media convey information in different ways, the theory suggests that the medium must be suitable to the complexity of the task (Daft and Lengel 1986). McGrath and Hollingshead (1993) extended the theory by mapping specific task types to various media, whereby the task of negotiating is hypothesized to require a rich medium, such as face-to-face or something similar, e.g. video conferencing. Based on the amount of information that can be exchanged within a time interval, face-to-face interactions are the richest, followed by video then audio, and, finally, text-based communications.

Empirical studies using media richness theory (Suh 1999; Mennecke, Valacich et al. 2000; Purdy, Nye et al. 2000; Galin, Gross et al. 2007) showed that, although richer media reduce effort (e.g., time required and number of offers), joint outcome in negotiations does not differ among participants employing different media. One exception is the study by Croson (1999). In Croson's experiment (1999), email required more time for communication than face-to-face, but it provided higher joint outcomes by reducing social cues that appeared to distract from the task. In order to expand on the theory, conflict level was introduced in the task as a moderator between the ENS and the objective outcomes (e.g., joint outcome and number of agreements). The results from Sheffield (1995) demonstrated that negotiators in lower levels of conflict benefited from increased medium richness, meaning that collaborative negotiators obtained higher joint outcome when they saw their counterpart because they could capture social cues to build

trust. However, competitors reached lower joint outcomes because visual presence introduced emotions, which distracted them from the negotiation task. When the level of conflict was varied within competitive dyads (i.e., the level of conflict among negotiation issues), the findings from Foroughi, Perkins et al. (2001) suggested that high conflict situations required competitors to use a richer medium.

Using repeated measures, video, audio and text media have been compared to assess their impact on subjective variables (Yuan, Head et al. 2003). The findings pointed to equivalency between video and audio, both of which were rated superior to text in terms of communication efficiency and effectiveness. Perhaps, the difference rests more on the characteristic of the medium rather than the type. As video and audio provided immediate feedback, users were not affected by the delays imposed by text-based communication. This new direction led Psendorfer and Koeszegi (2006) to compare synchronous and asynchronous text-based communications. They have found that uninhibited and competitive behavior was more present in synchronous dyads, and these behaviors affected the assessment of discussion climate and outcome satisfaction.

Overall, an increase in media richness reduces effort but it does not necessarily lead to increase in gains. The intervals between messages appear to have a greater effect than the richness of the message conveyed. As these studies span over ten years, the change in people's abilities, habits and perceptions of electronic communication may contribute to the discrepancy among the studies.

3.3.3 Usage Model on Assessment

The design of ENSs for electronic commerce has sparked the movement towards IS perspective of assessment, which is based upon usage of ENSs rather than a comparison

with face-to-face negotiation. *Technology acceptance model* (TAM) proposed by Davis, Baggozi et al. (1989) and the Delone and Mclean model of IS success (1992) serve as the premises to the analysis of the impact of different usage patterns on perceptions, and objective and subjective outcomes (Lim 2003).

Inspire is an ENS built to allow users from all over the world to practice electronic negotiations (it has been used by more than 6,000 users from 60 different countries with). A business case was implemented in Inspire that let the users negotiate by exchanging proposals to settle a contract for bicycle parts. The contract involved four issues and various options for each issue. The system guided users through the three stages of negotiation. Users communicated by sending and receiving offers and messages (sent jointly or separately).

Based on TAM and Delone and Mclean's model of IS success, usage of Inspire was shown to influence the objective outcomes and perceptions of the ENS, all of which ultimately affected outcome satisfaction. Figure 8 depicts these relationships and the studies that supported them.
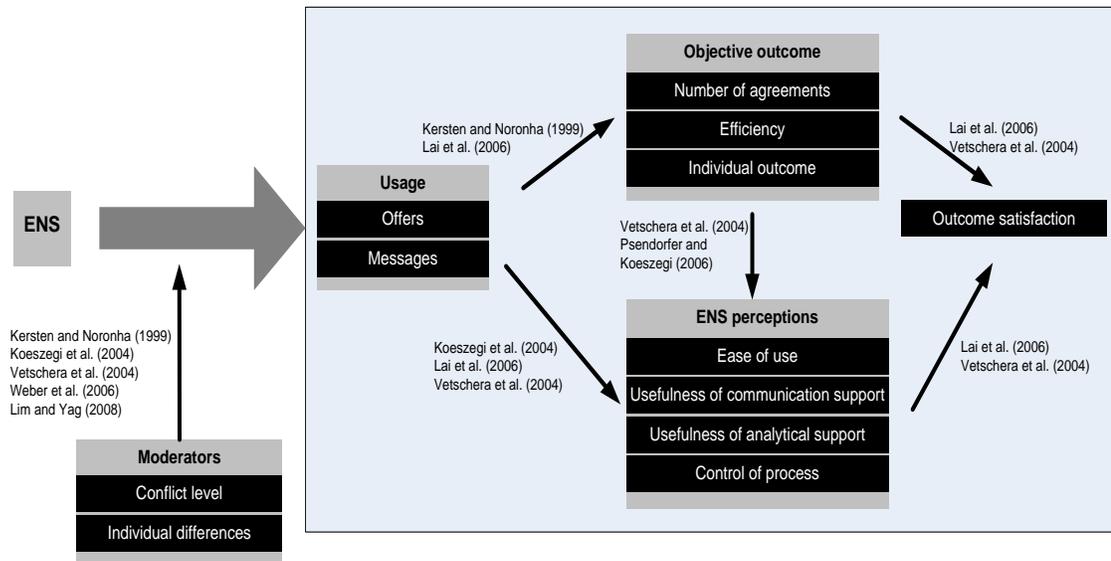
Figure 8 Usage model of ENS assessment

At the individual level, the assessment of ENSs focuses on outcome satisfaction, which is defined as the extent to which the substantive goals of the user are met by negotiating using the system. The interactions between the user and system are assessed through usage, which allows individuals to form perception of the system. Usage enables viewing objective outcomes, which, in turn, affects ENS perceptions.

Based on the offer and/or message sent (Kersten and Noronha 1999; Koeszegi et al. 2004; Vetschera, Kersten et al. 2004; Lai, Doong et al. 2006) and behaviour patterns (Vetchera 2006), usage was shown to positively influence the number of agreements, efficiency of agreements (Kersten and Noronha 1999), perceived ease of use and usefulness of the system (Vetschera, Kersten et al. 2004). The overall outcome satisfaction from electronic negotiation is positively impacted by these objective outcomes and ENS perceptions (Vetschera, Kersten et al. 2004; Lai, Doong et al. 2006).

In general, perceptions of ISs reflect the users' internalization of their interaction with the system. However, ENSs differ from traditional ISs. ENSs act as facilitators and intermediaries (e.g., mediators or assistants); they mainly focus on helping people make decisions and communicate with the other party (Lim and Benbasat 1992). User perceptions of the ENS reflect the manner in which individuals see the feature(s) as supporting or facilitating their negotiations. ENS perceptions are not only derived from the benefits from using the system, but also from the process of exchanges between parties mediated by the system.

ENSs serve as a medium for negotiators to exchange offers and have discussions. Therefore, the perceived ease of use, defined as the degree to which negotiating using the technology would require little effort (Foroughi, Perkins et al. 1995), provides a subjective assessment of the system. Two predominant perceptions of usefulness have been examined in ENSs studies relating to communication and decision support. Perceived usefulness of analytical support (defined as the degree to which negotiating with the technology would facilitate decision-making) and perceived usefulness of communication support (defined as the degree to which using the ENS would improve understanding between parties) were affected by usage through the moderation of low-context and high-context cultures (Koeszegi, Vetchera et al. 2004). The perception of control over the process increased as negotiators increased communication with their counterparts, implying that the more offers and messages were sent and received the greater the negotiators perceived control over negotiations was (Lai, Doong et al. 2006). In an experiment using ProNeg, Yang, Lim et al. (2007) found that an agent-based negotiation mechanism caused users to experience less perceived control than an ENS

with only decision support. This perception of lower control could further influence the user's anxiety towards using the system.

Online negotiations with users from different countries entail different patterns of usage (Kersten and Noronha 1999; Koeszegi, Vetchera et al. 2004; Vetschera, Kersten et al. 2004; Weber, Kersten et al. 2005; Vetschera 2006). For example, Chinese negotiators tended to send more messages than offers alone, which led to less efficient agreements compared to other countries (Kersten and Noronha 1999). Lim and Yang (2008) also examined Chinese negotiators and found that multi-lingual support actually slowed down usage because the language editor reduced typing speed.

When classified into low-context and high-context cultures (i.e., low-context cultures are the ones that use more explicit information in communication, e.g., North Americans and western European), negotiators belonging to low-context cultures used more structured communication, such as offers alone, than less-structured messages (Koeszegi, Vetchera et al. 2004). The difference in usage patterns did not produce any effect on perceived ease of use, but users from low-context cultures perceived greater usefulness of analytical support. Those users from high-context cultures, who obtained high individual outcomes (i.e., the utility achieved through the agreement), reported a greater perceived usefulness of communication support. Using the same dataset as Koeszegi, Vetchera et al. (2004) and adding more observations, Vetschera, Kersten et al. (2004) have confirmed the findings from the previous study and showed that perceived usefulness of analytical support is also positively influenced by individual outcome.

Based on cluster analysis of motivational orientations, Lai, Doong et al. (2006) classified negotiators into collaborative and non-collaborative individuals. In their study,

they found that collaborators sent more unstructured communication (e.g., messages), which led them to report that using the system permitted them to (1) feel in greater control of the process, and (2) achieve more agreements, when compared with non-collaborators. Kersten and Noronha (1999) also found that the increased use of messages allowed for more agreements, although the agreements were not necessarily efficient (i.e., Pareto optimal).

The Delone and Mclean's model of IS success (1992) suggests that IS success is not solely determined by predictions of usage as implied by TAM. User satisfaction plays also an important in assessing the value provided by the ENS. Although Delone and Mclean (1992) did not give a clear measure for user satisfaction, Vetschera, Kersten et al. (2004) and Lai, Doong et al. (2006) showed that usage ultimately impacts outcome satisfaction through objective outcomes and ENS perceptions. In fact, outcome satisfaction was found to be influenced by individual outcome, perceived ease of use and usefulness of analytical and communication support (Vetschera, Kersten et al. 2004).

3.3.4 Results of System Assessments

The cost-benefit framework suggests the need to decrease effort while increasing gains. This can be achieved by restructuring the process to integrate communication and decision support. Empirical studies of ENSs have revealed that the value of negotiation support extends beyond the benefits of combining a communication medium with decision support functionalities. Instead, the integrated system restructures the process by decreasing the cost required in the exchange process and increasing the benefits at the dyadic and individual levels (Delaney, Foroughi et al. 1997, Rangaswamy and Shell 1997, Lim 2000).

A rich communication medium does not necessary improve the process and outcomes of negotiation. To achieve these improvements, the focus should be on tools that facilitate decision-making. Furthermore, contextual differences, such as conflict level and motivational orientation strongly moderate the effect of the media on the process and outcomes of negotiation. Empirical studies showed that negotiators in low conflict or cooperative situations profited from employing richer media, while those in high conflict and competitive setting became distracted from the task while using such media (Sheffield 1995, Suh 1999, Mennecke, Valacichi et al. 2000, Purdy, Nye et al. 2000, Foroughi, Perkins et al. 2001, Psendorfer and Koeszegi 2007).

The usage models measured ENS perceptions as well as objective and subjective outcomes. More specifically, usage, involving the information exchange between parties (e.g., offers and messages from Kersten and Noronha 1999 and Vetchera 2006) describes the process of negotiations as well as the interaction between the user and the system. System usage, through the interaction of the user with the system in order to communicate with the other party, affects objective outcomes and ENS perceptions. (Kersten and Noronha 1999; Koeszegi, Vetchera et al. 2004; Vetschera, Kersten et al. 2004; Lai, Doong et al. 2006; Vetschera 2006).

This review points to the importance of investigating the impact of ENS on the process and outcome, in terms of both objective and subjective variables. However, it also discloses a lack of research into: (1) how the ENS can help negotiators overcome biases in decision-making; (2) the features that promote fruitful exchanges under different contextual settings; and (3) integrating cognitive theories established from

studying face-to-face negotiations. As summarized in Table 5, there are few studies that

link ENS design research to that in decision theory or motivational orientation.

Table 5 Review of ENS assessment studies

Authors	ENS	Moderating variables	Process and outcome variables	Summary and comments
Jones and Jelassi (1990)	DSS (computer makes suggestions during face-to-face negotiation)	- *Conflict level*: half of the participants were given preferences that are more divergent (distributive) than the other half (integrative)	- *Joint outcome*: DSS improved gains for integrative dyads but not for distributive ones - *Settlement time*: DSS required more time from integrative dyads to reach an agreement - *Discussion climate*: was perceived more favorably by distributive dyads with DSS, but had the opposite effect with integrative dyads - *Perception of counterpart*: in terms of friendliness was not sign. - *Outcome satisfaction*: integrative dyads with DSS reported greater satisfaction	- Measure the effect of DSS in face-to-face negotiation with different conflict levels - DSS allowed integrative dyads to achieve greater joint outcome, but required more time. This cause integrative dyads to perceive greater outcome satisfaction, but lower discussion climate as DSS prevented them from easily conceding to each other
Foroughi et al. (1995)	NSS (DSS + communication tool)	- *Conflict level*: half of the participants were given preferences that are more divergent (distributive) than the other half (integrative) ---same case as Jones and Jelassi (1990)	- *Joint outcome*: NSS improved gains for integrative and distributive dyads - *Contract balance*: NSS improved distribution for integrative and distributive dyads - *Settlement time*: NSS required more time for integrative and distributive dyads - *Number of contract proposed*: in terms of offers was not sign. - *Discussion climate*: was perceived more favorably by integrative dyads with NSS, but no sign effect for distributive dyads - *Outcome satisfaction*: NSS improved satisfaction for integrative and distributive dyads	- Study the effect of NSS in different conflict levels - NSS improved outcome for both types of dyads, but required more time - Only integrative dyads reported increase in discussion climate (could be due to statistical power) - This study showed the benefits of creating a complete interactive system to support negotiations (NSS) - Importance of interactive quality to engage user's perception of the value of the system

Authors	ENS	Moderating variables	Process and outcome variables	Summary and comments
Sheffield (1995)	ENT (audio vs. text) using an electronic conferencing system	- *Motivational orientation*: collaborators (instructions to maximize joint gains) and competitors (instruction to maximize own gains) Manipulation check on orientation	- *Joint outcome*: Collaborators increase joint outcome in visual treatment especially when communicating with text. Competitors decrease joint outcome in visual treatment overall - *Relative cooperativeness*: (measure by looking at ratio of cooperative and contentious behavior) is higher in visual treatment for collaborators (mostly) and competitors with audio, but no change for competitors with text	- Examine the effect of ENT, visual presence and motivational orientation. - 2X2X2 design (audio vs. text) X (visual vs. no visual presence) X (cooperator vs. competitor) - Using a non-zero-sum case, visual presence affects joint outcome different for collaborators and competitors - Collaborators benefit from see their partner especially using text communication - Competitors achieve lower joint outcomes when they see the opponent - Relative cooperativeness (ambiguously measured) is increased in visual treatment for collaborators and competitor (only with audio), but no change for competitor with text - Visual presence increase media richness (mostly for collaborators), but does not necessarily translate to efficiency (mostly for competitors)
Delaney et al. (1997)	- NSS (DSS + communication tool) - DSS	- *Conflict level*: half of the participants were given preferences that are more divergent (distributive) than the other half (integrative) ---same case as Jones and Jelassi (1990)	- *Joint outcome*: DSS > face-to-face, NSS = DSS by improving gains for integrative and distributive dyads - *Contract balance*: DSS > face-to-face, NSS = DSS by improving distribution for integrative and distributive dyads - *Settlement time*: DSS > face-to-face, NSS = DSS required more time for integrative and distributive dyads - *Number of contract proposed*: DSS > face-to-face, NSS = face-to-face terms of offers for both types of dyads - *Discussion climate*: was perceived more favorably by integrative dyads with NSS - *Outcome satisfaction*: NSS improved satisfaction for integrative and distributive dyads (NSS > face-to-face, NSS=DSS)	- Examine the effect of various negotiation support (NSS and DSS) on different conflict levels - Objective measures of outcome (joint outcome and contract balance) are similar between DSS and NSS, both better than face-to-face - Difference in the process variables, as DSS requires more effort (number of contract proposed) but for the same amount of time as NSS - The difference in process is reflect in the perceived discussion climate, where NSS > DSS - NSS is more than the combination of DSS + communication as Lim and Benbasat (1992) suggested.

Authors	ENS	Moderating variables	Process and outcome variables	Summary and comments
Rangaswamy and Shell (1997)	- Email - DSS (preparation system + face-to-face - NSS (Decision support pre-negotiation, negotiation and post-negotiation + structure communication tool in terms of messages and offers)		- *Pareto optimality*: (agreement along the pareto frontier) NSS = DSS > communication tool = face-to-face - *Perception of process*: electronic communication (communication tool and NSS) was better perceived than face-to-face communication - *Outcome satisfaction*: improved with more support (NSS > DSS > face-to-face > communication tool)	- Study the effects of various negotiation support on the stages on negotiation - The researchers tried to examine the value of NSS by focusing on pre-negotiation, exchange process, post-negotiation - Preparation for negotiation proved to best enable negotiators to reach pareto optimality, DSS = NSS - Aspiration levels were maintained using DSS and NSS to help negotiators reach integrative agreements - People prefer electronic communication as it allowed them to distance themselves from the conflict, but only if they are able to handle impersonal modes of communication
Croson (1999)	ENT (email)		- *Joint outcome*: ENT > face-to-face - *Contract balance*: ENT > face-to-face	- ENT required more time for communication and time is suggested as factor influencing mixed results in other studies - ENT reduces social cues, which suggest that ENT produced more balanced contract because there were more equal participation
Kersten and Noronha (1999)	ENS	- *Culture*: national culture from Canada, China, Finland, India and USA	- *Number of agreements*: above 2/3 of negotiators in most countries reached an agreement, except for India - *Efficiency*: most countries achieved above 50% pareto efficiency agreements, except for China - *Usage*: Chinese like to use messages, while the Finnish like to send only offers. - *Outcome satisfaction*: Negotiators from India expected less and got more, while the ones from the USA were just the opposite - *Relationship*: most negotiators reported a positive experience with the opponent	- Exploratory study on the difference between various countries and the effect on usage and outcome achieved from ENS - Field experiment using Inspire bicycle part contracting case - Suggest that greater usage leads to more likelihood of agreement, but heavy text communication can distract the users from the task and lead them to poorer agreements - Different cultures have different levels of expectations

Authors	ENS	Moderating variables	Process and outcome variables	Summary and comments
Suh (1999)	ENT (text, audio, video)	- *Conflict level*: intellective (problem-solving task, financial computations, low conflict) vs. negotiation (non-consonant given preference vs. consonant elicited preference, high conflict) Negotiation Case: zero-sum game	- *Decision quality*: no difference between different ENT or with face-to-face for negotiation or intellective tasks - *Decision time*: audio > video = face-to-face > text for negotiation or intellective tasks - *Process satisfaction*: Video = face-to-face > text > audio for intellective task. Negotiation with non-consonance; text > face-to-face = video = audio. Negotiation with consonance; face-to-face > video > audio > text. - *Outcome satisfaction*: no difference between media only with task, intellective > negotiation in general	- Test media richness theory (task performance improves when there is a fit between information required and the medium ability to convey this information) with 2 types of task and four media - Media richness theory is not supported because there were no interaction effect for decision quality and time - Audio was fastest but reported lowest process satisfaction - High levels of conflict (non-consonance) people prefer written vs. oral communication - Video is similar to face-to-face - Text provides rich enough medium for negotiation - Conflict level affect process satisfaction
Mennecke et al. (2000)	ENT (text, audio, video)	- *Conflict level*: intellective (problem-solving task, each party, low conflict) vs. negotiation (elicited preference on social issues, high conflict) Negotiation Case: funding on social issues	- *Decision quality*: (objective measure based on 1. the parameters of the intellective task or 2. the difference between expectation and final agreement) Intellective: video > face-to-face > audio > text Negotiation: the differences are no sign. - *Decision time*: (time required to complete task) Intellective: the differences are no sign. Negotiation: face-to-face = video > audio > text	- Examine the task media fit hypothesis proposed by (McGrath and Hollingshead 1993) using 2 X 4 deign, conflict level (intellective vs. negotiation) and communication medium (face-to-face, video, audio & text) - Each participant performs both the intellective and negotiation tasks, order is random - Task media fit hypothesis was partially supported by the negotiation task (no difference in terms of outcome satisfaction, but face-to-face > video > audio > text for time required) - Increase conflict in the task influences greater perception of task media fit hypothesis to be supported - Difficult to compare results as measures for performance are different between the two tasks

Authors	ENS	Moderating variables	Process and outcome variables	Summary and comments
Lim (2000)	- Email - DSS (negotiate face-to-face) - NSS (DSS with integrated electronic communication)		- *Individual outcome*: supported > non-supported & face-to-face > distributive - *Joint outcome*: supported > non-supported & face-to-face > distributive - *Perceived fairness*: supported > non-supported - *Outcome satisfaction*: (expectation – final agreement) supported negotiators obtained positive value, whereas non-supported got negative values	- Test a 2 (support vs. non-support) X 2 (face-to-face vs. distributive) design - Supported (NSS or DSS) allowed for better outcomes, but DSS did a little better - Difficult to compare result because preferences were elicited and negotiators could add issues during negotiation
Purdy et al. (2000)	ENT (text, video, audio)		- *Behavior type* : (competitive or collaborating self-reported after negotiation) Collaborative: face-to-face = video > text = audio Competitive: video = text > audio > face-to-face - *Perceived behavior type of opponent*: Collaborative: face-to-face > text > audio = video - *Negotiation time*: most efficient is face-to-face, audio, video, but text required sign. more time than the others - *Joint outcome*: no sign difference for different media, but subjected reported to use collaborative approach obtained higher joint outcome - *Outcome satisfaction*: richer the media higher the satisfaction - *Relationship*: (desire for future negotiation) richer the media higher the relationship	- Test a framework linking media richness to objective (negotiation time and joint outcome) and subjective variables (behavior type, outcome satisfaction and relationship) - Richer media produce higher values for subjective variables - ENT affects the behavior adopted by the negotiator in the process

Authors	ENS	Moderating variables	Process and outcome variables	Summary and comments
Foroughi et al. (2001)	NSS (DSS + text or audio communication)	- *Conflict level*: half of the participants were given preferences that are more divergent (distributive) than the other half (integrative) ---same case as Jones and Jelassi (1990)	- *Joint outcome*: Audio = text for integrative, but audio > text distributive dyads - *Contract balance*: no sign effect for integrative and distributive dyads - *Settlement time*: Text required more time than audio for integrative and distributive dyads - *Number of contract proposed*: Text > audio for integrative dyads, but no sign. for distributive ones - *Discussion climate*: no sign effect - *Outcome satisfaction*: no sign. effect	- Examine the effect of various communication support in NSS on different conflict levels - Objective measure of outcome (joint outcome) was influenced by communication media for those with high conflict, but did not interfere in low conflict - This means that people in high conflict need a richer media to find good solutions - In terms of the process, text require more time than audio in general and more proposals for integrative bargainers - Subjective outcomes had no effect although objective ones were sign. - The statistical power is weak because more than 16 dyads/ treatment is not enough for 2X2 design
Yuan et al. (2003)	ENT (text alone, T; text and audio, TA; and text with video and audio, TAV)		- *Communication efficiency*: TVA = TA > T - *Communication effectiveness* TVA = TA > T - *Positive social-emotional communication*: TVA = TA > T - *Negative social-emotional communication*: TVA > TA = T (mean TVA was more distracting to the process) - *Outcome satisfaction*: (the paper calls it perceived better solution but the authors writes that the items used were based on outcome satisfaction) TVA = TA > T	- Study the value of increase media richness to the process of negotiation - MBA students negotiate a house purchasing case, two rounds with change in media and counterpart - Once the more richer media were provided people refrain from using text - An increase from T to TA or TVA created an increase in perceptions (communication efficiency, communication effectiveness and positive social-emotional communication), but not much difference from TA to TVA - In fact video distracted negotiators from the task as they became more self-aware - The results maybe affected by the poor quality of the video output - No objective results were presented

Authors	ENS	Moderating variables	Process and outcome variables	Summary and comments
Koeszegi et al. (2004)	ENS	- *Culture*: (low-context vs. high-context refers to the amount of implicit information captured in the message) Asian and Latin countries are consider to have high-context, while North American and western European have low context	- *Actual use*: record of usage is different between cultures. Low-context culture use offers only, while high-context culture use communication tool more with offers - *Ease of use*: (perception of cognitive effort required) no difference between cultures - *Usefulness of communication*: : (perception of communication support by ENS measured after negotiations) high-context perceived usefulness of communication to be higher - *Usefulness of analytical*: (perception of analytical support by ENS measured after negotiations) low-context perceived usefulness of analytical to be higher	- Study the impact of culture on perceptions, assessment and use of ENS - Field experiment using Inspire bicycle part contracting case - Usage patterns are different, as high-context culture included more messages with offers, while low-culture resign to sending more offers alone - High-context cultures value analytical support more than low-context culture that value by communication support
Vetschera et al. (2004)	ENS		- *Individual differences*: age, gender, national culture and experience affect perceptions of usefulness and ease of use as well as individual outcome - *Actual use*: (number of offers and number of offer with message) affects perceptions of usefulness and ease of use as well as individual outcome - *Individual outcome*: (utility achieved) impacts perceptions of usefulness and ease of use as well as outcome satisfaction - *Ease of use*: (cognitive effort required to use the system in general and for analytical support) affects outcome satisfaction - *Usefulness*: (divided into analytical and communication support) affects outcome satisfaction - *Outcome satisfaction*: (measure as assessment) has the potential to affect *intention to use*	- Explore factors that influence intention to use ENS - Field experiment using Inspire bicycle part contracting case - User's perceptions are influenced by individual difference, actual use and individual outcomes from use - Perceptions of ease of use and usefulness lead to outcome satisfaction - This exploratory study is based on correlation analysis and not structure equation modeling

Authors	ENS	Moderating variables	Process and outcome variables	Summary and comments
Doong and Lai (2006)	ENT (synchronous vs. asynchronous communication)		- *Perceived usefulness*: positively affects satisfaction with ENS and ENS continuance intention - *Positive disconfirmation*: (expected usage – actual usage) positively affects perceived usefulness and satisfaction with ENS - *Satisfaction with ENS*: (items are similar to attitude towards ENS) positively affects - *ENS continuance intention*: greater for asynchronous	- Test a structural model to explain ENS continuous intention - Perceived usefulness and satisfaction with system affect ENS continuous intentions - Mixed synchronous and asynchronous treatments, which provides no insight into the difference between the two types of communication
Lai et al. (2006)	ENS	- *Motivational orientation*: cooperativeness vs. non-cooperativeness (self-reported)	- *Offer type*: cooperative negotiators send more offers with message, while non-cooperative negotiators rely more on offer alone - *Control of process*: negotiators who feel in control of the process adopt a more cooperative strategy - *Discussion climate*: cooperative negotiators report a friendlier discussion climate - *Outcome satisfaction*: collaborators have greater outcome satisfaction - *Number of agreements*: collaborators have greater number of agreements	- Study the relationship between negotiator's strategy and negotiation process and outcome - Field experiment using Inspire bicycle part contracting case - Cluster analysis of self-reported measures for cooperative or non-cooperative strategies - Correlation between self and opponent's strategy, meaning that they influence each other - Collaborators send more message with their offers and experience greater control in the process, discussion climate, number of agreements and outcome satisfaction - It is not clear if the agreement reached by collaborators are actually better (more efficient) than non-collaborators

Authors	ENS	Moderating variables	Process and outcome variables	Summary and comments
Psendorfer and Koeszegi (2006)	ENT (synchronous vs. asynchronous communication)		- *Behavior type*: more uninhibited behavior in synchronous. Synchronous users engaged in more tactical behavior, while asynchronous users engaged in more task-oriented exchanges - *Process coordination*: synchronous communication required more time and process coordination - *Outcome satisfaction*: greater for asynchronous - *Discussion climate*: greater for asynchronous - *Number of agreement*: no sign difference	- Examine negotiators' behavior in synchronous and asynchronous communication - Use two different cases: bicycle parts and pharmaceutical products (non-zero-sum) - Synchronous users were more uninhibited, competitive and required greater process coordination, which lead them to report lower outcome satisfaction and discussion climate - The number of agreement is the same for both types of communication - Different amount of time was given to the two treatments and the two cases was given under repeated measure protocol, both of which can contribute to the difference in findings
Vetschera (2006)	ENS (preference elicitation in pre-negotiation)	- *Individual difference*: gender, age, experience, culture and understanding of case - *Role*: Buyer or seller	- *Behavior consistency*: whether behavior during negotiation matches preferences elicited in pre-negotiation. Examples of deviations are: accept an offer that is inferior to a previously rejected offer or if the final offer proposed and accepted is greater than any previous offer (assumption of distributive bargaining). Individual difference have little influence over inconsistency (except for understanding of case), but role played by negotiator affected their consistency (sellers were more likely to be more inconsistent with their own offer.	- Examine the consistency of behavior with preference structure elicited in pre-negotiation - Field experiment using Inspire bicycle part contracting case - The person's understanding of the case affects consistency as well as their role - Sellers seem to start the process as being more generous, but move to a more distributive position once they are more engaged in the negotiation - The measurement of consistency is questionable as the deviations can be tactics used by negotiators

Authors	ENS	Moderating variables	Process and outcome variables	Summary and comments
Weber et al. (2006)	ENS (graph feature as part of decision support)		- *Number of agreements*: no difference between graph and no graph support - *Number of offers*: (number of offers needed to reach an agreement) graph users submitted more offers than those with no graph - *Textual communication*: (number of message and length of message) no difference between the number, but no graph users submitted longer messages supported > non-supported	- Study the effect of graph representation of offer utility on negotiation process and outcome - Field experiment using Inspire bicycle part contracting case - No graph support (n=54) and graph support (n=2,353), which can cause statistical biases when results are compared - No difference in outcome between graph and no graph in term of number of agreement - No graph users made less offers because graph users can have a more holistic picture of the offer space presented by graphical representation - Number of message was the same, but no graph users wrote longer messages to explain their rational and positioning - It appears that graph representation enables reduces cognitive effort, but did not affect the outcome because of tabular information provided to both groups
Galin et al. (2007)	ENT (text)		- *Joint outcome*: no sign. difference - *Time required*: ENT required more time - *Integrative behavior*: (soft tactics) were greater for face-to-face - *Distributive behavior*: (hard tactics) were greater for ENT	- Compare ENT with face-to-face - No difference in outcome - Face-to-face required less time and mediated more integrative behavior - The results did not show the difference between the two cases used

Authors	ENS	Moderating variables	Process and outcome variables	Summary and comments
Psendorfer and Koeszegi (2007)	ENT (text)	- *Conflict intensity*: manipulated by extending the case to include a history of negotiation breakdown between the parties - *Social embeddedness*: manipulated by asking participants to bring someone they know	- *Offer quality*: (claiming or creating value) negotiators with a relationship used value creation in low conflict situation, but no sign. difference between social embeddedness in high conflict - *Information quality*: (integrative vs. distributive exchange of information) negotiators with a relationship used more integrative and less distributive exchange in low conflict situation, but no sign. difference between social embeddedness in high conflict - *Number of agreements*: socially embedded negotiators reached more agreements in general	- Study the effect of social embeddedness on conflict intensity - In weak conflict, socially embedded dyads use value creation and more integrative vs. distributive information exchange, but did not reach sign. more agreements than non-embedded dyads - In high conflict, there were no difference in behavior between the two social groups, but socially embedded dyads reached more agreements - These findings are surprising, but given the sample size and no efficiency of agreement measure it is difficult to tell if social embeddedness produced better results
Yang, Lim et al. (2007)	ENS (decision support) vs. NSA	- *Cognitive complexity*: measure of tolerance for ambiguity. - *Value orientation*: task or people oriented individuals	- *Perceived control*: feeling of control over the process of negotiation. - *System anxiety*: unpleasant emotional state caused by tension, apprehension or worry	- ENS caused higher perceived control, which led to lower system anxiety. - Moderators had no effect.
Lim and Yang (2008)	ENS (with or without: multi-lingual support or NSS)		- *Individual outcome*: increased with NSS - *Joint outcome*: increased with NSS - *Equality*: interaction between NSS and multi-lingual support - *Time*: decreased with multi-lingual support - *Outcome satisfaction*: no sign effect - *Process satisfaction:* no sign effect	- Multi-lingual support helped increase equity (when paired with NSS), but required more time . - NSS helped increase economic outcome - Subjective measures were not sign.

3.4 Summary of Electronic Negotiation Systems

The primary objective of ENSs is to provide capabilities for enabling negotiators to learn about the problem and possible solutions to resolving their conflicts, as well as to help them reach agreements favourable for the individuals as well as the the dyads (Kersten 2003). The development of ENSs began with: (1) DSS and NSS (comprised of features that support decisions on standalone computers, and, possibly communication facilities on local networks); (2) progressed to employing internet technology for communications (e.g., ENT); (3) followed by the use of software agents in NAA to help with computationally intensive activities; and (4) increasing automation by giving agents entire control of the negotiation processes with NSA.

Over the years, various features have been developed to support pre-negotiation, the conduct of negotiation and post-negotiation activities. These features mediate the flow of information between parties by facilitating communication and decision making, but the impact of these features on the users and negotiated outcomes is still relatively unknown. An assessment of ENS studies shows that most research focused on the cost benefit framework, media richness theory and IS models of success without much consideration of cognitive theories of negotiation.

4 Outcome Frames

This section examines subjective representations of the situation, issues involved, and outcomes disputed in a negotiation through the perspective of information framing. In essence, it describes the *framing of outcomes* in terms of the negotiator's conception of the conflict relating to gains and profits (gain frame), or involving losses and costs (loss frame) through information presented in the case or by the mediating system. The frame is controlled partly by the formation of the problem found in the case or the system, and partly by the norms, habits and inherent biases of the individual.

Behavioral studies have pointed to the negotiators' cognitive limitations, biases and/or mistakes in integrating information as reasons for failed or inefficient negotiations (Neale and Bazerman 1991). These shortcomings are not necessarily due to humans' inherent inadequacies, but they may be due to the situational factors and complexity of the decision problem (Bazerman 1986). De Dreu and Carnevale (2003) argued that slight deviations in the structure of the task can have severe consequences on the manner in which people think and behave.

This section explores the literature on framing effects, especially those of outcome framing in negotiations. The first subsection, Section 4.1, describes the cognitive perspective of framing, with risk, attribute or goals. Section 4.2 discusses outcome frames and their effects on negotiations. Section 4.3 introduces framing in electronic commerce for comparison of objects or events. Section 4.4 points to the potential of ENSs for inducing framing outcomes in the negotiation process. Finally, the fifth subsection, Section 4.5, summarizes the discussion on outcome frames.

4.1 Framing Effect

Negotiation research follows many research traditions in the applied behavioral sciences, such as psychology, political science, law, economics, communication, anthropology, and organizational behavior (Bazerman, Curhan et al. 2000). On a theoretical level, behavioral researchers study and build models to explain processes and outcomes of negotiations. On a practical level, they aim to predict process and outcomes and to help people negotiate more effectively and efficiently (Thompson 1990). Over the years, research has focused on how the economic and structural characteristics of the negotiation context influence human decision processes and outcomes reached (De Dreu, Beersma et al. 2006). Behavioral researchers observed that a decision-maker may respond differently to slight variations in the descriptions of a problem. Studies in such area of human judgment call the phenomenon *the framing effect*.

The concept of framing refers to the different manner in which the decision problem is presented. A frame affects evaluation of probabilities and outcomes, so that the preferences shift when the same problem is framed in different ways. The impact of a few words can change the preferences of individuals from one option over to another, violating the rationality principles assumed in, for example, expected utility model of von Neumann and Morgensten (1947).

Numerous laboratory studies have shown that when two descriptions of outcomes are framed differently (e.g., one in terms of lives saved and another in terms of lives lost), people make different choices. The participants would select the riskier option when the problem is framed in terms of lives lost. The *prospect theory*, formulated by Kahneman and Tversky (1979), describes the differences in decisions made when: (1) outcomes are

expressed as positive or negative deviations from a reference point, and (2) risk attitudes that are formed when gains and losses are considered.

The effect of an outcome frame can be interpreted through a value function adapted from prospect theory. The function describes the relationship between objective outcomes and subjective values (Tversky and Kahneman 1981). To illustrate the different perceptions of value generated by different outcome frames, Figure 9 uses the S-shaped curve to demonstrate the differences in perception for the same objective values in both frames. The objective value stated in the gain frame is the same as that in the loss frame (i.e., a difference of 25 points on the x-axis for G and L), but the subjective value is greater in the loss frame (i.e., SL is about 20 points on the y-axis) than in the gain frame (i.e., SG is about 12 points on the y-axis). Hence, the pleasure associated with gaining a sum of money is generally less than the displeasure associated with losing the same amount of money.
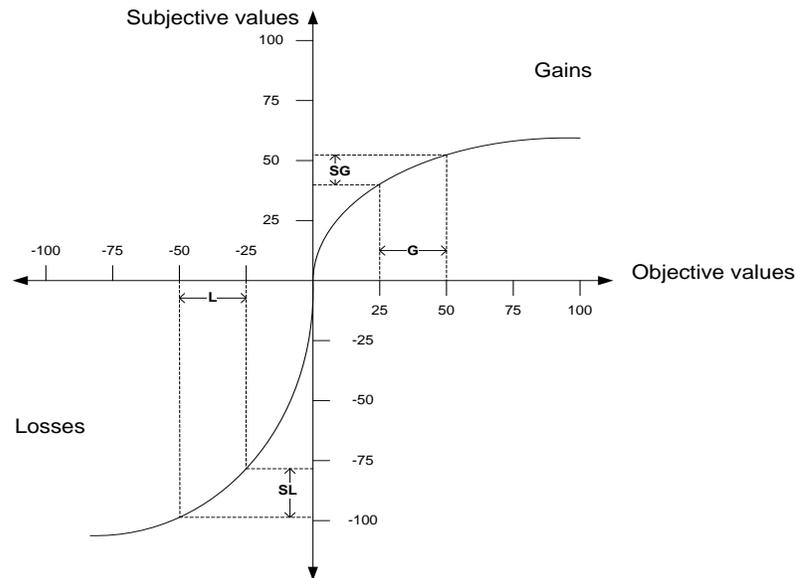
Figure 9 Theoretical value function based on Kahneman and Tversky (1979)

Prospect theory shows that decision-makers seek more risky options in a loss frame, but they prefer less risky options in a gain frame. Their risk attitude follows the S-shaped value function, whereby they take greater risk associated with losses than they do with gains.

As work in framing effect expands to a large number of scenarios ranging from medical judgments to social dilemmas, Levin, Schneiderb et al. (1998) proposed a typology to distinguish three different types of framing effects: attribute framing, risk choice framing, and goal framing. These types are discussed below.

4.1.1 Attribute Framing

Attribute framing is the most straightforward type of framing, as it involves describing objects or events in either positive or negative terms (Levin, Schneiderb et al. 1998). Studies showed that people evaluate objects more positively when they are framed in a positive light than in a negative one. For example, the attribute study of Levin and Gaeth (1988) revealed that the perception of quality for ground beef is dependent of whether the product is labeled positively "75% lean" or negatively "25% fat". Subjects rated the ground beef framed as "75% lean" as being tastier and less greasy that the same product but labeled in the negative frame.

Attribute framing is at the root of outcome framing studies in negotiations. Outcomes can be presented to negotiators in terms of either gains or losses through a profit schedule, while the net profit is the same in both frames. The effects of outcome framing serve to explain why favorable offers are accepted in the gain frame but not in the loss frame Bazerman (1986). Section 4.2 presents an in-depth discussion of outcome framing in negotiations.

4.1.2 Risk Choice Framing

Risk choice framing examines decision-making under uncertainty for attribute selection. Under risk choice framing, people make different choices depending on the description of the options in either positive or negative terms: between a risky vs. a certain (or very low risk) option of equal expected value. For example, Tversky and Kahneman (1981, p. 453) gave the subjects the following options:

(1) In the *positive* risk frame,

  (a) 100% possibility of saving 200 lives; or

  (b) 33% possibility of saving all 600 lives and 66% possibility of saving no lives

(2) In the *negative* risk frame,

  (c) 100% possibility of losing 400 lives; or

  (d) 33% possibility of losing no lives and 66% possibility of losing all 600 lives

The results of such studies demonstrated that the majority of decision-makers selected the riskless option (a) in the positive frame, but reversed their preferences in the negative frame to the risky option (d).

The notion of risk framing is debated by different researchers in the study of negotiations. Neale and Bazerman (1985) argued that risk plays an important part in explaining the difference of results obtained from positively vs. negatively framed outcomes. They noted that negotiators were more averse to risky arbitration in the positive (gain) frame than in the negative (loss) frame. In the gain frame, the negotiators were, therefore, more likely to make larger concessions and settle. However, the study did not explicitly describe the risk to negotiators, which puts into question the uncertainty faced when confronted with arbitration. De Dreu, Carnevale et al. (1995) stated that the

lack of explicit risk of non-agreements violates the use of risk choice, and that the differences in results between positively and negatively presented outcomes are due to the framing of the problem, a question of attribute framing.

4.1.3 Goal Framing

Goal framing relates to persuading individuals to act as a consequence of the message being presented in either positive or negative terms (Levin, Schneiderb et al. 1998). Goal framing in the positive frame is often used in advertisement to emphasize a desirable consequence or course of action. But in the negative frame, goal framing seeks to underscore the undesirable consequences of the behavior. The positive frame of the message focuses on a behavior that entails a positive consequence, whereas negative framing highlights the same behavior in avoiding a negative consequence. For example, in a medical study that looked at goal framing (Meyerowitz and Chaiken 1987), women were more likely to perform self-breast exams when the consequences of not doing so were presented in negative terms. The following two statements were used:

    (1) In the *positive* goal frame,

        "Research shows that women who do breast self-examinations have an increased chance of finding a tumor in the early, more treatable stage of the disease."

    (2) In the *negative* goal frame,

        "Research shows that women who do not do breast self-examinations have a decreased chance of finding a tumor in the early, more treatable stage of the disease."

The difference between attribute and goal framing is that goal framing does not stress whether the behavior is positive or negative. Instead, the consequence in the message is

framed negatively or positively depending on whether the behavior is performed or not. Goal framing appears to be more effective when the message is presented in negative consequences, but there is less evidence to this effect than those of other types of framing (Levin, Schneiderb et al. 1998). Thus far, the application of goal framing is not reported in negotiation research.

4.2 Outcome Frame in Negotiation

In negotiation, the framing of an outcome is a form of attribute framing, and it is shown to be influential in formulating offers, communicating with the counterpart and judging concessions made (De Dreu, Carnevale et al. 1995). The *outcome frame* refers to the negotiator's conception of the disputed event as involving gains or losses (Kahneman and Tversky 1979). Moreover, outcome frames are necessarily present in every negotiation as people make decisions based on a comparison of a prospective outcome to a reference point, and they subsequently negotiate to seek greater gains or reduce potential losses. The outcome frame may be derived from the negotiator's cognitive representation of potential outcome or from the characterization of the dispute as profit or cost to the negotiator (De Dreu, Carnevale et al. 1995).

The main premise behind outcome frames is the reference point, which negotiators use to compare their outcomes. A gain frame suggests that an outcome provides greater profit than the reference value, while a loss frame points to an outcome below the reference value. In negotiations, the level of aspiration serves as a reference value that individuals use as a basis to evaluate offers. If the received offer falls below the expectation level (in terms of gains) then the negotiator views accepting such an offer as a loss. To illustrate this point, consider a single issue negotiation between management

and a labor union. The union has received a 3% increase in pay last year and expects to get the same increase. When the company offers a 2.5% the union views this as a loss of 0.5% compared to last year's 3% increase. If the union expects to receive only a 2% increase in this negotiation because of either weaker economic conditions or because other unions have accepted a 2% increase, then an offer of 2.5% compared to an expectation of 2% is considered to be a gain. Therefore, a high reference point can cause negotiators to resist concessions.

The explanations for outcome framing effect are generally based on two theories: (1) *heightened risk tolerance* (Bazerman 1983), and (2) *heightened concern for outcome* (De Dreu, Carnevale et al. 1995). Both theories assume that framing outcomes as gains and losses implies the evaluation of potential outcomes in subjective terms following many rounds of offer exchange.

The heightened risk tolerance theory argues that negotiators make larger concessions in the gain frame because they would rather reach a sure settlement than risk arbitration or a non-agreement. But in the loss frame, negotiators are more risk-seeking and willing to choose arbitration than accept certain loss. To demonstrate the risk tolerance, Bazerman (1983) asked negotiators to choose either accepting a $4,000 offer or face arbitration. Negotiators placed in a gain frame, where the reference value was $0, were more likely to accept the offer than risk arbitration compared to those in the loss frame using a reference value of $8000.

Subsequently, Neale and Bazerman (1985) tested their risk hypothesis by conducting an experiment involving a multi-issue, union-management negotiation, whereby subjects played the role of management representatives who were given the

instructions to either maximize gains or minimize losses. A trained facilitator played the role of the union representative and mimicked the strategy adopted by the subjects. In case of an impasse, an arbitrator would make a final decision on the terms of the settlement. The results showed that negotiators operating in a gain frame settled more often and reported the discussion climate to be less competitive. These findings appeared to support the heightened risk tolerance explanation for outcome effect. However, it is unclear whether the subject in different treatment assessed the risk of facing an arbitrator differently (De Dreu, Carnevale et al. 1995). The theory of heightened risk tolerance needs to be extended, especially when uncertainty is not measured or proven to generate outcome framing effect without manipulation by a researcher.

The heightened concern for outcome theory coincides with Kahneman's (1992) argument that losses loom greater than gains forgone. This theory is based on attribute framing (Levin, Schneiderb et al. 1998), and it suggests that negotiators working in a loss frame feel that every concession is a loss of revenue, while those in a gain frame see concessions as a forgone gain. Therefore, concessions are more difficult to make for those in the loss frame. In an experiment on the endowment effect, i.e. when people value an object that they possess more than if the same object is not in their ownership (Thaler 1980), one group of subjects was given a coffee mug and asked to give the value at which they would trade this mug, whereas subjects from another group were asked to give the value at which they would buy the mug from those in the first group. The results showed that subjects in the first group worked with a loss frame, which influenced them to place the value of the mug twice as high as those in the gain frame (i.e., subjects in the other group). This theory is also supported by other studies (Kahneman, Knetsch et al. 1990;

Carnevale and Pruitt 1992; Carnevale, De Dreu et al. 1994; De Dreu, Carnevale et al. 1995).

The difference in outcome framing implies that potential outcomes (offers) are evaluated based on a reference point A or B as shown in Figure 10. On one hand, a negotiator in the gain frame evaluates offers based on A, so that changes are perceived as movements along a concave function. On the other hand, a negotiator in the loss frame judges offers based on B, so that changes are perceived as movements along a convex function. For example, an offer value at 50 is compared to 0 (reference point A) and perceived as a gain of 50. However, the same offer in the loss frame (i.e., a comparison to reference point B) is perceived as a loss of 75 (i.e., SL is larger than SG).
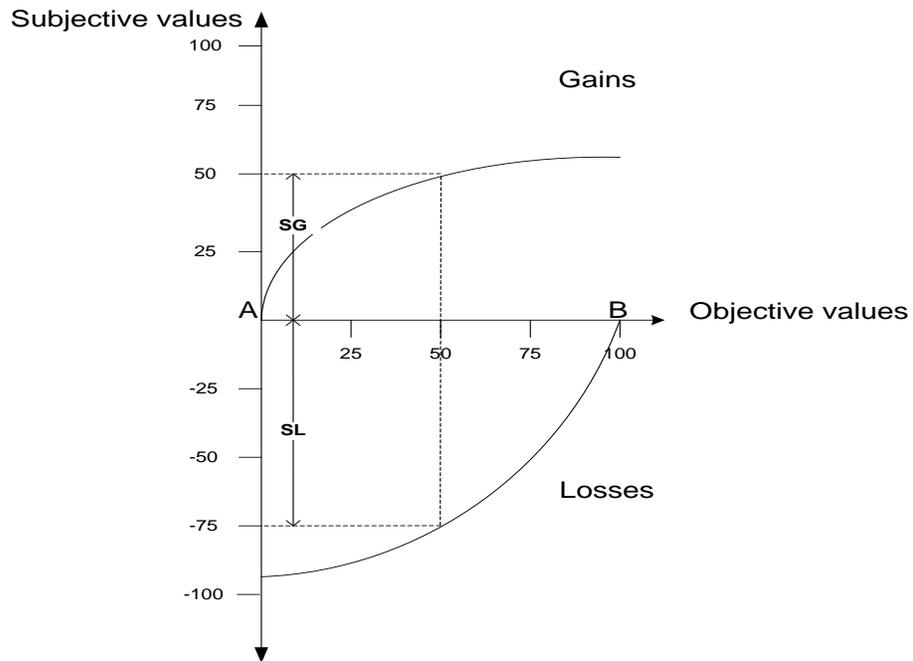
Figure 10 Comparison of outcomes adapted from De Dreu, Carnevale et al. (1995)

100

4.2.1 Loss Frame and Conflict Escalation

The difference between a loss and a gain frames centers on the reference point, on which negotiators judge the prospective outcome. Negotiators given a high reference point generally concede less, use more contentious behavior, hold higher expectations, take longer to reach settlement, and are less likely to reach an agreement compared to those given a low reference point (Carnevale and Pruitt 1992).

In an early study on outcome frames, Bazerman, Magliozzi et al. (1985) created two markets to test a 3-issue integrative bargaining task. In the gain frame condition participants were given a table of all possible agreements expressed in terms of profits, while those in the loss frame condition received a table of all possible agreements stated in terms of expenses; while both conditions had identical net profits. When the outcomes were framed as profits, negotiators reached more agreements, the joint outcome was greater, and they reported better perception of relationship with other party than those in the loss frame.

To confirm this difference in perception of gains and losses, De Dreu and his colleagues tested the effect of outcome frames by assigning participants to the role of seller and asked them to bargain with a computer program (which the participants were led to believe was another participant) that played the role of a buyer. The participants negotiating over expenses (loss frame) were more demanding and conceded less than those operating in a gain frame. Furthermore, the messages sent by the participants (not replied to by the computer program) differed between outcome frames, whereby gain frame negotiators used more positive communication to express their preferences and potential concessions, while those in the loss frame stressed negative consequences

towards concessions. The dissimilar perceptions of values is what caused negotiators to resist concession-making and engage in more contentious behaviors, which hindered the discovery of integrative solutions (De Dreu, Carnevale et al. 1995).

4.2.2 Frame Adoption and Overcoming the Loss Frame

According to frame adoption theory, a loss frame is easily adopted but less readily transformed into a gain frame than vice versa. In a series of experiments (De Dreu, Carnevale et al. 1994) with preprogrammed offers and messages from a computer acting as a buyer, human subjects ("sellers") would engage in six rounds of negotiations with the computer. The computer used messages that referred to outcomes as gains, profits and benefits in the gain frame, while in the loss frame the messages expressed outcomes as expenses, costs and losses. In the analysis, the messages sent by the humans were coded as communicating either in a gain or loss frame based on the way offers were expressed. The results indicated that negotiators operating in the gain frame adopted the use of loss-framed messages when negotiating with a loss-framed computer. However, those in a loss frame did not adopt the use of the gain-framed messages when negotiating with a computer in a gain frame.

Thus, the loss frame appears to be dominant over the gain frame (i.e., a loss frame instigates the counterpart to adopt a loss frame, but the gain frame does not have the same effect). In addition, the findings from this experiment showed that the loss frame has the potential to negatively impact negotiation by escalating the conflict. Nevertheless, several moderating factors have been demonstrated to reduce the influence of framing.

The framing effect can be diminished by changing the reference point. The notion of a static outcome frame, established at the onset of negotiation and remaining constant

throughout a negotiation, was challenged by studies that sought to move the reference point or introduce an anchor. In these studies positive effect, risk of arbitration, and motivational orientations were manipulated and their impact on outcomes was assessed (De Dreu, Carnevale et al. 1994; Olekalns 1994; Carnevale 2007; Trötschel and Gollwitzer 2007). The introduction of moderating variables on outcome framing coincides with the three forces that reduce the impact of a loss frame as suggested by Levin and Gaeth (1988):

- *Decrease the threat of loss*: A concession implies a larger cost in the loss frame as it is judged to be a greater decline in value than in the gain frame. The effect of such an impact in the loss frame is assumed to diminish by shifting the value function to the right (i.e., by manipulating the reference point). Thus, the perception of a concession in the loss frame is seen as equivalent to a concession in the gain frame (Carnevale 2007). Figure 11 depicts the shift of the value function and the difference in subjective values over similar concessions in the gain and loss frames. The shifted function causes concessions values to be evaluated similarly for gains and losses (i.e., SG1 is equal to SL1 for the same concession for either G1 or L1).
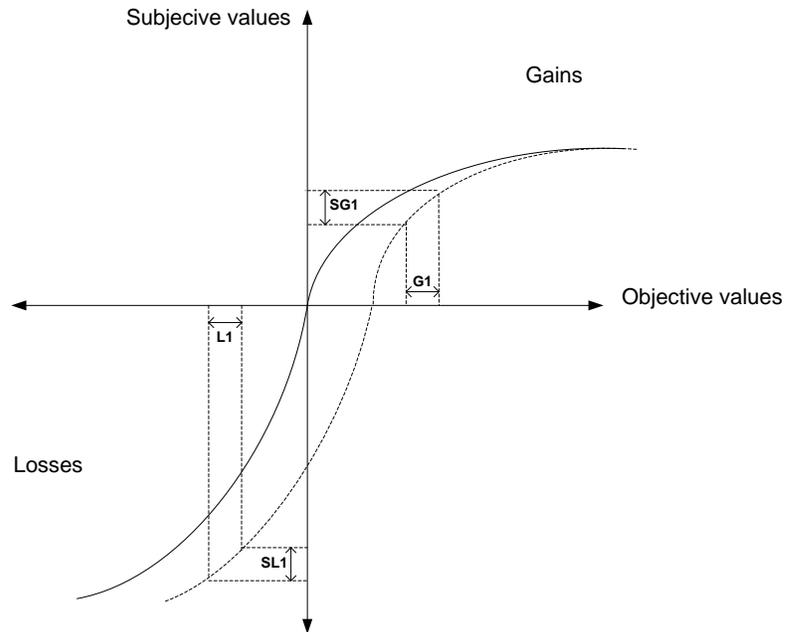
Figure 11 Shift in value function based on Carnevale (2007)

- *Avoid facing adverse possibilities*: The heightened concern for outcome is considered the main reason that negotiators place greater value on concessions made in the loss frame. The risk of suffering a greater loss in deadlock can introduce an anchor, which affects the judgment of concessions. The anchor shifts the negotiator's reference to the value of potential outcomes (Bazerman 1983). In an experiment that examines the uncertainty created by an impasse, the loss frame negotiators were more cooperative and reached integrative agreements when they faced a risky gamble in case of a deadlock than if they were not subjected to such uncertainty (Bottom 1998). These results from the experiment also highlighted the importance of evaluating all sources of uncertainty faced by negotiators in complex business negotiations involving substantial risk.

Prior to assessing the effect of a loss frame, the risk incurred by a negotiator needs to be determined in order to properly judge his/her behavior and the negotiation outcome. Botton (1998, p. 109) stated that:

> "When contracting involves large uncertainties, as it does in most significant business transactions, then the greater risk taking associated with high reference points leads to more cooperative bargaining and a greater chance of agreement. When the only uncertainties concerned those of strategic choices or BATNAs (best alternative to negotiated agreement), the riskier strategies that threaten non-settlement will appeal primarily to those who are negotiating over losses. However, when the payoffs from different contractual arrangements are highly uncertain, then these strategies have greater appeal to gain-frame negotiators. The direction depends on the relative attractiveness of the party's BATNA, the downside risk stemming from a potential contract, and the negotiator's reference point.
>
> Therefore in the assessment of outcome frame effect, the risk of impasse must also be considered as an agreement can entail greater downside risk than the status quo, such that a high reference point, not a low one, influences negotiators to make greater concessions and reach and more agreements."

- *Contrast with social motives*: From a cognitive perspective, the concession aversion shown by negotiators in a loss frame can be lessened by a high concern for other's outcome in a collaborative setting (De Dreu, Carnevale et al. 1995).

The argument is that negotiators modify their resistance to concession-making when they must consider the impact of rejecting the opponent's demands on the joint outcome. However, early experiments analyzing the influence of social motives and outcome frames on negotiation have been inconclusive. Olekalns (1994) found that collaborative negotiators obtained lower joint outcome in a loss frame than in a gain frame, Carnevale and Keenan (1990) reported that collaborative negotiators benefited more from a loss frame than a gain frame. In a later experiment, dyads negotiating in a loss frame overcame the effect of loss aversion when elements of cooperation were introduced in the scenario (Olekalns 1997). In order to reconcile the discrepancy between these studies, Trötschel and Gollwitzer (2007) showed that prosocial motives alone were not enough to surpass the high resistance to concession-making in the loss frame. Instead, negotiators needed to be given an implementation strategy in the form of intentions towards making a fair counteroffer to help them engage in problem-solving and reach more efficient agreements.

Research in this area has dealt mostly with framing outcomes by means of case description given in pre-negotiation. However, there haven't been studies investigating the effects of framing from a system's perspective in negotiations, since most experiments involved face-to-face interactions. Negotiation is a dynamic process that can change the perceptions of outcomes as evidenced by the forces described by Levin, Schneiderb et al. (1998). Electronic negotiations involve technology that is incorporated

into the process. The facilitation of decisions and interaction through the ENS may provide the potential to frame outcomes throughout the process.

4.3 Online Framing

The cognitive heuristics employed in attribute selection describe the people's tendency to select a reference point or anchor when evaluating offers. They adjust this reference point or anchor when situational variables affect their judgment (Tversky and Kahneman 1986; Dawes 1988). The perception created by the framing of outcome in the problem description has been intensely studied. Research on factors that cause shifts in perception during the process of negotiation has not been well developed. This especially the case for outcome frames, which are subjected to the dynamics of the interaction between the two sides (De Dreu and Carnevale 2003) and, in the case of electronic negotiation, that of the user with the system.

Evidence of outcome framing is present throughout electronic commerce. Vendors use framing to display product characteristics in terms of maximizing gains or minimizing losses (Stibel 2005). Figure 12 illustrates two websites that advertise sales through the display of prices for goods as either emphasizing gains or costs. The outcome frames used on the left side of Figure 12a centers on the gains that a consumer would receive from the purchase (e.g., a saving of $170). The right side (Figure 12b) focuses on the reduction of cost to the buyer (e.g., the sale price of $495 means that the ring will cost the buyer less than if he/she paid the original price of $1000). According to Levin, Schneiderb et al. (1998), people evaluate products as being more attractive when information is presented from a positive perspective in attribute framing. This means that

people are more likely to evaluate an option more favorably when it is described positively, i.e. in terms of gains rather than losses (Kahneman and Tversky 1979).

a) Positive framing of prices as saving   b) Negative framing of prices as cost

Figure 12 Display of sales in positive and negative process frame

Another example of a website manipulating frames to influence purchasing decisions can be found when users purchase music or download a video from *yahoo.com*. The duration of the song is presented in positive values to show the gains achieved from buying the song, as reflected by the 1:44 minute display in Figure 13a. Alternatively, in Figure 13b, when users are sampling music online, electronic retailers such as *last.fm* use a negative value (a -0:16 minute) to depict the duration of the song. The negative value creates a perception of loss that stimulates users to avoid such dispossession and to purchase the album.
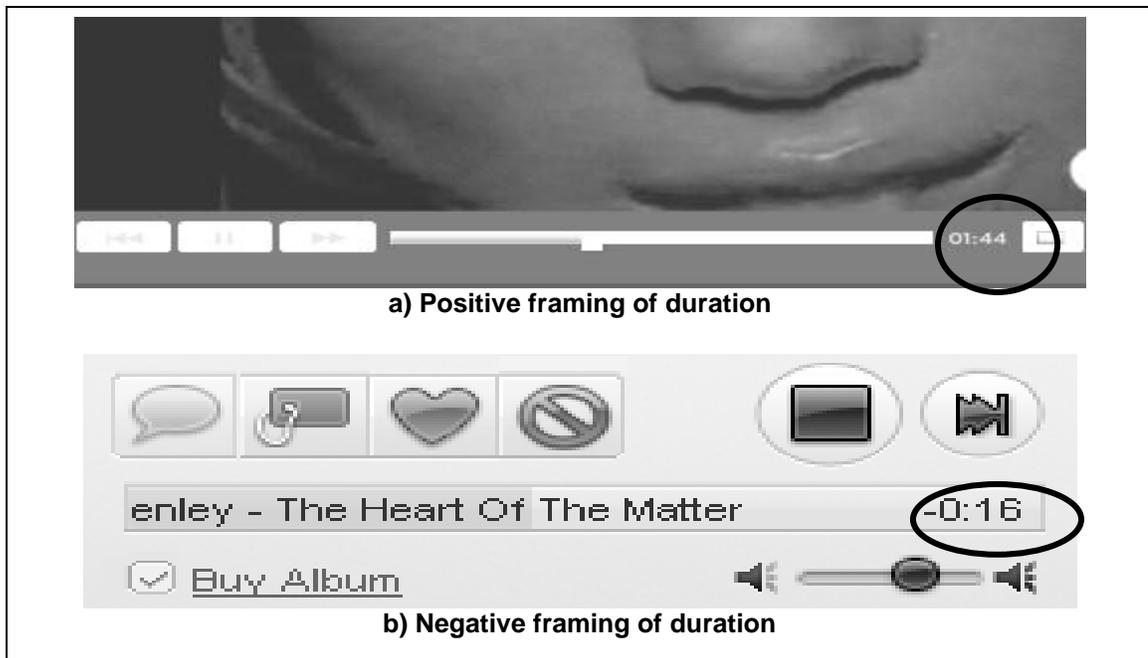
Figure 13 Outcome frames in music downloads

4.3.1 Interpretation and Limitation of System Framing

Tversky and Kahnaman (1981) alluded to the use of computational aids to help people solve complex problems that required concurrent decisions. However, the introduction of decision support may in itself frame information and shift a reference point or an anchor. The manipulation of information by online systems has been shown to encourage electronic purchases (Stibel 2005).

System framing is also the choice of the medium used to present information to influence the cognitive process of the decision-maker (Silver 2008). It can be extrapolated to attribute framing, whereby when an object is described in a positive way people offer better evaluation of the object than if it is presented in a negative way. Although the effect appears intuitive, the explanation points to cognitive processing that evokes complex association of the stimulus to selective information coded in the memory (Levin and Gaeth 1988). The positive labeling of an item evokes favorable associations in

the memory, whereas the negative labeling of the same attribute engenders unfavorable associations.

The exposure of a positive stimulus can create favorable distortions that persist to later evaluations of other stimuli (Russo, Medvec et al. 1996). The valence-based encoding causes a confirmatory bias involving the same sort of selective attention and cognitive search mechanism, which can explain why expectations have such an intense effect on judgment (Harris 1991). The cognitive explanation rests heavy on the positively or negatively valence-based knowledge accessed during the impression formation process. In psychology, limitations on the framing effect have been shown when the object or event involves:

- *Highly personal or ethical issues*: Topics that evoke profound reactions are less susceptible to framing effects as favorable or unfavorable associations are not able to counter the inherent beliefs. Marteau (1989) found that no framing effects were present when testing subjects on problems involving abortion decisions.

- *Estimation of one's own performance*: Invariance of framing is also found when people are evaluating their own performance, which can be explained by their tendency to overestimate their abilities and neglect information that does not support their self-worth.

- *Dealing with extreme values*: System framing suffers from ceiling and floor effect as people have difficulty evaluating extreme levels. Levin and Gaeth (1988) showed that evaluations of options were more striking using intermediate than extreme levels.

4.4 Potential of System Framing

Literature on the effect of system framing so far has centered on a single decision rather than many decisions, which is the case throughout the course of negotiation (Kirchler, Maciejovsky et al. 2005). The impact of this effect needs to be studied because ENSs influence the process and results through their mediation of communication between parties and restructuring of information to support decision-making.

In Section 3, ENSs were described as performing two major functions: (1) they facilitate negotiations by providing a platform for users to communicate and possibly find acceptable solutions; and (2) they mediate negotiations through the provision of decision support. Both of these tend to manipulate information, which can help users build and evaluate offers. The impact of such framing can affect the negotiators' preconceived representation of the problem (Delaney, Foroughi et al. 1997). More importantly, ENSs inevitably influence the process of negotiation by displaying explicit information to help people compare alternatives (Delaney, Foroughi et al. 1997).

ENS framing can enhance or hinder negotiated outcomes depending on the variables external to the system. In the third experiment presented by Trötschel and Gollwitzer (2007), motivational orientation was manipulated as a variable external to the ENS, which presented stocks in gain and loss frames. The study found that collaborators benefited more from a loss frame than from a gain frame, because when the system framed information as losses, they were more hesitant to make large, disadvantageous concessions that would reduce joint gains.

The decision support component introduces framing through the interface that displays the evaluations of offers and counteroffers. In these instances, the information

displayed includes the offer rating in either positive or negative values based on different reference points. For example, an offer that is characterized as "meeting 75% of one's goals" (in a gain frame) can be perceived very differently than the same offer being described as "25% away from one's objectives" (in a loss frame).

Studies on DSS interface showed that the presentation of items can affect their persuasiveness and preferences by the user (Bettman and Sujan 1987; Payne, Bettman et al. 1993). Tversky (1969) alluded to the effects of such framing when he described the additive and difference rule in comparing two alternatives displayed. He suggested that sequential presentation is more adequate for computing the addition of alternatives, while simultaneous display is best for comparing the difference of alternatives. Moreover, strategies are affected by the format of information display as reported by Johnson (1984).

The framing of offers in the negotiation process can also alter people's evaluation of these and have the potential to decrease resistance to concession making. An example of such framing by the context, but not through a system and not in a controlled experimental setting, was given by Raiffa (1982). He noted in a classroom exercise that students were more likely to accept offers that were framed positively than negatively. Wilson (1989) claimed that positive graphs and images can increase the persuasive power of a message in terms of attitude and behavioral intention towards the behavior promoted by the message. A study of visual display of NSS led Herniter, Carmel et al. (1990) to discuss the need to limit the amount of information presented to the user in order to reduce confusion and help with problem-solving. In essence, the system must select and frame information matching the activities of the negotiator. For example, they proposed

using graphs to help users visualize patterns and predict trends, while use of tables was recommended for referencing data and comparing few offers. These guidelines were based on the comparison survey by Herniter, Carmel et al. (1990), who did not provide specific methods for inducing gain or loss frame.

ENS framing is a form of outcome framing that integrates the representation of gains and losses into the process of negotiation. The individual's conceptualization of likely negotiated outcomes is not only actualized at the onset of the problem, but also reiterated through the information provided by the decision support component of the system. This implies that the negotiator's perception of gains or losses can be altered by representing offer ratings in either a positive or negative format. The examination of such framing in electronic negotiations has thus far not been discussed or studied for multi-issue problems.

4.5 Summary of Outcome Frame

Outcome frame is focused on the negotiator's conception of the disputed event as involving gains or losses. Findings from empirical studies on outcome frame showed that when similar outcomes were presented in terms of gains or losses, negotiators operating with losses were more demanding, conceded less, arrived at fewer agreements and reached less efficient agreements. The reasons rest on people's heightened concern for outcome and/or risk tolerance. A decrease in the threat of concession-making, the avoidance of a greater potential loss in deadlock or the contrast of social motives can reduce the effect of a loss frame. So far, research on outcome framing in negotiation has focused on different representations of outcomes in face-to-face negotiations (Malhotra and Bazerman 2008). As ENSs facilitate decision-making and mediate interactions

between both sides, the system inevitably frames outcomes during the process through information presentation.

ENS framing refers to the individual's conceptualization of an outcome influenced by the information displayed during the process as either being a gain or a loss. In simple decisions, positive framing of attributes is more persuasive and leads to better evaluation of items (Levin, Schneiderb et al. 1998). Even though system framing has been studied in psychology for single shot evaluations of items, it has not been explicitly discussed in traditional negotiation research, which focuses mostly on face-to-face interactions and is not concerned with the display of information by a system. Research in DSSs points to the importance of restricting and framing information to help users make decisions that are consistent with their goals and tasks.

Foroughi, Perkins et al. (1995) suggested many ways in which ENSs may help negotiators overcome cognitive limitation without specific insight into how a system improves the process. By examining the potential of ENS framing on various contextual settings with different cognitive biases, a clearer understanding of the impact of technology can be achieved. This would help the designers provide systems that would encourage or discourage concession making depending on the objectives of the interaction.

5 Proposed Framework and Hypotheses

As the growth of internet-based technology engenders greater opportunities for organizations to transact online, the promise of ENSs is to provide not only a medium for communication, but also a structure for the exchange process by modeling decision-making and by representation of information. The literature review shows that empirical studies on ENS assessment have been concentrated mainly on the relation between the costs and benefits of the system, media richness of the communication channel and patterns of usage as predictors of system success (see Section 3). Behavioral research on conflict and negotiation stresses the importance of motivational orientation and outcome framing as antecedents, which influence the dynamics of interaction and, inevitably, the negotiated outcomes (see Section 2 and Section 4).

Early ENS studies followed the assumption that users are competitive, meaning that they are only concerned with their own outcomes; thereby the impact of motivational orientation on system interaction was mostly disregarded. For example, in Section 3.3, only two (Sheffield 1995; Lai, Doong et al. 2006) out of twenty two assessment studies looked at motivational orientation.

The competitive assumption is not necessarily reflective of field experiments or marketplaces where negotiators are free to pursue other goals, which may not be based solely on maximizing one's own utility. Using the bicycle parts case from the Inspire system, Lai, Doong et al. (2006) first asked participants to report their concern for selves and that for the counterparts, and then plotted their responses along the dual concern axes, from which two clusters emerged: collaborators and non-collaborators. Based on these clusters, Lai, Doong et al. (2006) found that each group had different patterns of

usage (i.e., collaborators tended to send more messages with offers, while non-collaborators focused more on offers with solely numeric information) that affected their likelihood of reaching an agreement and achieving outcome satisfaction. In another study, where collaborative and competitive orientations were clearly distinguished through the use of different incentive structures, Sheffield (1995) showed that technology (in terms of media richness) and visual presence of the counterparties played different roles in moderating the outcome. Collaborators obtained high joint outcome in visual treatment with text communication as opposed to competitors who fared better using audio communication without visual presence.

These studies highlighted the need to examine ENSs under different motivational contexts, because systems could be designed to help market participants with different orientations; more specifically, one of competitive, "I care only to maximize my gains", or other of collaborative orientation, "I need to maximize your and my gains as our welfare depends on each other". The studies also emphasized the importance of providing different types of system features that match the motivational orientations of the negotiators.

Behavioral researchers have long noted the significance of information framing on conflicts and negotiations (Bazerman 1986). Depending on the negotiators' perception of outcomes in terms of gains or losses, the likelihood of resisting concession-making or settling easily is different between the two frames (De Dreu, Carnevale et al. 1995).

Thus far, behavioral researchers have used similar negotiation cases, but presented the possible outcomes in each case as either gains or losses to create these two frames (Neale and Bazerman 1985). Using ENSs, we can take this approach further by

framing the negotiation process in accordance with the framing of outcomes, whereby the information technology artifact frames the interaction between negotiators.

In the review of ENS studies (Section 3.3), the systems with decision aids have only presented information in a gain frame (whereby all offers are considered positive when compared to the worst possible offer), and therefore the possibility of using a loss frame (whereby offers are framed negatively when compared to the best possible offer) has not been explored. Although the loss frame has been criticized to escalate conflict (Bazerman, Magliozzi et al. 1985), it has the potential to prevent negotiators from making unfavorable concessions and easily settling on poor offers (De Dreu, Carnevale et al. 1995). As non-zero sum negotiations require parties to discover the others' preferences and resist succumbing to the first satisficing solution (Lax and Sebenius 1986), the loss frame may interact with motivational orientation to enhance such negotiations.

In Section 5.1, a framework is presented that integrates behavioral and ENS design research. It describes the impact of motivational orientations and ENS framing at the dyadic and individual levels. Section 5.2 states hypotheses on the combined effect of motivational orientations and ENS framing on the negotiation process and outcome, in both objective as well as subjective terms.

5.1 Proposed Framework Description

The research framework, shown in Figure 14, depicts the impact of different motivational orientations interacting with ENS frames on the process and outcome from an objective, dyadic level and subjective, individual level. The elements characterizing the research framework are divided into independent and dependent variables. The independent variables are: (1) motivational orientation in terms of collaboratively or competitively

oriented dyads, and (2) ENS framing of offers as either gains or losses. The dependent variables describe the effect of the independent variables on the process and outcome. At the dyadic level, the dependent variables for the process include number of offers and cooperativeness, and those for the outcome include joint outcome as well as contract balance. At the individual level, they include cognitive effort and discussion climate for the process, and outcome satisfaction along with relationship for the outcome.

Motivational orientation		Process	Outcome	
Collaborative		Number of offers	Joint outcome	Dyadic level
Competitive		Cooperativeness	Contract balance	
ENS framing		Cognitive effort	Outcome satisfaction	Individual level
Gain frame		Discussion climate	Relationship	
Loss frame				
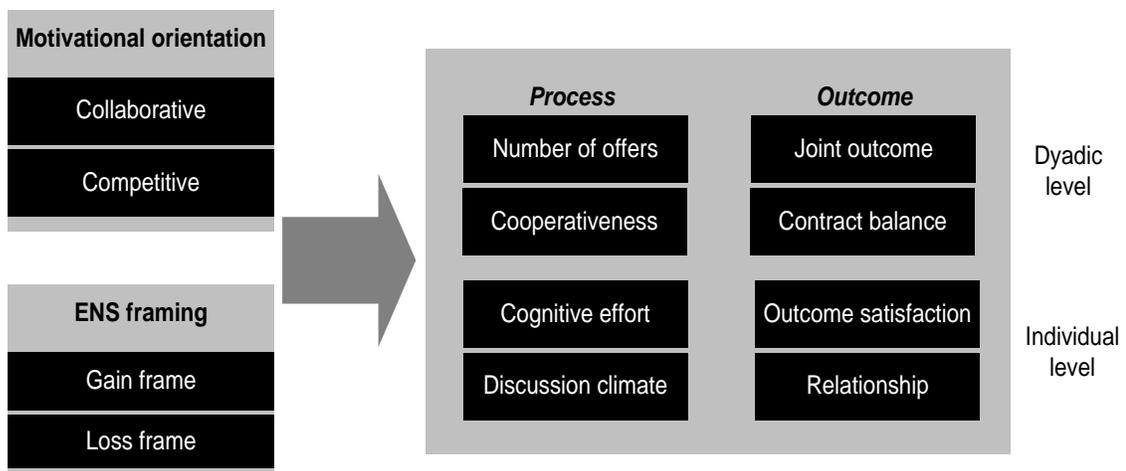
Figure 14 Research framework

5.1.1 Independent Variables

Motivational orientation refers to the individual's preference for a particular distribution of substantive outcome between oneself and the opponent (McClintock 1977). Although a variety of motivational orientations can arise from these two orthogonal perspectives of self and others (Pruitt and Rubin 1986), the competitive and collaborative orientations are most prevalent in economic transactions (Sheffield 1995; Shell 2001). They are also the underlying premises for two extreme market structures

118

(Soh and Markus 2002; Markus and Christiaanse 2003): purely competitive spot markets and long-term collaborative supply chain networks (Malone, Yates et al. 1987; Powell 1990; Montazemi, Siam et al. 2008).

On the one hand, traditional economic theories of bargaining assume that individuals adopt a *competitive orientation*, which is to say that individuals are only concerned with maximizing their own outcomes. Accordingly, any apparent collaborative behavior is speared by underlying egoistic motives, where personal gains, achieved by a settlement, can only result from providing the counterpart with an acceptable outcome (Sebenius 1992). Since agreements are reached when negotiators jointly discover beneficial solutions, the economic theories place little concern on social motives and explain failures to reach efficient solutions as cognitive limitations or biases resulting from poor judgment (Schelling 1960; Bazerman, Curhan et al. 2000).

Social psychology, on the other hand, considers motivational orientation to be paramount in explaining and predicting behaviors and outcomes (Thompson 1990). Social psychologists have claimed that competitively oriented individuals become distrusting, hostile and have negative interpersonal perceptions. However, the *collaborative orientation* (i.e., those, who are interested in maximizing their and the opponent's welfare) assumes a more trusting and positive attitude towards the other side, which can lead to constructive information exchange and integrative solutions (Kramer and Carnevale 2001). In their meta-analysis, De Dreu, Weingart et al. (2000) described motivational orientation as an important antecedent leading to differences in perceptions, attitudes, behaviors and negotiated outcomes. Compared to competitive dyads, collaborative ones engaged in more accurate exchange of preferences and priorities,

which allowed for more agreements. However, competitive dyads were able to push each other towards more efficient solutions.

The introduction of collaborative and competitive orientations broadens the context under which ENSs have been examined, meaning beyond the often assumed competitive realm to include social awareness (Sheffield 1995; Lai, Doong et al. 2006). Although different motivational orientations have been attributed to certain behaviors and outcomes, they do not provide an absolute prognostication of negotiation (De Dreu, Carnevale et al. 1995). The dynamic and complex exchanges are also governed by the manner in which information is framed (Bazerman, Curhan et al. 2000).

ENS framing examines the manipulation of information by information technology artifact to help users evaluate offers. Framing is derived from prospect theory, where individuals make choices based on their cognitive representation of potential outcomes associated with gains or losses (Kahneman and Tversky 1979). More specifically, ENS framing is defined here as the evaluation of offers based on either a *gain frame*, whereby offers are compared to the worst possible solution, or a *loss frame,* whereby offers are measured against the best possible solution. The framing of offers in these positive or negative terms influences decision-making differently. Studies examining the framing of outcomes as gains and losses demonstrated that people dread losses more than they seek rewards (Kahneman and Tversky 1995).

In behavioral research, different outcome frames have been presented in pre-negotiation with the assumption that the frames are static and remain firm throughout the exchange in face-to-face negotiations. (Neale and Bazerman 1991). For example; in the gain frame, negotiators were given potential outcomes in positive values (profits), while

in the loss frame, they were presented with outcomes in negative values (expenses). When outcomes were framed as gains, the participants demanded less, conceded more, and settled easier than in the loss frame (De Dreu, Carnevale et al. 1994). One reason is that these decision-makers judged offers based on their intuition and heuristics, which introduced biases, especially in complex decision-making tasks with multiple issues and options (Dawes 1980; Raiffa 1982; Malhotra and Bazerman 2008). In essence, people are willing to give up more in the gain frame because they perceive that the same amount is worth less than in the loss frame (Bazerman, Magliozzi et al. 1985; Bottom 1998).

The cognitive difficulties produced by the loss frame may be surpassed with negotiators who have a collaborative orientation (De Dreu, Carnevale et al. 1995). The conjecture is that the loss frame could impinge upon the collaborator's desire to make large concessions, and thus help to reduce unfavorable outcomes. The experimental findings showed mixed support for this theory in face-to-face studies (Carnevale, De Dreu et al. 1994; Olekalns 1994; Olekalns 1997). The implementation of framing throughout negotiations is important to uphold the bias created because the exchange process requires continuous decision-making and judgment, rather than a simple one-shot choice. Therefore, ENSs' mediating role creates the potential to extend framing over the course of interaction.

In Section 4.2, the discussion on outcome frame described how people make decisions based on their perceptions of outcomes, but as new information emerges they make adjustments to their cognitive representations (Kahneman and Tversky 1995). The information provided by decision support systems may also bias users as the system displays information that they employ for decision-making. In order to reduce cognitive

efforts, information, which requires inference, integration and transformation, is often mentally discounted or ignored in decision-making (Payne, Bettman et al. 1993). ENSs can structure, summarize, and present information (such as graphs and tables) to ease decision-making. A system that records, compiles and displays data inevitably frames this data. The manner in which the system guides negotiators has important implications on the process and outcome. ENS framing not only involves the display of potential outcomes prior to negotiations, but also the presentation of concessions made by the negotiator and the opponent during the exchange (Delaney, Foroughi et al. 1997).

An example of gain frame is presented in Figure 15, where offers are represented in positive values in comparison to the worst possible solution with a value of "0". Figure 16 depicts a loss frame, where offers are shown in negative values in comparison to the best possible solution with a value of "0". These mock screenshots depict graphs, tables and offer rating features important to supporting decision-making.

Trade-off both

End negotiation

Counteroffer history

	A	B	C	D	Value
counteroffer 1	h	h	h	h	0
counteroffer 2	f	a	h	h	+15
counteroffer 3	d	a	h	h	+30
counteroffer 4	d	d	f	h	+50

Accept

Your offer history

	A	B	C	D	Value
offer 1	a	a	a	a	+100
offer 2	a	a	d	b	+95
offer 3	d	a	f	e	+84
offer 4	d	d	f	b	+83

Propose new offer

		Value
A	Select option	0
B	Select option	0
C	Select option	0
D	Select option	0
	Total	0

Propose

Value exchange graph

Gains

100

50

0   10   15   20   30 min

Counteroffer
Your offer

Chat history

Figure 15 ENS framing of offers as gains

You have to decide whether to accept the last counteroffer or propose a new offer.

End negotiation

Counteroffer history

	A	B	C	D	Value
counteroffer 1	h	h	h	h	-100
counteroffer 2	f	a	h	h	-85
counteroffer 3	d	a	h	h	-70
counteroffer 4	d	d	f	h	-50

Accept

Your offer history

	A	B	C	D	Value
offer 1	a	a	a	a	0
offer 2	a	a	d	b	-5
offer 3	d	a	f	e	-16
offer 4	d	d	f	b	-17

Propose new offer

		Value
A	Select option	0
B	Select option	0
C	Select option	0
D	Select option	0
	Total	0

Propose

Value exchange graph

Losses

100

50

0   10   15   20   30 min

Counteroffer
Your offer

Chat history

Figure 16 ENS framing of offers as losses

5.1.2 Dependent Variables

The dependent variables in the research framework describe the process and outcomes resulting from the interaction of motivational orientation and ENS framing. For the process, the number of offers and cooperativeness assess the interaction of the dyad, while discussion climate and cognitive effort provide a subjective view of this interaction. For the outcome, the joint outcome and contract balance describe the objective achievements of dyadic, whereas outcome satisfaction and relationship point to the individual's assessment of the negotiated results.

<u>Negotiation Process</u>

At the dyadic level, the exchange of offers over the course of negotiations demonstrates the manner in which parties work with or against each other to arrive at an outcome. The *number of offers* characterizes the quantity of decisions taken by the dyad toward an agreement. It has been used mostly by researchers in ENSs (e.g., Delaney, Foroughi et al. 1997; Rangaswamy and Shell 1997). ENS studies considered the number of offers indicative of the effort required by the users interacting with each other in order to reach an agreement. Based on the usage assessment studies presented in Section 3.3.3, the number of offers affects the results of the negotiation and the perceptions of the ENS.

According to Sheffield (1995), *cooperativeness* is a variable that summarizes offer pattern in the negotiation process. This variable describes the quality of decisions that the dyads make over the course of negotiation. Cooperativeness captures the actions taken by the negotiators as a ratio of moves towards an agreement. These moves may create mutual value (integrative offers) or claim sole value (distributive offers) (Sebenius (1992). Olekalns and Smith (1999; 2003a; 2003b) espoused that the quality of exchange,

in terms of integrative and distributive activities, is important in characterizing the process (see Section 2.3.2 for further explanations). The coopertiveness represents the number of integrative offers over the total number of offers.

At the individual level, negotiation can be seen as a dialogue aimed at enabling mutual understanding and a forum for effective discussion. The assessment of the process is based on the individual's perception of the dialogue. *Discussion climate* points to the willingness of the counterpart to reveal relevant information that helps the negotiators seek a settlement (Delaney, Foroughi et al. 1997). This variable is highlighted in studies examining ENS, whereby users perceived the system as a facilitator to greater exchange of information (see Section 3.3). Another perception is the *cognitive effort* required by the individual to manage the negotiation using the system. Cognitive effort is defined as the degree to which negotiating with the technology would require little effort to exchange transactional signals. Cognitive effort, based on the concept of effort expectancy by Kohne, Schoop et al. (2005) and perceived effort by Vetchera, Kersten et al. (2004), has been used to ascertain the success of decision support in market exchanges (Chen, Vahidov et al. 2009).

<u>Negotiation Outcome</u>

In economics, negotiation is a mechanism that allocates resources to individuals. The assessment of such a mechanism embedded in a system is based on the economic performance of the dyad. The economic perspective deems that individuals' actions are the interaction of communicative signals sent, received and perceived, and that performance is not simply the result of actions, but rather a comparison of the result to standards of efficiency (Raiffa 1982). When performance is measured against set

parameters (i.e., the profit structure given to negotiators), it can simply be assessed by *joint outcome*, which describes the value achieved by both parties in a settlement. This is the primary standard for contrasting treatments in face-to-face and ENS studies, as shown in summary tables presented in Sections 2.3 and 4.3.

The equity of outcomes among the negotiating parties can be measured by the *contract balance*, which is a variable that determines the division of wealth generated by the agreement (Foroughi, Perkins et al. 1995; Delaney, Foroughi et al. 1997; Croson 1999). In ENS research, systems have been evaluated based on their ability to help users find efficient and equitable solutions. In framing experiments, Trötschel and Gollwitzer (2007) used this variable to assess whether subjects negotiating in a gain frame received a greater share of profits than their counterparts negotiating in a loss frame.

The instrumental perspective refers to negotiation as a means for reaching an agreement. The assessment of ENS is focused on the extent to which the substantive goals of the user are met by negotiating using the system. *Outcome satisfaction* relates to the difference between the results of the negotiation in comparison to the user's expectations (Suh 1999), whereas the transformation perspective considers negotiation as a way for individuals to create a new social reality, relationship, or situation (Loewenstein, Thompson et al. 1989). Negotiation outcome cab be measured by the *relationship* (i.e., positive rapport) derived from the impressions of the bond with other party as a result of the interaction (Curhan, Elfenbein et al. 2005). Relationship is built on attributions that the negotiator has of the opponent's behaviour and a sense of shared understanding of the situation and outcome (Bazerman, Curhan et al. 2000).

5.2 Development of Hypotheses

For the objective variables at the dyadic level, the hypotheses were developed based on the counteraction of gain and loss framing with the shortcomings of collaborative and competitive orientations (Carnevale and Pruitt 1992; De Dreu, Weingart et al. 2000). Collaborative dyads were expected to perform better in the loss frame than the gain frame, whereas the opposite was expected for competitive dyads. Based on the research framework, Figure 17 depicts the research model at the dyadic level. The hypotheses related to the benefits of ENS framing for dyads of different motivational orientations are represented by H1a to H4a for collaborative dyads and H1b to H4b for competitive dyads (further described in Section 5.2.1). The hypotheses that compare the effects of different dyadic orientations within a given ENS frame are described by H5a to H8a for the gain frame and by H5b to H8b for the loss frame (detailed in Section 5.2.2).
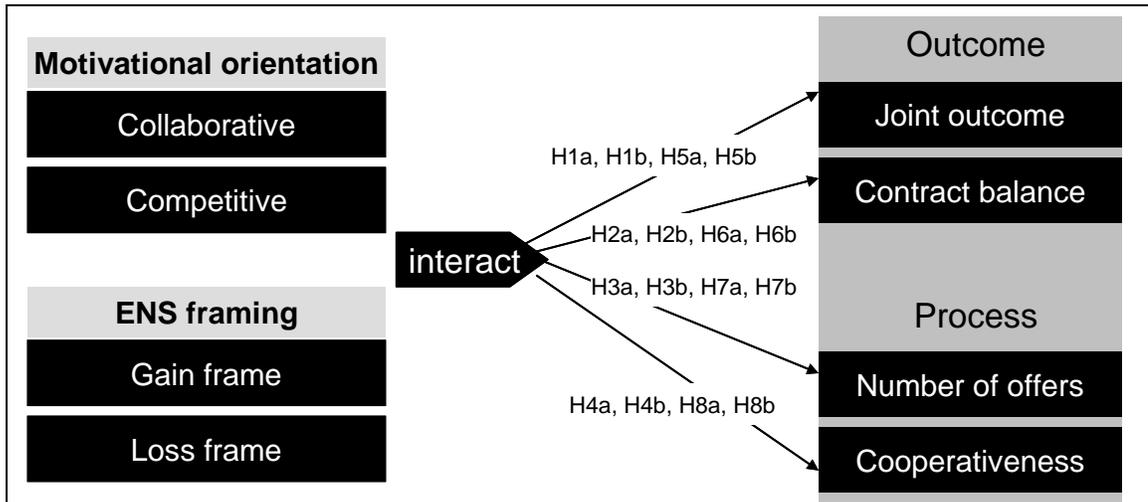
Figure 17 Research model at the dyadic level

Although objective variables are hypothesized to be impacted by framing and motivation, the hypotheses regarding individual perceptions pointed to a gap between objective and subjective assessments. This implies that system can affect outcomes, without the effects of the system being perceived by the user. Figure 18 shows the hypotheses that relate ENS framing to individual perceptions.
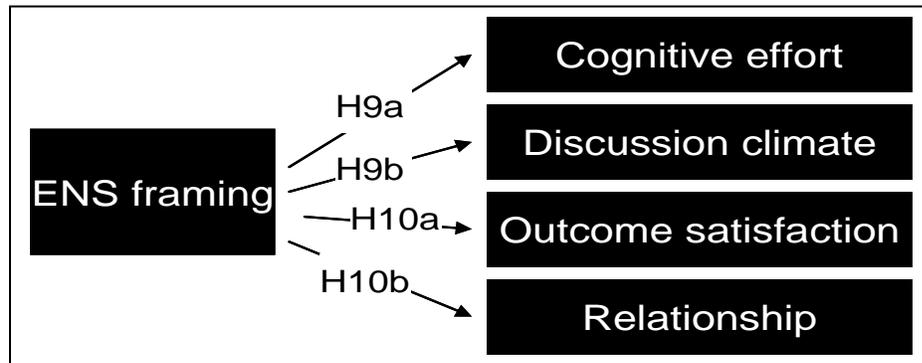
Figure 18 Research model at the individual level

5.2.1 Benefits of Framing for Different Dyads

Behavioral researchers have prescribed a collaborative-competitive approach for motivational orientations (Lax and Sebenius 1986). They have suggested that competitive individuals achieve better results when they consider the interest of the counterparts, as collaborators would do. Collaborators, on the other hand, who want to maximize joint outcomes, should not easily concede, but rather hold firmly to their positions, as competitors would do. In essence, competitive negotiators benefit from adopting some collaborative behaviors and vice versa. As negotiations require balancing competition and collaboration, the prescriptive advice is that each orientation (e.g., collaborative) needs to adopt behaviors from the other orientation (e.g., competitive) to compensate for shortcomings associated with one's orientation.

In prospect theory, Kahneman and Tversky (1979) described the difference in people's evaluation of alternatives in either a gain versus a loss frame. They argued that losses loom greater than forgone gains, based on which Bazerman, Magliozzi et al. (1985) used the loss/gain differences to suggest that negotiators operating in a loss frame are more resistant to concession-making than those in the gain frame.

This study looks at whether the deficiencies of collaborators and competitors could be offset by the use of framing. ENS framing of offers encourages consensus building in the gain frame for competitors and discourages unfavorable settlement in the loss frame for collaborators. The expectation is that competitors would perform better under a gain frame, while collaborators would profit from a loss frame. By examining ENS framing of offers, this study tested the effects of gain and loss framing on the process and outcome.

The first set of hypotheses, presented below, concentrate on ENS framing, especially on accentuating the benefits of a gain frame for competitive dyads and a loss frame for collaborative ones. The dual concern model argues that favorable joint outcomes can be derived from: (1) collaborators who have a high level of resistance to concession making (Ben-Yoav and Pruitt 1984; Ben-Yoav and Pruitt 1984), or (2) competitors who cooperate by incorporating both sides' preferences (Rubin 1991; De Dreu, Weingart et al. 2000). The first and second hypotheses, regarding dyadic outcomes, deal with the effects of framing by the ENS within each orientation.

H1a: Collaborative dyads negotiating in the ENS loss frame achieve

better joint outcomes than those negotiating in the ENS gain frame.

H1b: Competitive dyads negotiating in the ENS gain frame obtain better joint outcomes than those negotiating in the ENS loss frame.

H2a: Collaborative dyads negotiating in the ENS loss frame achieve greater contract balance than those negotiating in the ENS gain frame.

H2b: Competitive dyads negotiating in the ENS gain frame obtain greater contract balance than those negotiating in the ENS loss frame.

Most studies on framing have examined only outcome variables involving face-to-face interactions, which can be difficult to characterize through oral communication with many non-descriptive clues (Trötschel and Gollwitzer 2007). However, studies on ENSs have been concerned with the process as it is mediated by the system (Keersten and Lai 2007). Findings from three experiments, which examined the negotiation process (Olekalns 1994; Olekalns 1997; Trötschel and Gollwitzer 2007) suggest that competitors in the gain frame, who expressed their preferences to their counterpart, made more integrative offers and achieved higher joint outcomes than those in the loss frame. In the loss frame, collaborative dyads were able to create value in the later half of negotiations by increasing efforts for expressing their preferences. Furthermore, ENS studies have shown that (1) an increase in the numbers of offers leads to higher joint outcomes and better contract balance (Delaney, Foroughi et al. 1997); and (2) an increased cooperativeness encourages greater joint outcomes (Sheffield 1995). Therefore, the following hypotheses were proposed for the dyadic processes:

H3a: Collaborative dyads make more offers in the ENS loss frame than in the ENS gain frame.

H3b: Competitive dyads propose more offers in the ENS gain frame than in the ENS loss frame.

H4a: Collaborative dyads act more cooperatively (i.e., propose more integrative offers) in the ENS loss frame than in the ENS gain frame

H4b: Competitive dyads propose more cooperatively in the ENS gain frame than in the ENS loss frame.

5.2.2 Contrasting Motivational Orientations for Each Frame

Although research has highlighted the benefits of one type of framing over another (Bazerman, Magliozzi et al. 1985) and the success of competitive dyads over collaborative ones in the gain frame (De Dreu, Weingart et al. 2000), little is known about the difference between the two orientations in the loss frame. Adhering again to the collaborative-competitive approach (Lax and Sebenius 1986), the loss frame is believed to favor collaborators over competitors because it can help collaborators resist settling easily and push them to more advantageous solutions. However, the loss frame has also been found detrimental to competitors, because it discouraged consensus and increased contention (De Dreu, Carnevale et al. 1995). Therefore, the following hypotheses were formulated:

H5a: In the ENS gain frame, competitive dyads obtain higher joint outcome than collaborative dyads.

H5b: In the ENS loss frame, collaborative dyads achieve higher joint outcome than competitive dyads.

H6a: In the ENS gain frame, competitive dyads reach better contract balance than collaborative dyads.

H6b: In the ENS loss frame, collaborative dyads achieve greater contract balance than competitive dyads.

Since the dyadic interactions were mediated by the system, the process variables were stipulated to be influenced by framing. As ENS studies have been mainly conducted in the gain frame, competitive dyads were found to make more offers and exhibit greater cooperativeness than collaborative ones (Sheffield 1995). Basically, competitors worked on many small, incremental offers that allowed for the discovery of mutual benefits, while collaborators simply made large concession in hopes of pleasing the other side.

The loss frame has only been hypothesized to benefit collaborative over competitive dyads through the reduction of concession-making (De Dreu, Carnevale et al. 1995). In the loss frame, collaborators are believed to make more incremental concessions, but competitors are believed to be biased against any concessions or actions that take away their profits.

H7a: In the ENS gain frame, competitive dyads make more offers than collaborative dyads.

H7b: In the ENS loss frame, collaborative dyads make more offers than competitive dyads.

H8a: In the ENS gain frame, competitive dyads act more cooperatively (i.e., propose more integrative offers) than collaborative dyads.

H8b: In the ENS loss frame, collaborative dyads act more cooperatively than competitive dyads.

5.2.3 Framing Effects on Perception of Process

The perception variables, measured at the individual level, are theorized to diverge from objective outcomes due to a gap between reality and perceptions. As ENS framing pertains to the information presented by the decision support feature in the process of offer exchange, the difference in framing is conjectured to influence *only* perceptions of the process. Although framing was hypothesized to impact objective outcomes, these effects may not necessarily be perceived by the users (Lim and Yang 2008). Works on DSS showed a gap between reality and perception, even in repeated measure experiments where users participated in both the control (no DSS) and the treatment (DSS) settings (Lilien, Rangaswamy et al. 2004).

Despite the differences between reality and perception, individual assessment of the process and outcome are important to ascertain the success of IS (Delone and McLean 1992). Researchers in ENS have also stressed the importance of individual perception pertaining to the improvements allowed by the system (Foroughi, Perkins et al. 1995; Keersten and Lai 2007). Variables relating to the perception of the process are more influenced by ENS use than those relating to the perception of the outcomes (Chen, Vahidov et al. 2009).

Regarding the process, De Dreu, Carnevale et al. (1995) suggested that the loss frame requires more cognitive effort than the gain frame and it reduces consensus building. This implies that the gain frame provides an easier process for users, while the loss frame is more burdensome for them. Jain and Solomon (2000) argued that the perceptions of process are more distinguishable among different systems than perceptions of outcomes, meaning that the perceptions of outcomes are not differentiable between

frames even if actual outcomes are. The following hypotheses postulate that negotiators would provide a more favorable evaluation of the process in a gain frame than in a loss frame, but they would not perceive a difference in outcomes.

H9a: The ENS gain frame is perceived to require less cognitive effort than the ENS loss frame.

H9b: The ENS gain frame is perceived to provide better discussion climate than the ENS loss frame.

H10a: The ENS gain frame has no differential effect on the perception of outcome satisfaction compared to the ENS loss frame.

H10b: The ENS gain frame has no differential effect on the perception of relationship compared to the ENS loss frame.

The hypotheses were developed to contrast ENS framing effects between and within dyads. Table 6 summarizes the hypotheses relating to the dyadic composition. They (1) examine the effects of ENS framing for the two dyadic compositions, and (2) highlight the differences of framing between competitive and collaborative dyads. The last set of hypotheses, shown in Table 7, aims to test the impact of framing on perceptions of the process and outcome at the individual level.

Table 6 Summary of hypotheses at the dyadic level

Treatment	Dependent variable	Hypothesis
Comparing frames within each motivational orientation		
a. Collaborative	Joint outcome	*H1a: Loss > Gain*
	Contract balance	*H2a: Loss > Gain*
	Number of offers	*H3a: Loss > Gain*
	Cooperativeness	*H4a: Loss > Gain*
b. Competitive	Joint outcome	*H1b: Gain > Loss*
	Contract balance	*H2b: Gain > Loss*
	Number of offers	*H3b: Gain > Loss*
	Cooperativeness	*H4b: Gain > Loss*
Comparing motivational orientations within each frame		
a. Gain frame	Joint outcome	*H5a: Competitive > Collaborative*
	Contract balance	*H6a: Competitive > Collaborative*
	Number of offers	*H7a: Competitive > Collaborative*
	Cooperativeness	*H8a: Competitive > Collaborative*
b. Loss frame	Joint outcome	*H5b: Collaborative > Competitive*
	Contract balance	*H6b: Collaborative > Competitive*
	Number of offers	*H7b: Collaborative > Competitive*
	Cooperativeness	*H8b: Collaborative > Competitive*

Table 7 Summary of hypotheses at the individual level

Treatment	Dependent variable	Hypothesis
Comparing frames for process		
Both orientations	Cognitive effort	*H9a: Gain > Loss*
	Discussion climate	*H9b: Gain > Loss*
Comparing frames for outcome		
Both orientations	Outcome satisfaction	*H10a: Gain = Loss*
	Relationship	*H10b: Gain = Loss*

6 Methodology

The primary goal of this study is to provide insights into the effects of both social motivation and ENS framing on the process and outcomes of negotiations. The nature of ENSs as an emerging facilitator of online transactions and the formulation of motivationally distinct dyadic compositions required an experimental approach to investigate the hypotheses proposed. In order to investigate framing and motivational impacts on negotiations, a controlled laboratory experiment was first conducted to ensure internal validity of results, followed by a quasi-field experiment to demonstrate external validity of findings. The combination of a laboratory and field study approaches provide a form of triangulation that not only strengthens the results, but also sets precedence for using such a methodology to test theories in IS, especially those pertaining to web technologies.

Section 6.1 introduces past experiments on manipulating the independent variables discussed in literature. Section 6.2 describes the treatment of dependent variables to measure the negotiation process and outcome from the dyadic and individual levels. Section 6.3 examines the experimental design employed to test the hypotheses. Finally, Section 6.4 discusses three pretests, including: (1) the manipulation of motivational orientation with 70 participants online, (2) an internal trial of the experimental workflow with experts in the laboratory, and (3) an external trial of the experimental workflow with sample participants in the laboratory.

6.1 Operationalization of Independent Variables

In the past, the operationalization of both independent variables (motivational orientation and framing of outcomes) was mostly performed by manipulating the context of the negotiation task. In motivational experiments, either the objectives of the task were changed to reflect the collaborative and competitive orientations, or the predisposition of subjects (i.e., individual differences) was assessed through a decomposed game and then subjects were matched to create desired dyadic composition. In frame experiments, the profit schedule of negotiated issues was presented either in terms of gains or losses to create different treatments. This section reviews these manipulations of the independent variables in past studies and describes the approach taken in this work.

6.1.1 Capturing Motivational Orientation

Based on the literature review in Section 2.2, the antecedents affecting orientations are contextual dimensions and individual differences. The operationalization of motivational orientations has been derived from either manipulating these antecedents through extrinsic means (e.g., influencing the context through instruction) or by measuring individual differences (i.e., measuring inherent dispositions towards an orientation by decomposed games or survey instruments). The decomposed games were first introduced by Messick and McClintock (1968) and refined by Kuhlman and Marshello (1975); while the survey instruments were devised by Kilmann and Thomas (1977) and Rahim (1983) to construct profiles on negotiators. From a meta-analysis of twenty eight studies, De Dreu, Weingart et al. (2000) claimed that both approaches of operationalization are valid in producing/capturing particular orientations for experimentation.

The literature review in Section 2.3 describes studies assessing individual differences (Olekalns and Smith 2003b, Montoya-Weiss et al 2001, Oleklans and Smith 1999, Jain and Solomon 1999, De Dreu and Boles 1998, Olekalns et al. 1996, De Dreu and Van Lange 1995); or manipulating substantive, relational and divergent contextual dimensions to produce or measure collaborative and competitive orientations for negotiators (Trötschel and Gollwitzer 2007, Schei et al. 2006, De Dreu et al. 2006, Olekalns and Smith 2005, Beersma and De Dreu 2005, Olekalns and Smith 2003a, Schei and Rognes 2003, Beersma and De Dreu 2002, Oleklans 1997, 1994, Weingart et al. 1993).

Table 8 summarizes how these studies have addressed the treatment of social motives in negotiations. In addition, the table reviews the reinforcement of social motives through a reward structure and the success of the treatment by manipulation checks, both of which Thompson (1991) considered essential.

Table 8 Operationalization of motivational orientation

Study	Motivational orientation	Operationalization	Reward structure	Manipulation check
Weingart et al. (1993)	Competitive	instructions to maximize own outcome	No reward mentioned	Select among three alternatives describing their primary goal: a) maximize own outcome, b) maximize group outcome; c) other
	Collaborative	instructions to maximize own outcome + group outcome		
Olekalns (1994)	Competitive	instructions to maximize individual profit	Small cash prize lottery with tickets for individual gains	Rate their behavior on a 1 to 7 scale (1=highly cooperative; 7=highly competitive)
	Collaborative	instructions to maximize joint profit	Small cash prize lottery with tickets for joint profits	

Study	Motivational orientation	Operationalization	Reward structure	Manipulation check
De Dreu and Van Lange (1995)	Competitive	use Messick and McClintock (1968) set of 9 decomposed game, select for subject who picked competitive and extreme competitive options for 6out of 9 games	Show up fee	No manipulation check reported
	Collaborative	use Messick and McClintock (1968) set of 9 decomposed game, select for subject who picked cooperative options for 6 out of 9 games		
Olekalns et al. (1996)	Competitive	use Messick and McClintock (1968) set of 9 decomposed game, select for subject who picked competitive and extreme competitive option for 6 out of 9 games	No reward mentioned	No manipulation check reported
	Collaborative	use Messick and McClintock (1968) set of 9 decomposed game, select for subject who picked cooperative options for 6 out of 9 games		
Olekalns (1997)	Competitive	instructions to maximize individual profit (or minimize individual losses)	Small cash prize lottery with tickets for individual gains	Rate their behavior on a 1 to 7(1=highly cooperative; 7=highly competitive)
	Collaborative	instructions to maximize joint profit (or minimize joint losses)	Small cash prize lottery with tickets for joint profits	
De Dreu and Boles (1998)	Competitive	use Kuhlman and Marshello (1975) set of 9 decomposed game, select for subject who picked competitive and extreme competitive options for 6 out of 9 games instructions to "earn as many profit points as you can for your store"	No reward mentioned	No manipulation check reported
	Collaborative	use Messick and McClintock (1968) set of 9 decomposed game, select for subject who picked cooperative options for 6 out of 9 games instructions to "earn as many profit points as you can for your store and the other store"		

Study	Motivational orientation	Operationalization	Reward structure	Manipulation check
Jain and Solomon (1999)	Competitive	use Thomas-Kilmann instrument and select for strong competitors	Course requirement	No manipulation check reported
	Collaborative	use Thomas-Kilmann instrument and select for strong collaborators		
Olekalns and Smith (1999)	Competitive	use Messick and McClintock (1968) set of 9 decomposed game, select for subject who picked competitive and extreme competitive options for 6 out of 9 games	points = lottery tickets for monetary reward	Rate own and partner's competitiveness and cooperativeness
	Collaborative	use Messick and McClintock (1968) set of 9 decomposed game, select for subject who picked cooperative options for 6 out of 9 games		
Montoya-Weiss et al. (2001)	Competitive	adapt Rahim (1983) instrument to select for competitors	No reward mentioned	No manipulation check reported
	Collaborative	adapt Rahim (1983) instrument to select for collaborators		
Beersma and De Dreu (2002)	Competitive	instructions to maximize own income	course requirement + monetary bonus for the best performers	Use 5 item questionnaire on 5-point scale to check for social motives
	Collaborative	instructions to maximize group income	course requirement + monetary bonus for the best group	
Olekalns and Smith (2003a)	Competitive	instructions to maximize own outcome and case manipulation (union negotiation, individual and independent goal)	Course requirement	Select: a) maximize own outcome or b) maximize own and group outcome
	Collaborative	instructions to maximize own outcome + dyad outcome and case manipulation (two country negotiation, interdependent goals)		

Study	Motivational orientation	Operationalization	Reward structure	Manipulation check
Olekalns and Smith (2003b)	Competitive	use Messick and McClintock (1968) set of 9 decomposed game, select for subject who picked competitive and extreme competitive options for 6 out of 9 games	No reward mentioned	No manipulation check reported
	Collaborative	use Messick and McClintock (1968) set of 9 decomposed game, select for subject who picked cooperative options for 6 out of 9 games		
Schei and Rognes (2003)	Competitive	instructions to maximize own outcome	Course requirement	Select among three alternatives describing their primary goal: a) maximize own outcome, b) maximize own and the total outcome for two companies; c) other
	Collaborative	instructions to maximize own and the total outcome for two companies		
Beersma and De Dreu (2005)	Competitive	instructions to maximize own income	Course requirement + participation fee + monetary bonus for the best performers	Use 5 item questionnaire on 5-point scale to check for social motives
	Collaborative	instructions to maximize group income	Course requirement + participation fee + pay out for best agreement	
Olekalns and Smith (2005)	Competitive	instructions to maximize own outcome	Small cash prize lottery with tickets for individual gains	Rate their behavior on a 1 to 7 scale (1=highly cooperative; 7=highly competitive)
	Collaborative	instructions to maximize own outcome + group outcome	Small cash prize lottery with tickets for joint profits	

Study	Motivational orientation	Operationalization	Reward structure	Manipulation check
De Dreu et al. (2006)	Competitive	instructions to "think of the other as your opponent" given a list of cooperative tactics	points = tickets for a monetary lottery draw Course credit or participation fee	Rate perceived cooperativeness on a 1 to 5(very competitive to very cooperative)
	Collaborative	instructions to "think of the other as your partner" given a list of competitive tactics		
Schei et al. (2006)	Competitive	instructions to maximize own outcome	Course requirement	Select between two alternatives describing their primary goal: a) maximize own outcome or b) maximize own and group outcome
	Collaborative	instructions to maximize own outcome + group outcome		
Trötschel and Gollwitzer (2007)	Competitive	instructions to maximize own welfare	Show-up fee + bonus prize for individual outcome	Ask participants: "how committed do you feel to the goal to find a fair solution" (0=not at all; 9=very)
	Collaborative	instructions to find a fair solution		

Each of the three methods of operationalizing motivational orientations has advantages and disadvantages. The use of instructions allowed for easy matching of negotiators, instead of having to measure orientations first followed by a matching process to formulate different dyadic compositions. Studies that employed instructions also utilized manipulation checks after negotiations to verify if the goals instructed were internalized by the participants. However, use of manipulation checks that measured perceived behavior (e.g., Olekalns 1994, 1997, De Dreu et al. 2006, Olekalns and Smith

2005) was not necessarily a proper verification of goal internalization as behavior is subject to the moderators and dynamics of the negotiations. Instead, the questions relating to primary goals (e.g., Schei et al. 2006) or social motives (e.g., Beersma and De Dreu 2005) provided a better means of evaluation.

Manipulation checks were generally not performed with decomposed games or survey instruments, because it was assumed that the inherent disposition of the participant was properly selected for and remained stable during negotiations. Some have challenged this assumption and pointed to the strength of context in changing people's social motives (Carnevale and Probst 1997). Since an objective of this work is to examine individuals in competitive and collaborative environments, methods that focused on inherent dispositions may have been at odds with realistic business scenarios, whereby the negotiator is an agent who must represent the goals and interests of the firm.

Reward theories suggest the importance of aligning incentives to the goals promoted by the study, which requires instructions be combined with incentives to direct participants on a course aimed at achieving their goals (Beersma and De Dreu 2002). Moreover, De Dreu, Weingart et al. (2000) showed that performance-based experiments (e.g., rewarding students with course credits or money) were more effective at generating differences between motivational orientations than those conducted in class exercises, where students were simply "going through the motions" of negotiation scenarios.

After analyzing the various experimental designs suggested in past studies, the operationalization of motivational orientation most suitable for this project consisted of instructions (e.g., those employed by Schei and Rognes 2003), matched with a reward structure of either course credits or monetary awards (e.g., Beersma and De Dreu 2002),

and followed by a manipulation check of goal instructions and strategic behaviors (e.g., Schei and Rognes 2003; Schei, Rognes et al. 2006). In addition, the participants' inherent dispositions were measured as a possible confounding variable to verify any influences on dependent variables.

6.1.2 Developing Outcome Frames

In the realm of negotiation research, the operationalization of outcome frames has remained mostly true to the method of problem framing originated by Kahneman and Tversky (1979). This method consists of presenting a similar problem (with identical outcomes) in either a gain frame or a loss frame to two groups of subjects, and showing the difference of choice based on the subjects' relative evaluation of outcomes. Consider the following example from Tversky and Kahneman (1981, p.454):

> Imagine that you face the following pair of concurrent decisions. First examine both decisions, and then indicate the options you prefer:
>
> Decision (i) Choose between:
>
> > A. a sure gain of $240
> >
> > B. 25% chance to gain $1000 and 75% chance to gain nothing
>
> Decision (ii) Choose between:
>
> > A. a sure loss of $750
> >
> > B. 75% chance to lose $1000 and 25% chance to lose nothing

When group 1 was presented with the gain frame in (i), 84% selected choice A, the less risky option, but when group 2 was given the loss frame in (ii), 87% chose B, the higher risk option. These results demonstrated the manner in which the framing of outcomes in the problem alters people's behavior, in this particular case, their attitude towards risk.

The decision problem, or more specifically the negotiation case, as a means of operationalizing outcome framing started with Bazerman, Magliozzi et al. (1985). The researchers gave participants, similar cases with different profit schedules in a laboratory experiment. For the gain frame, the profit schedule was presented in positive net profits, while the loss frame showed each outcome as an expense that must be deducted from a gross profit. The net profit for both frames was the same. Table 9 is an adaptation of the profit schedules employed by Bazerman, Magliozzi et al. (1985). It illustrates the manipulation of outcome frames in negotiations.

Framing through the use of profit schedules differs from risk choices presented by Tversky and Kahneman (1981). Profit schedules address the presentation of information, rather than the decisions regarding actual wins or losses in a certain vs. a risky situation. Hence, attribute framing is achieved through wording of potential outcomes as described in Section 4.1.1.

Table 9 Sample profit schedule

a) Net profit schedule in gain frame

		Delivery Time ($)	Discount terms ($)	Financial terms ($)
Options	A	1600	2400	4000
	B	1400	2100	3500
	C	1200	1800	3000
	D	1000	1500	2500
	E	800	1200	2000
	F	600	900	1500
	G	400	600	1000
	H	200	300	500
	I	000	000	000

b) Expense schedule in loss frame (gross profit = $8000)

		Delivery Time ($)	Discount terms ($)	Financial terms ($)
Options	A	-000	-000	-000
	B	-200	-300	-500
	C	-400	-600	-1000
	D	-600	-900	-1500
	E	-800	-1200	-2000
	F	-1000	-1500	-2500
	G	-1200	-1800	-3000
	H	-1400	-2100	-3500
	I	-1600	-2400	-4000

Bazerman, Magliozzi et al. (1985) also instructed participants to either "maximize net profit" or "minimize expenses" depending on whether they were using a net profit or expense schedule. This standard of manipulating outcome frames and even the exact negotiation case have been used by other researchers (e.g., Neale and Bazerman 1985; De Dreu, Carnevale et al. 1994; Carnevale 2007) seeking to recreate the framing effect. However, several confounding factors and concerns have emerged as a result of using such buyer-seller case with different profit schedules.

The first confounding effect concerns the different roles played by the subjects, whereby buyers generally earned significantly higher gains than sellers. Bazerman, Magliozzi et al. (1985) hypothesized that as buyers had to part with their money to

acquire a good, they were inevitably placed in a loss frame with respect to their monetary wealth, while sellers were expected to receive money (gain frame). In order to circumvent the problem, subjects negotiated on one side only, while the other side was represented either by a confederate (Neale and Bazerman 1985) or a computer program (De Dreu, Carnevale et al. 1994) that behaved following a set strategy (e.g., tit-for-tat from game theory). Although the approach did resolve the role bias, it created the problem of generalizability, so that the findings were limited to the set of strategies employed. A second solution involved changing the case to a contract negotiation that is not associated with the roles of a buyer and a seller (Olekalns 1994; Olekalns 1997). For example, subjects acted as commodity traders and discussed issues that did not consist of the term "price" (i.e., price can be fixated with the perception of handing money from one party to another).

Another unintended bias was the format of the profit schedule. When profits were shown in descending order, negotiators reached higher gains compared to when profits were presented in ascending order (Ritov 1996). For example, Table 9 ranks options in a descending order in relation to net profits or expenses. The results obtained from profit schedule formatting differences challenged the relative buyer's advantage characterized by Bazerman, Magliozzi et al. (1985). Ritov (1996) stipulated that the directionality of options negates the importance of the role, as buyers, and sellers performed equally poor in the ascending order of options.

To eliminate the biases related to profit schedule formatting, the endowment effect has been employed to create gain and loss frames. The endowment effect starts by giving one party the object of contention or all the favorable conditions, and he/she must

then negotiate with the other party on the distribution of the endowment. If no agreement is reached, then the parties either gain nothing or walk away with a substantially less arbitrary distribution. The assumption is that the party with the endowment perceives any proposals to share as a loss of his/her initial wealth, and thus a loss frame is created on one side. Consequently, the other party, who starts off with nothing, perceives all proposals to share as possibilities for gains, and thus, the other party is placed in a gain frame. For example, in their first two experiments, Trötschel and Gollwitzer (2007) gave one side all the territories and asked him/her to negotiate the distribution of these territories with the other side. Upon the deadline, any unresolved territories would be lost for both parties. The manipulation checks on the endowment technique showed that each group exhibited different beliefs regarding their objectives (Trötschel and Gollwitzer 2007). The subjects in the gain-frame treatment reported that they believed their goal to be one of maximizing gains, while those in the loss-frame treatment believed it to be one of minimizing losses.

One major problem with the endowment effect is that only mixed- frame (i.e., one side starts with the initial endowment gain, in a loss frame, and the other side must negotiate for it, in a gain frame) studies are possible. As a solution, Bottom (1998) asked subjects to discuss the claim of numbers from 1 to 100 for a chance of winning ten dollars. Once subjects reached an agreement over the share of numbers, a draw was made to determine the winning number. If no agreement was reached, regarding the distribution of numbers, then each party received $3.50. The loss frame was induced by initially placing the ten dollar bill with one of the parties. This manipulation could be

performed on either sides or none of them (i.e., to induce a gain frame). However, no check was carried out to test the success of such operationalization of outcome frames.

To surpass confounding biases caused by the role played in the case or format of profit schedules, one study involved an ENS to frame the outcomes. Kirchler, Maciejovsky et al. (2005) provided participants with a similar case on both sides. The participants acted as bond brokers rather than buyers or sellers, and an ENS framed dividends in either gains or losses. A comparison of offers with the worst possible alternative provided a positive value that induced the perception of gain. Nevertheless, Kirchler, Maciejovsky et al. (2005) did not verify the results of frame manipulation by the system through manipulation checks.

Table 10 summarizes the studies mentioned in this section and mentions the use of course requirements (as discussed in the previous section), cash prizes or both employed to incentivize quality participation. This simply means that the subjects were motivated by a reward for following the objective stated by a researcher. Although the manipulation checks on outcome framing verified whether the subjects understood the objectives of the frame, these checks are less crucial to the success of the treatment than those for motivational orientation. As social motives need to be internalized by the subjects to effectively create different orientations, outcome framing is external to the individuals.

This study used an ENS to frame potential outcomes. The system utilized in the experiments displayed either a positive net profit schedule or an expense schedule with matching instructions (i.e., to maximize net profit or minimize expense). The system also guided the process by presenting offers as profits or expenses throughout the negotiation.

Table 10 Operationalization of outcome frame

Study	Outcome frame	Operationalization	Reward Structure	Manipulation check
Bazerman et al. (1985)	Gain	Positive net profit schedule for negotiation between buyer and seller	Class assignment	Ask participants: "When negotiating a transaction, how did you think about your goal?" (1= minimize expenses; 7=maximize net profits)
	Loss	Expense schedule, when deduced from gross profit is equal to positive net profit schedule		
Neale and Bazerman (1985)	Gain	Settlement points for a contract between management (participant) and union (confederate) is represented in *gains* for the firm.	Voluntary students	No manipulation check reported
	Loss	Settlement points for a contract between management (participant) and union (confederate) is represented in *losses* for the firm.		
De Dreu et al. (1994)	Gain	Positive net profit schedule for negotiation between buyer (computer) and seller (student)	Course requirement + results are converted to points for lottery tickets with the chance of wining $10, $15 and $25	Ask participants to what extent they were trying to minimize expense (1= not at all; 6=very hard)
	Loss	Expense schedule, when deduced from gross profit is equal to positive net profit schedule		
Olekalns (1994)	Gain	Positive net profit schedule for negotiation between two commodity brokers	Small cash prize lottery with tickets for profits earned	No manipulation check reported
	Loss	Expense schedule, when deduced from gross profit is equal to positive net profit schedule	Small cash prize lottery with tickets for net profits earned (subtract expenses from max. profit	
Ritov (1996)	Gain	Positive net profit schedule for negotiation between buyer and seller	Class assignment	No manipulation check reported
	Loss	Expense schedule, when deduced from gross profit is equal to positive net profit schedule		

Study	Outcome frame	Operationalization	Reward Structure	Manipulation check
Olekalns (1997)	Gain	Positive net profit schedule for negotiation between two commodity brokers	Small cash prize lottery with tickets for profits earned	Ask participants to indicate the minimum profit (maximum expense) that they were prepared to accept. Loss frame negotiators report higher minimum profit than gain frame
	Loss	Expense schedule, when deduced from gross profit is equal to positive net profit schedule	Small cash prize lottery with tickets for net profits earned (subtract expenses from max. profit)	
Bottom (1998)	Gain	Exp 1:No money given before negotiation ($0 is the reference point), but if no agreement is reached then $3.50 is awarded. Exp2: Negotiate a risk position in 3 different markets. Success is framed in gaining all points and failure is equal to 0 points	Cash prize between $0-10, participants divided 100 points between them for a $10 draw	No manipulation check reported
	Loss	Exp1: Initially given a $10 bill to establish a reference point. Exp2: Negotiate a risk position in 3 different markets. Success is framed in losing 0 points and failure is equal to losing all points		
Kirchler et al. (2005)	Gain	The system gives subjects positively framed dividend information	points = tickets for a monetary lottery draw	No manipulation check reported
	Loss	The system gives subjects negatively framed dividend information		
Carnevale (2007)	Gain	Positive net profit schedule for negotiation between buyer (participant) and seller (computer)	Corse requirement + cash prize of $25, $15 and $10 for 1st, 2nd and 3rd place performers	No manipulation check reported
	Loss	Expense schedule, when deduced from gross profit is equal to positive net profit schedule		
Trötschel and Gollwitzer (2007)	Gain	Exp1 & 2: Positive value point for gains in different regions of an island. Exp 3: Positive value point for gains in shares in 6 different companies	Cash for participation + cash prize of 25 Euro for best performance in Exp 3	Ask participants to indicate the outcome focus (either to maximize gains or minimize losses)
	Loss	Exp1 & 2: Negative value point for losses. Exp 3: Negative value point for losses in shares in 6 companies.		

6.2 Operationalization of Dependent Variables

6.2.1 Dependent Variables at the Dyadic Level

At the dyadic level, the dependent variables reflect the dynamics of interactions between the two sides as well as the outcomes of such interactions. The dependent variables were measured based on joint actions of the dyad to determine the effects of the treatments. The number of offers and cooperativeness captured the objective process, while joint outcome and contract balance referred to the objective results achieved by the dyad.

The **number of offers** is a variable mostly used in ENS to show the utilization of the system. It not only reflects the negotiators' interactions with the opponent, but also the number of decisions that they made based on information collected through communication exchanges (Lim and Benbasat 1993). This variable was employed by Carnevale (2007), as a quantitative measure, to show the process involving different outcome frames and affect experienced. The number of offers was calculated based on the sum of all offers exchanged by the dyad.

Cooperativeness is a variable used to assess the quality of the process. It determines the process pattern by which negotiators reach an agreement. The interaction between negotiators has been analyzed by modeling their concessions in outcome framing (Carnevale 2007; Trötschel and Gollwitzer 2007) and motivational orientation studies (Olekalns, Smith et al. 1996; Olekalns and Smith 1999). In order to determine the quality of interactions, Sheffield (1995) proposed that the cooperativeness of the dyad, which he called relative cooperativeness, be measured as a ratio of integrative offers over the total number of offers. Integrative offers are those that create mutual gains for both parties.

The variable of **joint outcome** has been often used in negotiation studies. It has been used in motivational orientation, outcome frame and ENS research to assess and compare results among different treatments. For example, Weingart, Bennett et al. (1993) justified the superiority of collaborative dyads over competitive ones by contrasting joint outcomes. Jones and Jelassi (1990) compared joint outcomes between integrative and distributive tasks using decision support to show the benefits of such a feature in integrative conflicts. Moreover, Olekalns (1994) demonstrated the importance of framing and motivational orientation in face-to-face negotiations by contrasting joint outcome of the dyads.

In order to use joint outcome as a measure for comparing the interaction of motivational orientation and outcome framing, this study provided negotiators with a task that has assigned values for each possible solution to the conflict. This limited the parameters (i.e., everyone had set values for all possible solutions) and allowed the joint outcomes from agreements to be compared (Bazerman, Magliozzi et al. 1985; Foroughi, Perkins et al. 1995). The joint outcome was calculated by summing the values obtained for the agreement by each negotiator in the dyad.

The **contract balance** is an examination of the distribution of wealth generated by an agreement and indication of equity (Trötschel and Gollwitzer 2007). Contract balance has been used in the three areas of interest in this thesis and was measured by computing the absolute difference between values achieved by the two parties from the settlement. ENS studies have long argued that electronic negotiation and specifically decision aid can increase contract balance (Foroughi, Perkins et al. 1995; Delaney, Foroughi et al. 1997; Croson 1999; Foroughi, Perkins et al. 2001).

6.2.2 Dependent Variables at the Individual Level

At the individual level, the subjective assessment of the process and outcome has traditionally been employed in psychology and management literature. The variables were obtained by having the participants rate their negotiation experience, in terms of the cognitive effort required and discussion climate between the pair in the process, as well as the outcome satisfaction and relationship established as a result of negotiations. These latent variables that were not directly observed are hypothetical constructs that were measured using questions called items. Based on previous studies, the original items are found in Appendix G, which also describes the adaptation process used to produce the items for this study.

The construct of **cognitive effort** has mostly been examined in ENS studies. It seeks to demonstrate whether a system (or feature of a system) improves the process through the reduction of the cognitive load placed by the procedures implemented. Cognitive effort was measured with four items on a 7-point Likert scale, taken from Chen, Vahidov et al. (2009), who adapted them from Kohn, Schoop et al. (2005) and Vetchera, Kersten et al. (2004). The construct reflects the effort required to meet the objective of the case, negotiate via the system, make decisions, and evaluate the decision of the other. The items are found in Appendix G.

The **discussion climate** is used in motivational orientation (Beersma and De Dreu 2002) and ENS (Jones and Jelassi 1990; Foroughi, Perkins et al. 1995; Delaney, Foroughi et al. 1997; Foroughi, Perkins et al. 2001; Lai, Doong et al. 2006; Pesendorfer and Koeszegi 2006) studies. It was assessed based on four items adapted from Beersma and De Dreu (2002) as well as Foroughi, Perkins et al. (1995) on a 7-point Likert scale. This

variable is concerned with the interaction between negotiators, i.e. it targets such aspects of the process as whether the communication was friendly, whether parties felt comfortable and if the discussions were open to problem-solving. The items are found in Appendix G.

The variable of **outcome satisfaction** generally serves to determine the success of an ENS (Jones and Jelassi 1990; Foroughi, Perkins et al. 1995; Delaney, Foroughi et al. 1997; Rangaswamy and Shell 1997; Kersten and Noronha 1999; Suh 1999; Lim 2000; Purdy, Nye et al. 2000; Foroughi, Perkins et al. 2001; Yuan, Head et al. 2003; Vetschera, Kersten et al. 2004; Lai, Doong et al. 2006; Pesendorfer and Koeszegi 2006; Galin, Gross et al. 2007). Outcome satisfaction was measured from four items adapted from Suh (1999) and Vetchera, Kersten et al. (2004) on a 7-point Likert scale. This construct points to the negotiator's attitude toward the outcome of the conflict in respect to their expectation and the other party's achievement. The items are found in Appendix G.

Curhan, Elfenbien et al. (2005) stressed that **relationship** is an important variable, which represents the consequence of the negotiation process that is not reflected in pure substantive assessments. They stated that outcome satisfaction and relationship are the main dependent variables that negotiations studies should measure at the individual level. This variable was evaluated from four items adapted from Curhan, Elfenbien et al. (2005), Beersma and De Dreu (2002) and Jones and Jelassi (1990) on a 7-point Likert scale. It refers to the rapport established with the counterpart and the impression that the other side imparted. The items are found in Appendix G.

Table 11 summarizes the dependent variables in terms of the level of analysis, studies that employed them and their operationalization in this research.

Table 11 Studies referencing dependent variables

Level of analysis	Variable	Study	Operationalization
Dyadic	Number of offers	ENS (Foroughi, Perkins et al. 1995; Delaney, Foroughi et al. 1997; Kersten and Noronha 1999; Foroughi, Perkins et al. 2001; Koeszegi, Vetchera et al. 2004; Vetschera, Kersten et al. 2004; Weber, Kersten et al. 2005; Lai, Doong et al. 2006) Outcome frame (Carnevale 2007)	Sum of offers made by the dyad
Dyadic	Cooperative-ness	ENS (Sheffield 1995; Pesendorfer and Koeszegi 2007) Outcome frame (Carnevale 2007; Trötschel and Gollwitzer 2007)	Ratio of integrative offers over distributive offers, where integrative offers (I) represent proposal that engage in logrolling and distributive offers (D) represent increase in utility for one side. Ratio is computed by: I*100/(I+D) from Sheffield (1995)
Dyadic	Joint outcome	Motivational orientation (Beersma and De Dreu 2002; Olekalns and Smith 2003; Olekalns and Smith 2003; Schei and Rognes 2003; Beersma and De Dreu 2005; Schei, Rognes et al. 2006; Trötschel and Gollwitzer 2007) ENS (Jones and Jelassi 1990; Foroughi, Perkins et al. 1995; Sheffield 1995; Delaney, Foroughi et al. 1997; Croson 1999; Lim 2000; Purdy, Nye et al. 2000; Foroughi, Perkins et al. 2001) Outcome frame (Bazerman, Magliozzi et al. 1985; Neale and Bazerman 1985; De Dreu, Carnevale et al. 1994; Olekalns 1994; Ritov 1996; Olekalns 1997; Bottom 1998; Trötschel and Gollwitzer 2007)	Sum of values achieve by the dyad from a settlement
Dyadic	Contract balance	Motivational orientation (Trötschel and Gollwitzer 2007) ENS (Foroughi, Perkins et al. 1995; Delaney, Foroughi et al. 1997; Croson 1999; Foroughi, Perkins et al. 2001) Outcome frame (Trötschel and Gollwitzer 2007)	Difference of values for the agreement between each negotiator in the dyad
Level of analysis	Variable	Study	Operationalization
Individual	Cognitive effort	ENS (Koeszegi, Vetchera et al. 2004; Vetschera, Kersten et al. 2004; Kohne, Schoop	4 items taken from Chen, Vahidov et al. (2009) on a

		et al. 2005; Chen, Vahidov et al. 2009)	7-point Likert scale.
Individual	Discussion climate	Motivational orientation (Beersma and De Dreu 2002) ENS (Jones and Jelassi 1990; Foroughi, Perkins et al. 1995; Delaney, Foroughi et al. 1997; Foroughi, Perkins et al. 2001; Lai, Doong et al. 2006; Pesendorfer and Koeszegi 2006)	5 items adapted from Beersma and De Dreu (2002) as well as Foroughi et al. (1995) on a 7-point Likert scale.
Individual	Outcome satisfaction	Motivational orientation (Jain and Solomon 2000; Schei, Rognes et al. 2006) ENS (Jones and Jelassi 1990; Foroughi, Perkins et al. 1995; Delaney, Foroughi et al. 1997; Rangaswamy and Shell 1997; Kersten and Noronha 1999; Suh 1999; Lim 2000; Purdy, Nye et al. 2000; Foroughi, Perkins et al. 2001; Yuan, Head et al. 2003; Vetschera, Kersten et al. 2004; Lai, Doong et al. 2006; Pesendorfer and Koeszegi 2006; Galin, Gross et al. 2007)	4 items adapted from Suh (1999), Vetschera, Kersten et al. 2004 on a 7-point Likert scale.
Individual	Relationship	Motivational orientation (Olekalns and Smith 2005) ENS (Kersten and Noronha 1999; Purdy, Nye et al. 2000) Subjective values in negotiation (Curhan, Elfenbein et al. 2005)	4 items adapted from Curhan, Elfenbein et al. (2005), Jones and Jelassi (1990) and Beersma and De Dreu (2002) on a 7-point Likert scale.

6.3 Experimental Design

An experimental approach that combined laboratory and quasi-field settings served to test the research hypotheses stated in Section 5.2. The advantage of conducting a laboratory experiment is that causality may be better established by manipulating the independent variables in order to observe the impact on the dependent variables (Carnevale and De Dreu 2005). The benefits of a quasi-field experiment (i.e., the subjects are assigned to the treatments rather than being uncovered in a natural state) are in increasing the external validity of the study and strengthening the findings (Kerlinger and Lee 2000).

The experiments were conducted to test: (1) the benefits (in terms of increased joint outcome and contract balance) of ENS framing for different motivational

orientations, and the process involved (i.e., number of offers and cooperativeness); (2) the dissimilarities between gain and loss frames for collaborative and competitive dyads; and (3) the effect of the independent variables on individuals' assessment of process (i.e., cognitive effort and discussion climate) and outcome (outcome satisfaction and relationship).

The design consisted of a 2X2 factor comparison of ENS frames with motivational orientation. Table 12 explains the four groups needed for the research design.

Table 12 Experimental design

	Gain frame	*Loss frame*
Collaborative dyad	Group1	Group3
Competitive dyad	Group2	Group4

6.3.1 Case

Bazerman, Magiozzi et al. (1985) developed a buyer-seller case based on three issues to illustrate the framing of outcome in a bargaining scenario, where two parties make tradeoffs over issues to achieve mutual benefits. This simple, well-documented case is easy to understand, but it requires much effort (in terms of cooperation and competition over the distribution of resources) to find combinations of efficient solutions. In the case, the two sides are given different values for each issue and option, and each side is only aware of its own values. Two of the issues are asymmetric, which implies that negotiators can concede on an issue of lesser value for one that is of a higher value. The third issue is symmetric (i.e., a loss on one side is a gain for the other).

For this study, the case was loosely adapted from Bazerman, Magliozzi et al (1985) with changes to the roles in order to avoid buyer and seller prejudices (Olekalns

1994; Olekalns 1997). But the most important change was the enforcement of framing by the system (i.e., in the gain frame, all displays of offers were positive, but they were negative in the loss frame). See Appendix A for the case, where delivery time and financial terms are integrative and discount terms is distributive.

6.3.2 Participants

The subjects consisted of university students recruited for the study. Since they did not have prior knowledge of ENSs (or the system, Inspire), they were relevant to studying ENS framing (i.e., the experiment would not be affected by different experience levels). Furthermore, ENSs are systems that may serve people of different demographics, thus the findings from a single laboratory experiment are often not generalizable, independent of whether student or non-student subjects are used (Lynch 1999).

An incentive structure was employed to ensure that the students took the experience seriously. It had two parts: (1) a general participation portion encouraged students to present themselves for the experiment (1% of course grade), and (2) a performance portion was given to induce thoughtful engagement in the experimental activities (maximum of 1% of course grade, based on the z-score of joint outcome for each session). The negotiator's objective was dependent on the orientation and framing. For example, in the gain frame, *X is the set of all possible contracts.* Let $V(x)$, where x is an offer ($x \in X$) be the profit function.

The competitive negotiators were encouraged to maximize their profit, that is:

max $V_{self}(x)$.

The collaborative negotiators were encouraged to maximize joint profit, that is:

$$\max \{ V_{self}(x) + V_{other}(x) \}.$$

As with any experiment involving human subjects, ethical considerations were addressed to prevent possible harm to the subjects. The experimental process did not involve deceit or misguidance. The subjects were informed of all activities and required to give their consent before the experiment. The consent form can be found in Appendix K.

6.3.3 Procedure

The recruitment was based on a class assignment for undergraduate students taking an introductory course to Management Information Systems. The recruitment process is presented in Appendix C. When the participants signed up for the experiment, they answered a background questionnaire to determine if any of the demographic variables might confound the findings. The participants further selected a session that was convenient for them. They were then sent an email two days before the session date and they were telephoned the evening before experiments to ensure participation.

Prior to entering the laboratory, the subjects were given the consent form and a number, which prevented the facilitator from associating their names with their performance. The subjects were randomly assigned to one of two laboratories (a room for each side of the negotiation). In the laboratory, they were placed in front of a computer logged onto the ENS.

During the two hour experiment, the subjects were guided by facilitators (one for each laboratory), who controlled the flow of activities and answered general questions about the ENS features and instructions. The facilitator's manual can be found in Appendix H. The students answered two questionnaires in the experiment. Before the

case was presented, a questionnaire on their predisposition was given to the students to measure their inherent orientation. This assessment of motivational orientation (AMO) was adapted from a decomposed game developed by Van Lange, Otten et al. (1997); see Appendix D. Participants were given the negotiation case (Appendix A) followed by a quiz (Appendix E) to measure their understanding of the case and the objectives. A system guide was provided to familiarize the subjects with its features (Appendix I). An explanation of the experimental rules was provided before subjects started negotiations (Appendix F). In ex-post, a questionnaire served to measure their subjective variables (Appendix G). The order of these activities is presented in Table 13.

Table 13 Experimental activities

	Activity	*Reference*
1	Sign up and answer demographic questions	Appendix J
2	Sign consent form	Appendix K
3	Randomly assign to two different laboratories (one for each side of the case)	Carnevale and De Dreu (2005)
4	Answer questions on their orientation (AMO)	Appendix D
5	Receive instruction on the negotiation	Appendix F
6	Read the case	Appendix A
7	Answer a quiz on the case	Appendix E
8	Receive explanation on the system guide	Appendix I
9	Negotiate for 45minutes	Pretest 2
10	Answer post-questionnaire	Appendix G

The quasi-field experiment proceeded with similar activities, except that subjects were not assigned to different laboratories. Instead they were given personalized login information and seven days to negotiate online in their natural settings.

6.3.4 Statistical Power

The statistical power is closely related to sample size. It represents the probability of correctly assessing whether the independent (or treatment) variables significantly affect the dependent variables (Kerlinger and Lee 2000). Therefore, the higher the statistical

power, the more likely false positive and negative results are avoided. The statistical power hinges on the alpha level chosen for the test (i.e., reduce Type II error, false negative), beta level chosen for the test (i.e., reduce Type I error, false positive), sample size, and number of treatments in the case of ANOVA tests.

For behavioral studies, a power of 0.80 (1 - beta), an alpha of 0.05 and an effect size of 0.28 are recommended to capture the effects between independent and dependent variables (Cohen 1988). The sample size was calculated as a function of the number of treatments, effect size, alpha, and power, using the R[7] statistical software. Based on the four treatment groups required by the research design, a sample size of 30 dyads was needed to achieve statistical power.

6.3.5 Confounding Variables

Confounding variables can affect the results of the experiment by adding undesired variance to the study. Several strategies were put in place to prevent the main confounding variables from influencing the experimental findings. Table 14 describes these strategies used for laboratory and quasi-field experiments.

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[7] http://cran.r-project.org/web/packages/pwr/pwr.pdf

Table 14 Confounding variables

Confounding variables	*Laboratory experiment*	*Quasi-field experiment*
Having a predisposition different from the motivational orientation manipulated	The predispositions of the subjects were assessed before they were given the case. See Appendix D.	Same as laboratory experiment
Being bias towards the role played in the case	The role was check against the dependent variables for each treatment group.	Same as laboratory experiment
Having negotiation experience	Their experience with negotiation was asked at registration and checked against the dependent variables for each treatment group. See Appendix J.	Same as laboratory experiment
Having demographic biases (e.g., gender and age)	The demographic data was captured at registration and checked against the dependent variables for each treatment group. See Appendix J.	Same as laboratory experiment
Inadvertently discovering the profit schedule of the counterpart	The participants were separated into two rooms, one for each side of the negotiation.	Personalized login information
Not being serious about the experiment	Participants were rewarded with course marks	Same as laboratory experiment
Not understanding the case	A quiz served to enforce the key points of the case. See Appendix E.	Same as laboratory experiment
Not understanding the features of the system	A system guide was provided to explain the main features. See Appendix I. A facilitator was present during the experiment to explain features.	Same as laboratory experiment
Experiencing different facilitation methods	A facilitation manual ensured that similar instructions were given in the experiment. See Appendix H.	Not applicable

6.3.6 Experimental Settings

Research in social sciences has long been driven by two paradigms: (1) studying novel phenomena by establishing causes and effects while reducing confounding influences; and (2) relating the findings, as much as possible, to the real-life environment (Pruitt 2005). This thesis hopes to attain these two objectives by using two experimental settings (laboratory and quasi-field) to enhance rigor and generality of findings in this research.

The laboratory setting is beneficial for observing the phenomenon of motivational orientation interacting with ENS framing, because variables may be isolated, and the relationships between the independent and dependent variables may be magnified to test

hypotheses. However, the creation of this artificial environment can produce atypical processes that lead to outcomes, which are dissimilar from those in the real-life setting (Pruitt 2005).

The quasi-field experiment was intended to replicate the negotiation environment in electronic commerce, where participants are not bound to a laboratory, 45 minute exchange, standardized browser, and pace set by the facilitator. Nevertheless, the case, sample demographics, ENS, documentation (e.g., system guide, instructions, etc), and sequence of experimental activities (i.e., from 4 to 10 in Table 13) were the same as in the laboratory experiment in order to retain the premise of the experimental design.

Internet-based studies have been criticized for moderating treatment effects and lacking control, but they may increase self-disclosure by distancing the experimenter from the participants (Siah 2005). In this study, the treatment effects were expected to be somewhat reduced because of: (1) the different technologies employed by the participants (e.g., browser and connection speed), and (2) participants being more skeptical of the experimental activities as a result of not seeing other participants or the experimenter (i.e., there are less peer- or authoritative pressures to pursue the experimental activities). The natural setting may lead to an increase of random error from participants, who may not understand the task or do not have the patience for a seven day experiment, thus submitting random responses, which would be difficult to identify. In order to minimize these undesirable effects, pretesting and an increase of the sample size were necessary (Siah 2005).

As internet-based studies do not require facilitators or physical interaction with the experimenter, the contact between the experimenter and the participants was diminished

in such an environment, and it was expected to enable more truthful behaviors and responses. The external validity of results was increased in the quasi-field setting such that the findings can be more generalizability (Pruitt 2005).

Furthermore, the comparison between both settings strengthened the causal effects obtained in the laboratory. In essence, strong effects were presented in both settings, but weaker ones only appeared in the laboratory.

6.4 Pretests

Before the experiment, three pre-tests were conducted to (1) verify that the appropriate motivational orientations could be induced (Pretest 1), (2) refine the instrument for measuring subjective variables (Pretest 1), and (3) test the workflow of the experiment (Pretest 2 and Pretest 3).

The first pretest consisted of a quasi-field experiment that was similar to the actual one conducted in the project. It assigned participants to two groups: collaborators and competitors. The 70 participants negotiated in a gain frame using the case described in Appendix A. The results showed that collaborating and competing behaviors were successfully induced through the instructions given in the case even though the subjects may have had inherently different orientations (see Appendix D for the assessment of motivation orientation) than the one that they were assigned.

The second and third pretest served to inspect the experimental procedures, identify possible confounding variables and find improvements to increase the validity of the experiments. They involved a mock conduct of the experiment followed by interviews to spot problems with experimental activities. The pretests determined that the case required 45 minutes for participants to communicate and learn each other's

preferences. They also revealed necessary updates to the documentation, which enhanced the understanding of the tasks as depicted in Appendix B.

6.4.1 Pretest 1: Quasi-field Test of Motivational Orientation

Pretest 1 sought to determine if collaborative and competitive negotiators could be induced by manipulating the objectives of the case, and to substantiate the dependent variables. The test was conducted as a quasi-field test in a gain frame, whereby undergraduate students were assigned to either collaborative or competitive treatments. In most cases, the subjects participated with some or no incentives (2-3% bonus grade in their course). They were given five days to negotiate the case. A total of 70 students volunteered for the test of which 34 were placed in the collaborative treatment and 36 were in the competitive treatment.

The subjective variables of cognitive effort, outcome satisfaction and relationship and discussion climate were examined. The analysis mainly consisted of verifying the loadings for the four subjective variables. Appendix G describes the original and adapted items for the questionnaire. Cognitive effort (items found in Table 15, part c) was based on Chen, Vahidov et al. (2009), and was performed in the context of auctions and negotiations, rather than that of general IS. Discussion climate (items found in Table 15, part d) was adapted from Foroughi, Perkins et al. (1995) and Beersma and De Dreu (2002). Outcome satisfaction (items found in Table 15, part a) was derived from Suh (1999) and Vetchera, Kersten et al. (2004). Relationship (items found in Table 15, part b) was adapted from Curhan, Elfenbein et al. (2005), Jones and Jelassi (1990), and Beersma and De Dreu (2002). Table 15 details (1) the instructions from the questionnaire used to capture the variables and (2) the items.

Table 15 Questionnaire measuring dependent variables

Based on your experience in this negotiation, please answer the following questions as accurately as possible.							
a) How satisfied (or dissatisfied) are you with…	Very satisfied	Satisfied	Somewhat satisfied	Neither satisfied nor dissatisfied	Somewhat dissatisfied	Dissatisfied	Very dissatisfied
1. the achieved outcome? (Suh 1999)	O	O	O	O	O	O	O
2. the results compared to your expectations? (Vetchera, Kersten et al. 2006)	O	O	O	O	O	O	O
3. the outcome when looking at what you originally wanted? (Suh 1999)	O	O	O	O	O	O	O
4. the solution being favorable for you? (Suh 1999)	O	O	O	O	O	O	O
b) In the negotiation…	Strongly agree	Agree	Partially agree	Neither agree nor disagree	Partially disagree	Disagree	Strongly disagree
5. my counterpart listened to my concerns. . (Curhan, Elfenbein et al. 2005)	O	O	O	O	O	O	O
6. a good foundation was set for future relationships with my counterpart. (Curhan, Elfenbein et al. 2005)	O	O	O	O	O	O	O
7. my counterpart acted in good faith. (Jones and Jelassi 1990)	O	O	O	O	O	O	O
8. my counterpart was honest. (Beersma and De Dreu 2002)	O	O	O	O	O	O	O
c) In the negotiation process…	Very easy	Easy	Partially easy	Neither easy nor difficult	Partially difficult	Difficult	Very difficult
9. acting in my role was…(Chen, Vahidov et al. 2009)	O	O	O	O	O	O	O
10. meeting the objectives of the case was…(Chen, Vahidov et al. 2009)	O	O	O	O	O	O	O
11. making decisions was…(Chen, Vahidov et al. 2009)	O	O	O	O	O	O	O
12. interacting in the business scenario was…(Chen, Vahidov et al. 2009)	O	O	O	O	O	O	O

Based on your experience in this negotiation, please answer the following questions as accurately as possible.							
d) During the negotiation...	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
13. the atmosphere was agreeable. (Beersma and De Dreu 2002)	O	O	O	O	O	O	O
14. I felt comfortable. (Beersma and De Dreu 2002)	O	O	O	O	O	O	O
15. my counterpart listened to me. (Beersma and De Dreu 2002)	O	O	O	O	O	O	O
16. the interaction was sociable. (Beersma and De Dreu 2002)	O	O	O	O	O	O	O
17. I could openly discuss disagreements. (Foroughi, Perkins et al. 1995)	O	O	O	O	O	O	O
e) In the case…							
18. I was instructed to try to achieve the best for me only.	O	O	O	O	O	O	O
19. I was instructed to try to achieve the best for me and my counterpart.	O	O	O	O	O	O	O
In negotiation, …							
20. Always gave others the benefit of the doubt.	O	O	O	O	O	O	O
21. Your loss is my gain.	O	O	O	O	O	O	O
22. Take a problem solving approach.							
23. The best defense is a good offense.							
24. Negotiate fair.							
25. Winner takes all.	O	O	O	O	O	O	O

The objective variables (i.e., number of offers, cooperativeness, joint outcome and contract balance) were recorded by the ENS.

The data was first analyzed to determine if the manipulation of orientations was successful. An ANOVA test on the instructions showed a significant difference between collaborators and competitors when they responded to items in Table 15, part e). On average, the p-value was less than 0.001 for the collaborators and competitors regarding the items used in the manipulation check. The collaborators agreed strongly with items

that aimed to maximize joint benefits, while competitors agreed with those that maximized profits for themselves only.

Another manipulation check was performed to make sure that the small bonus grades did not influence the manipulation of motivational orientation and joint outcome. The results show no significant effect with a p-value of 0.32 for motivational orientation and 0.48 for joint outcome.

Table 16 Total variance explained

Item	Initial Eigenvalue		
	Total	% of Variance	Cumulative %
1	4.921	30.754	30.754
2	3.636	22.727	53.482
3	2.813	17.584	71.066
4	1.655	10.344	**81.410**
5	.724	4.528	85.938
6	.418	2.612	88.550
7	.371	2.321	90.871
8	.331	2.067	92.938
9	.290	1.813	94.751
10	.197	1.234	95.985
11	.157	.983	96.968
12	.135	.845	97.813
13	.118	.735	98.548
14	.115	.718	99.266
15	.068	.427	99.693
16	.049	.307	100.000

Out of the 70 participants, only 28 competitors and 24 collaborators reached an agreement. The results of the factor analysis of the subjective variables showed that with an eigenvalue >1, four distinct factors could be identified with items loadings above 0.4, as indicated in Table 16. Table 17 illustrates the rotated loading for each factor and the Cronbach's alpha measuring reliability above 0.7. All of the values fall into acceptable

ranges (Kerlinger and Lee 2000). Therefore, four distinct, valid constructs were reliably assessed based on the items from the questionnaire.

Table 17 Rotated factor matrix

	Factor loading				
	Outcome Satisfaction	Cognitive effort	Discussion climate	Relationship	**Reliability (α)**
DC1	-.134	-.046	.892	-.006	.922
DC2	.028	-.028	.904	-.081	
DC3	-.016	-.182	.898	-.160	
DC4	.004	-.049	.891	.012	
DC5	.010	-.039	.901	-.002	
CE1	.019	.917	-.027	.025	.943
CE2	.059	.898	-.130	.000	
CE3	.020	.945	-.099	.094	
CE4	.001	.920	-.039	-.014	
OS1	.923	.066	.025	.200	.959
OS2	.916	.023	-.010	.228	
OS3	.918	.097	-.037	.171	
OS4	.929	-.088	-.111	.176	
Rel1	.368	.028	.013	.523	.820
Rel2	.123	-.067	-.045	.859	
Rel3	.134	-.001	-.077	.886	
Rel4	.277	.175	-.112	.782	

Rotation Method: Varimax with Kaiser Normalization.

The descriptive statistics in Table 18 show that competitive dyads, on average, reached a joint outcome of $116,964, while competitive dyads got $104,479. The same table describes that contract balance was higher for the collaborative dyads (mean = $16,562), than for the competitive ones (mean = $13,214). Regarding the process, competitive dyads sent about 7 offers on average, and these offers were more cooperative (mean = 29.6%) than those sent by collaborative dyads (average number of offers = 4 and cooperativeness =12%).

Table 18 Descriptive statistics of dependent variables

		N	Mean	Std. Deviation	Std. Error
Joint outcome	Competitive	28	116.9643	10.47168	1.97896
	Collaborative	24	104.4792	8.82281	1.80095
	Total	52	111.2019	11.51768	1.59721
Contract Balance	Competitive	28	13.2143	13.04119	2.46455
	Collaborative	24	16.5625	20.55034	4.19482
	Total	52	14.7596	16.83258	2.33426
Number of offers	Competitive	34	6.7059	3.88883	.66693
	Collaborative	34	4.2059	3.38248	.58009
	Total	68	5.4559	3.83010	.46447
Cooperativeness	Competitive	28	29.6286	21.41704	4.04744
	Collaborative	24	12.7750	13.79434	2.81576
	Total	52	21.8500	20.01561	2.77567

A MANOVA was conducted to examine the impact of motivational orientation and possible confounding effects from AMO (representing inherent orientation) and role (played in the case) on dependent variables. The analysis of the objective variables demonstrated that the confounding variables did not affect the dependent variables (p-values greater than 0.05). Furthermore, the induced motivational orientation significantly affected joint outcome (p-value < 0.001) and contract balance (p-value = 0.039) as shown in Table 19 and Table 20.

The MANOVA also modeled the process variables (i.e., number of offers and cooperativeness). The results showed that motivational orientation affects both the number of offers and competitiveness. In essence, competitive dyads exchanged significantly more offers (p-value = 0.023) and these offers were more cooperative (p-value = 0.001).

Table 19 Multivariate tests

Effect		Value	F	df	Error df	Sig.
Intercept	Pillai's Trace	.970	359.340	4.000	45.000	.000
	Wilks' Lambda	.030	359.340	4.000	45.000	.000
	Hotelling's Trace	31.941	359.340	4.000	45.000	.000
	Roy's Largest Root	31.941	359.340	4.000	45.000	.000
AMO	Pillai's Trace	.114	1.444	4.000	45.000	.235
	Wilks' Lambda	.886	1.444	4.000	45.000	.235
	Hotelling's Trace	.128	1.444	4.000	45.000	.235
	Roy's Largest Root	.128	1.444	4.000	45.000	.235
Role	Pillai's Trace	.006	.063	4.000	45.000	.992
	Wilks' Lambda	.994	.063	4.000	45.000	.992
	Hotelling's Trace	.006	.063	4.000	45.000	.992
	Roy's Largest Root	.006	.063	4.000	45.000	.992
Motivational orientation	Pillai's Trace	.411	7.840	4.000	45.000	.000
	Wilks' Lambda	.589	7.840	4.000	45.000	.000
	Hotelling's Trace	.697	7.840	4.000	45.000	.000
	Roy's Largest Root	.697	7.840	4.000	45.000	.000

Design: Intercept+AMO+side+MO

Table 20 Tests of between-subject effects

Source	Dependent Variable	Type III Sum of Squares	df	F	Sig.
Corrected Model	Number of offers	25.337(a)	3	2.527	.068
	Joint outcome	2345.422(b)	3	8.490	.000
	Contract balance	1283.021(c)	3	2.996	.040
	Cooperativeness	5434.823(d)	3	5.798	.002
Intercept	Number of offers	17.691	1	5.293	.026
	Joint outcome	32851.468	1	356.751	.000
	Contract balance	672.048	1	2.255	.140
	Cooperativeness	97.603	1	.312	.579
AMO	Number of offers	9.189	1	2.749	.104
	Joint outcome	143.100	1	.480	.492
	Contract balance	.002	1	.000	.998
	Cooperativeness	10.847	1	.076	.784
Role	Number of offers	.308	1	.092	.763
	Joint outcome	.000	1	.000	1.000
	Contract balance	.000	1	.000	1.000
	Cooperativeness	.000	1	.000	1.000
Motivational orientation	Number of offers	18.343	1	5.488	.023
	Joint outcome	2169.542	1	23.560	.000
	Contract balance	639.682	1	4.481	.039
	Cooperativeness	4192.720	1	13.419	.001

a R Squared = .136 (Adjusted R Squared = .082)
b R Squared = .347 (Adjusted R Squared = .306)
c R Squared = .158 (Adjusted R Squared = .105)
d R Squared = .266 (Adjusted R Squared = .220)

Pretest 1 confirmed that motivational orientation could be manipulated through the objective of the case, and that the subjects' inherent disposition did not affect the manipulation. It also verified the reliability and validity or the subjective variables. The results appear to support the expectation that competitive dyads perform better in the gain frame, i.e. they tend to make larger number of offers, and their offers are of higher quality.

6.4.2 Pretest 2: Internal Test of Workflow for Experiment

An internal pretest was conducted on February 26th, 2009 with six members of the Interneg research team: three developers of the system; two Ph.D. students (who are familiar with experiments and the Inspire system); one visiting fellow (who had conducted experiments with similar negotiation activities using the Inspire ENS, and is knowledgeable about decision support and important confounding variables that can affect the experiment); and one administrative staff (who has managed many experiments at the InterNeg[8] research centre).

Before the internal test, the participants were told that they would be collaborators negotiating a business contract. They were asked to give their opinions on the various activities in the experiments and the documentation used to guide them through the test. From the 77 minute pre-test, four important changes were suggested based on comments from the participants.

(1) The AMO instrument is difficult to understand. It needs to be clarified by giving readers an example, by re-phasing the distribution of points in the game, and by consolidating terms that mean the same (e.g., choice, option and decision).

(2) The private information must be given on paper to allow subjects to quickly refer to the case. In a short experiment, the case needs to stress the objectives in terms of the student's incentives (i.e., collaborators are judged based on joint gains and competitors on individual gains).

(3) The post-settlement feature is not needed in the experimental design, and it is difficult to understand for students unfamiliar with this type of decision support.

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[8] http://interneg.concordia.ca

The feature may be a crutch that students could lean on instead of working with the counterpart to find an efficient agreement.

(4) The negotiation time should be prolonged to either 40 or 45 minutes as students must have the time to familiarize themselves with the system and use the system features.

Other comments were also recorded and stated in Table 21. These involved small changes to the documentation used in the experiment, along with system updates.

Table 21 Treatment: Collaborators with gain frame

Phases	Activities	Comments	Min.
Setup lab	• Turn on computers (6) • Adjust browser • Display sign in page • Place number and handouts next to computers		
Greet participants	• Welcome participants to experiment • Read consent form and ask them to it • Ask participants to log in	• Update consent form	7
	• Outline experiment from welcome page • Read the AMO • Read public instructions • Read private information • Pass to quiz • Explain system	• No need to explain too much of the outline, just list the activities • The **AMO** is too confusing. Need to make it simpler and give an example • Update **public instructions**, explain better End negotiation activity • Update **private information**, stress the objectives and participants should be given a copy • Consensus on "**No need for post-settlement activity**", remove it from negotiation activities	20
Start negotiation	• Given subjects 30 minutes to negotiate	• Subjects should be given **45 minutes** • The graph takes a long time to load • Ask lab maintenance staff (CIT) to update computers in the lab • Deactivate email function during negotiations	30
End negotiations	• Ask participants to answer questionnaire	• Consider removing some questions to balance prolong negotiation time	20
			77

6.4.3 Pretest 3: External Test of Workflow for Experiment

An internal pre-test was conducted on March 10th, 2009 with six students that would be representative of the subjects in the target treatment groups. This pretest served to verify the students' understanding of the experimental procedures and documentation. These subjects were novices, who had not participated in electronic negotiation experiments before. They were incentivized to participate with a flat fee of $24 for three hours of work. They were told that no special skills were required. After the experiment, they were asked to give their opinions on the various activities in the experiments and the documentation used to guide them through the test. From the 90 minute pre-test, three important changes were suggested.

(1) The students need 10-15 minutes to arrive to the laboratory.

(2) The facilitator must seat the subjects following the sequence of login numbers, or else matching is problematic.

(3) An emphasis should be placed on coordinating the experimental activities between the two negotiation rooms.

Other recorded comments are shown in Table 22.

Table 22 Treatment: Competitors with gain frame

Phases	*Activities*	*Comments*	*Min.*
Setup lab	▪ Turn on computers ▪ Adjust browser ▪ Display sign in page ▪ Sign in ▪ Place number and handouts next to computers	▪ This process took longer than expected (15minutes to setup)	
Greet participants	▪ Welcome participants to experiment	▪ Participants do not arrive on time and they need time to get to the laboratories.	10
	▪ Outline experiment from welcome page ▪ Read the AMO ▪ Read public instructions ▪ Read private information ▪ Pass to quiz ▪ Explain system	▪ No need to explain too much of the outline, just list the activities ▪ Emphasize that post-settlement activity is to be skipped	20
Start negotiation	▪ Given subjects 30 minutes to negotiate	▪ **45 minutes** work well for the subjects to understand the case and system features for negotiation ▪ Ask lab maintenance staff (CIT) to update computers in the lab	45
End negotiations	▪ Ask participants to answer questionnaire	▪ All the questions were answered in time allocated	15
			90

7 Results

A total of 276 students participated in the laboratory experiment (out of which 274 reached agreements and were used for the study), and 490 in the quasi-field experiment (out of which only 350 reached agreements). The settings differed in negotiation time and experimental controls. The participants in the laboratory experiment were given two hours to complete the experiment, while those in the quasi-field setting had seven days. In the laboratory environment, a facilitator guided the students through the experimental protocol and ensured that they completed each stage of activities using Mozilla's Firefox browser version 3.5. The quasi-field experiment allowed the participants to negotiate from any place and at any time, at their convenience, without the aid of a facilitator, and with any browser technology. The results were analyzed independently for laboratory (Section 7.1) and quasi-field (Section 7.2) experiments following the same procedures.

The first step of the analysis consisted of verifying and describing the findings. Section 7.1.1 and Section 7.2.1 describe the validation of subjective constructs with Principal Component Analysis. Section 7.1.2 and Section 7.2.2 characterize the dependent and confounding variables with descriptive statistics, a general MANOVA results and Pearson correlation coefficients. Section 7.1.3 and Section 7.2.3 examine the results of the manipulation checks on motivational orientations.

The next step involved testing the hypotheses. Section 7.1.4 and Section 7.2.4 illustrate the framing effect within each orientation at the dyadic level. Section 7.1.5 and Section 7.2.5 describe the differences between collaborative and competitive dyads within each frame. Section 7.1.6 and Section 7.2.6 examine the impact of framing at the individual level.

Once the results were analyzed for each setting, they were compared to highlight the different framing effects, which are presented in Section 7.3. Finally, Section 7.4 summarizes the findings in Tables 46 and 47.

7.1 Laboratory Experiment

The laboratory environment allowed the isolation and manipulation of motivational orientation and ENS framing to verify their interaction under restricted conditions. Before hypotheses tseting, three important validations were needed: (1) checking that subjective constructs were properly measured with the items in the post-questionnaire; (2) ensuring that confounding variables such as age, gender, role, negotiation experience, English proficiency and AMO did not influence the relationship among the independent and dependent variables; and (3) verifying that independent variables were appropriately specified (e.g., checking for multicollinearity and accuracy of the induced motivational orientations). Once these validations had been performed, the hypotheses were examined at the dyadic and individual levels using analyses of variance to detect significant impacts of treatments on the dependent variables.

7.1.1 Validation of the Subjective Constructs

The first step in examining the subjective constructs, assessing process (i.e., cognitive effort and discussion climate) and outcomes (i.e., relationship and outcome satisfaction), was to determine the adequacy of the multi-item measurement instrument. Principal Component Analysis, with Varimax and normalization rotation, was performed to extract the intended constructs. The measures consisted of seventeen items determining outcome satisfaction, relationship, cognitive effort and discussion climate.

Table 23 shows that four factors with an eigenvalue above 1, representing the subjective variables, explained 79.6% of the variance. The first four eigenvalues imply that the seventeen items (i.e., responses to the questions) can be summarized by four factors.

Table 23 Total variance explained for all measures

Item	Initial Eigenvalue		
	Total	% of Variance	Cumulative %
1	8.246	48.507	48.507
2	2.613	15.370	63.877
3	1.666	9.800	73.677
4	1.002	5.896	**79.574**
5	.552	3.246	82.820
6	.484	2.845	85.665
7	.330	1.941	87.606
8	.315	1.853	89.460
9	.291	1.712	91.172
10	.273	1.605	92.777
11	.229	1.347	94.124
12	.207	1.220	95.344
13	.193	1.135	96.479
14	.181	1.063	97.542
15	.144	.846	98.387
16	.142	.836	99.223
17	.132	.777	100.000

Table 24 depicts the loadings for each item employed to measure the constructs. Items measuring the same construct were heavily loaded (i.e., above 0.4 as recommended by Boudreau, Gefen et al. 2001) by one factor. One item measuring discussion climate (DC3: question 7 of the questionnaire in Appendix G, "In the negotiation, my counterpart acted in good faith.") also loaded above 0.4 on the relationship factor. With high loadings on two factors, DC3 was dropped as a measure of discussion climate, and principal component analysis was repeated using all other items.

Table 24 Rotated factor matrix for all measures

Item	Factor loading			
	Discussion Climate	Relationship	Outcome satisfaction	Cognitive effort
OS1	.198	.290	.819	.215
OS2	.187	.289	.822	.192
OS3	.141	.151	.863	.195
OS4	.157	.289	.821	.244
REL1	.318	.818	.262	.105
REL2	.349	.763	.274	.067
REL3	.299	.839	.280	.102
REL4	.263	.831	.248	.104
CE1	.106	.184	.257	.772
CE2	.086	.153	.302	.812
CE3	.041	-.008	.157	.877
CE4	.183	.029	.045	.872
DC1	.764	.346	.229	.110
DC2	.766	.175	.250	.164
DC3	.686	**.524**	.138	.115
DC4	.864	.252	.075	.058
DC5	.795	.193	.092	.101

Table 25 Total variance explained for revised measurement

Item	Initial Eigenvalue		
	Total	% of Variance	Cumulative %
1	7.684	48.025	48.025
2	2.493	15.584	63.609
3	1.611	10.068	73.677
4	1.002	6.263	**79.940**
5	.541	3.381	83.321
6	.475	2.971	86.293
7	.318	1.985	88.277
8	.291	1.820	90.097
9	.286	1.787	91.885
10	.251	1.568	93.453
11	.219	1.369	94.821
12	.204	1.273	96.095
13	.193	1.205	97.300
14	.158	.986	98.286
15	.142	.888	99.175
16	.132	.825	100.000

Table 25 describes the factors extracted after DC3 was removed from analysis. The four factors explained 79.9% of the total variance for the sixteen rather than seventeen items. The elimination of DC3 provided a more adequate measurement model, while maintaining an eigenvalue greater than 1 for the extracted factors. In Table 26, the rotated factor matrix indicates convergent and discriminant validities for the four factors; where loadings range from 0.752 to 0.877 on designated factors, and from -0.012 to 0.361 on other factors.

With respect to the measurement instruments regarding perceptions of outcome, the four items assessing outcome satisfaction (OS1, OS2, OS3 and OS4) loaded between 0.817 and 0.864, and the four items for relationship (REL1, REL2, REL3 and REL4) weighed between 0.776 and 0.843. The instruments related to perceptions of process comprised of four items measuring cognitive effort (CE1, CE2, CE3 and CE4), which loaded between 0.772 and 0.877, and the four items assessing discussion climate (DC1, DC2, DC4 and DC5), which weighed between 0.752 and 0.863.

Table 26 also reports the reliabilities of the factors determined by the Cronbach alphas, which are between 0.889 and 0.936. All reliability values are above the 0.70 threshold (Nunnally and Bernstein 1994). Therefore, the items are internally consistent at determining the constructs.

Table 26 Rotated factor matrix for revised measurement

Items	Factor loadings				Reliability
	Outcome satisfaction	Relationship	Cognitive effort	Discussion climate	Cronbach alpha
OS1	.817	.298	.215	.194	0.932
OS2	.822	.295	.192	.179	
OS3	.864	.155	.195	.134	
OS4	.821	.293	.245	.148	
REL1	.263	.823	.106	.294	0.936
REL2	.265	.776	.068	.344	
REL3	.276	.848	.103	.283	
REL4	.243	.839	.106	.249	
CE1	.249	.191	.772	.113	0.889
CE2	.300	.155	.812	.084	
CE3	.163	-.012	.877	.031	
CE4	.048	.030	.872	.178	
DC1	.230	.361	.112	.752	0.896
DC2	.241	.198	.166	.775	
DC4	.071	.273	.059	.863	
DC5	.090	.211	.103	.793	

7.1.2 Descriptive Statistics

The means and standard deviations for confounding, objective and subjective variables are presented in Table 27. The table shows the descriptive statistics for the overall data set and for the each treatment.

Table 27 Descriptive statistics

Variable	Overall Mean (SD) n= 274	Motivational orientation			
		Competitive n=146		Collaborative n=128	
		Gain Frame Mean (SD) n=58	Loss Frame Mean (SD) n=88	Gain Frame Mean (SD) n=60	Loss Frame Mean (SD) n=68
Confounding					
Age	1.88(0.80)	1.77 (0.76)	1.85 (0.80)	1.81(0.88)	2.04(0.76)
Gender	0.50(0.50)	0.49 (0.50)	0.52 (0.50)	0.38(0.49)	0.57(0.50)
Role	0.50(0.50)	0.50 (0.50)	0.50 (0.50)	0.50(0.50)	0.50(0.50)
Negotiation experience	2.59(1.52)	2.89 (1.63)	2.39 (1.47)	2.47(1.32)	2.69(1.60)
English proficiency	5.92(1.12)	6.13(1.06)	5.88 (1.14)	5.61(1.18)	6.03(1.05)
AMO	1.15(0.54)	1.10(0.52)	1.15 (0.49)	1.27(0.61)	1.09(0.57)
Objective					
Joint outcome	113.11(11.18)	116.72(10.14)	112.53 (9.48)	106.82(13.00)	116.32(9.95)
Contract balance	15.21(18.48)	14.48(14.26)	19.74 (24.81)	14.12(17.97)	10.93(9.33)
Number of offers	12.02(7.00)	14.48(8.24)	11.45 (6.97)	8.37(5.16)	13.88(5.84)
Cooperativeness	13.41(13.52)	14.66(9.62)	11.92 (10.28)	10.81(19.67)	16.56(12.95)
Subjective					
Outcome satisfaction	1.34(1.00)	1.50(1.06)	1.35 (1.01)	1.43(1.00)	1.39(0.94)
Relationship	1.20(1.00)	1.40(1.13)	1.21(0.96)	1.27(1.08)	1.31(0.88)
Cognitive effort	1.52(1.00)	1.61(1.02)	1.54 (0.97)	1.67(1.01)	1.68(1.00)
Discussion climate	1.10(1.00)	1.13(0.97)	1.04(1.10)	1.06(0.97)	1.14(0.99)

For the confounding variables, the overall descriptive statistics from Table 27 indicate that the 274 participants were in each of the three age groups: the first age group of 20 years old or less (coded as "1"); the second age group of 21 to 25 years old (coded as "2"), with more emphasis on the latter (a mean of 1.88); or the third age group of 25 years old and greater (coded as "3"). The ratio of men (coded as "1") and women (coded as "0") was equal. The role describes the side they represented in the negotiation: the producer was coded as "1" and the retailer was coded as "0". The negotiation experience

was a self-reported measure, by which participants viewed themselves (with an average of 2.59) as being closer to a novice (coded as "1") than to an expert (coded as "7") in negotiations.

Although all participants were undergraduates enrolled at an English-language business school, English proficiency was assessed as a confounding variable because some non-native English speaking students might have had difficulties understanding the case. In Table 27, the overall average of 5.92 for English proficiency implies that the students considered their English skills to be near excellent, where excellent was coded as "7" and poor as "1". AMO was based on a decomposed game shown in Appendix D to determine the inherent motivational orientation of subjects. As the collaborators were classified with a "2", competitors with a "1", and the remaining with "1.5" (those that could not be classified as they had not chosen six or more options in either orientation of the decomposed game), the overall average of 1.15 from Table 27 means that most participants were inherently competitive. Specifically, 68% of participants considered themselves competitive (out of which 19% were extremely competitive), 23% were collaborative, and 9% were undecided.

Due to the restricted number of computers in the laboratories, the data was gathered over sixteen sessions, four sessions per treatment. 146 students were assigned to the competitive orientation, out of which 58 were subjected to the gain and 88 to the loss frame. 128 students were assigned to the collaborative orientation, with 60 in the gain and 68 in the loss frame. The number of participants per treatment was uneven because: (1) the students could select the sessions that were most convenient for them, and (2) some students did not show up for their registered session.

By large, the dyads achieved a joint outcome of $113,110, which was better than an evenly split outcome of $100,000, implying that they had worked on finding mutual gains. The highest mean joint outcome ($116,720) was obtained by the competitive dyads in the gain frame, and the lowest one was raeched by collaborative dyads ($106,820) in the same frame. Figure 19 depicts the joint outcomes of each treatment in form of a boxplot.
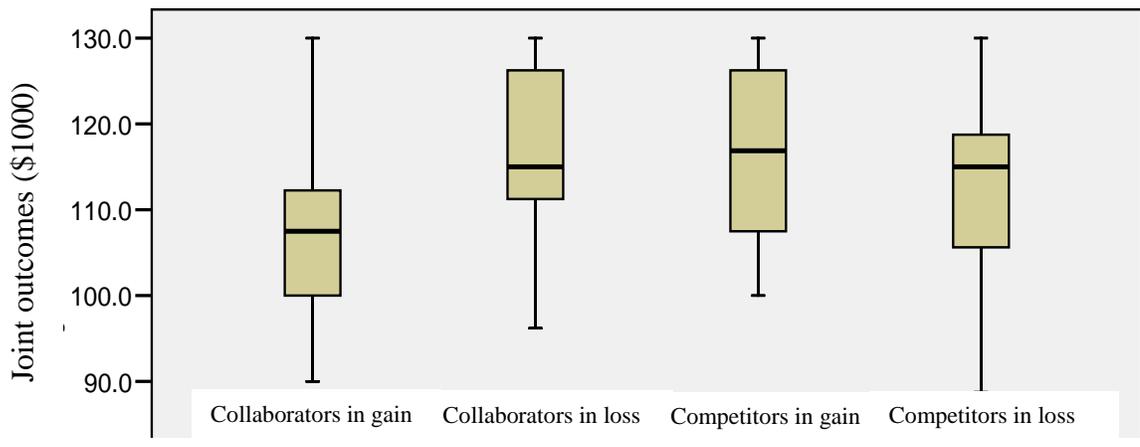

Figure 19 Boxplot of joint outcomes for all treatments in the laboratory

The mean disparity between negotiators of the same dyad, measured in terms of contract balance, was highest for competitive dyads in the loss frame ($19,740) and lowest for collaborative dyads in the same frame ($10,930). The treatments had an overall contract balance of $15,210.

In terms of the process, the dyads produced 12 offers on average, Subjects in competitive dyads in the gain frame proposed the highest number of offers (14 offers), while those in collaborative ones in the same frame sent the least number (8 offers). The quality of offers was measured by the cooperativeness (i.e., percentage of integrative offers proposed over total offers). Collaborative dyads in the loss frame were the most

cooperative (16.56% of all offers were cooperative), but competitive ones in the same frame were the least with 10.81% cooperativeness.

At an individual level, the subjective variables were measured using items on a seven point Likert-type scale, whereby the highest rating was coded with a "3" and the lowest was with a "-3". Competitors in the gain frame rated outcome satisfaction the highest, with an average rating of 1.50, but competitors in the loss frame gave this variable the lowest average rating of 1.35. Following the same pattern, the relationship was rated highest by competitors in the gain frame (an average rating of 1.40) and lowest by those in the loss frame (an average rating of 1.21).

Regarding the subjective assessment of the process, the loss frame created the most divergence between collaborators and competitors. The competitors perceived that the loss frame required the most amount of effort (an average rating of 1.54 for cognitive effort, whereby the higher was the number the less effort was required) and contributed to the worst (an average rating of 1.04) discussion climate. On the flip side, collaborators reported that the loss frame entailed the least amount of effort (an average rating of 1.68) and allowed for the best discussion climate (an average rating of 1.14).

In order to determine possible effects of confounding variables on the interaction of independent variables, MANOVA testing was employed to test the covariance. A general MANOVA was performed on the independent (motivational orientation and ENS framing) and dependent variables (joint outcome, contract balance, number of offers, cooperativeness, outcome satisfaction, relationship, cognitive effort and discussion climate) with the confounding variables used as covariates (age, gender, role, negotiation

experience, English proficiency and AMO). The structure of the MANOVA model was as follows:

Dependent variables
$= \mu + $ *motivational orientation* $ + $ *ENS framing* $ + $ *motivational orientation* $*$ *ENS framing* $ + \gamma_1 Age + \gamma_2 Gender + \gamma_3 Role + \gamma_4 Negotiation experience* $ + \gamma_5 English proficiency + \gamma_6 AMO$

Based on the significant values reported in Table 28 for the general model, it could be concluded that the confounding variables did not significantly affect the covariance of the independent variables (all p-values are above 0.05); except for English proficiency (p-value is equal to 0.05). The general MANOVA also found that motivational orientation was significantly influential with a p-value of 0.001, while ENS framing alone was not significant. Most importantly, the interaction of the independent variables significantly impacted the dependent variables (p-value < 0.001), which provided a good starting point for hypotheses testing regarding the dynamics of framing on motivational orientation.

Although the MANOVA showed some differences between the means of dependent variables among the treatments, the hypotheses testing was performed by comparing specific treatments, rather than a general analysis of variance. The results of the testing are found in Sections 7.1.4 and 7.1.5.

Table 28 General MANOVA model

Effect		Value	F	Hyp. df	Error df	Sig.
Intercept	Pillai's Trace	.839	152.705	8.000	234.000	.000
	Wilks' Lambda	.161	152.705	8.000	234.000	.000
	Hotelling's Trace	5.221	152.705	8.000	234.000	.000
	Roy's Largest Root	5.221	152.705	8.000	234.000	.000
Role	Pillai's Trace	.029	.860	8.000	234.000	.551
	Wilks' Lambda	.971	.860	8.000	234.000	.551
	Hotelling's Trace	.029	.860	8.000	234.000	.551
	Roy's Largest Root	.029	.860	8.000	234.000	.551
AMO	Pillai's Trace	.046	1.413	8.000	234.000	.192
	Wilks' Lambda	.954	1.413	8.000	234.000	.192
	Hotelling's Trace	.048	1.413	8.000	234.000	.192
	Roy's Largest Root	.048	1.413	8.000	234.000	.192
Age	Pillai's Trace	.026	.785	8.000	234.000	.616
	Wilks' Lambda	.974	.785	8.000	234.000	.616
	Hotelling's Trace	.027	.785	8.000	234.000	.616
	Roy's Largest Root	.027	.785	8.000	234.000	.616
Gender	Pillai's Trace	.046	1.399	8.000	234.000	.198
	Wilks' Lambda	.954	1.399	8.000	234.000	.198
	Hotelling's Trace	.048	1.399	8.000	234.000	.198
	Roy's Largest Root	.048	1.399	8.000	234.000	.198
Negotiation experience	Pillai's Trace	.025	.755	8.000	234.000	.643
	Wilks' Lambda	.975	.755	8.000	234.000	.643
	Hotelling's Trace	.026	.755	8.000	234.000	.643
	Roy's Largest Root	.026	.755	8.000	234.000	.643
English proficiency	Pillai's Trace	.063	1.981	8.000	234.000	.050
	Wilks' Lambda	.937	1.981	8.000	234.000	.050
	Hotelling's Trace	.068	1.981	8.000	234.000	.050
	Roy's Largest Root	.068	1.981	8.000	234.000	.050
Motivational orientation	Pillai's Trace	.110	3.616	8.000	234.000	.001
	Wilks' Lambda	.890	3.616	8.000	234.000	.001
	Hotelling's Trace	.124	3.616	8.000	234.000	.001
	Roy's Largest Root	.124	3.616	8.000	234.000	.001
ENS framing	Pillai's Trace	.057	1.780	8.000	234.000	.082
	Wilks' Lambda	.943	1.780	8.000	234.000	.082
	Hotelling's Trace	.061	1.780	8.000	234.000	.082
	Roy's Largest Root	.061	1.780	8.000	234.000	.082
Motivational orientation * ENS framing	Pillai's Trace	.231	8.786	8.000	234.000	.000
	Wilks' Lambda	.769	8.786	8.000	234.000	.000
	Hotelling's Trace	.300	8.786	8.000	234.000	.000
	Roy's Largest Root	.300	8.786	8.000	234.000	.000

The correlations between variables are presented in Table 29 and Table 30. The Pearson correlation coefficients were used to detect multicollinearity (i.e., correlations between independent variables can indicate poor model specification and measurement related problems), and possible correlations among confounding variables and dependent variables. Multicollinearity is an issue for multi-regression models such as MANOVAs but not for single regression models such as ANOVAs (Kerlinger and Lee 2000).

Table 29 shows the correlations involving the independent and dependent variables. As it can be seen, there was no significant relationship between motivational orientation and ENS framing (correlation coefficient of 0.072). Table 30 gives the inter-correlations between the confounding and dependent variables. The analysis of the correlations coefficients showed that most values (in Table 30) are not large enough to cause concern, except for the correlations between gender and cognitive effort (correlation coefficient of 0.173) as well as that between English proficiency and cognitive effort (correlation coefficient of 0.221).

Table 29 Correlations between independent and dependent variables

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1. Motivational orientation	1									
2. ENS framing	**.072**	1								
3. Joint outcome	-.104	-.111	1							
4. Contract balance	-.141 (*)	-.043	-.313 (**)	1						
5. Number of offers	-.097	-.081	.062	-.116	1					
6. Cooperativeness	.032	-.046	.647 (**)	-.268 (**)	-.081	1				
7. Outcome satisfaction	.062	-.034	.243 (**)	-.116	-.098	.294 (**)	1			
8. Relationship	.085	-.064	.245 (**)	-.199 (**)	.004	.285 (**)	.598 (**)	1		
9. Cognitive effort	.028	-.097	.172 (**)	-.099	-.116	.157(*)	.473 (**)	.294 (**)	1	
10. Discussion climate	.005	-.045	.149 (*)	-.146 (*)	.039	.198 (**)	.448 (**)	.632 (**)	.302 (**)	1

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Table 30 Correlations between confounding and dependent variables

	Role	*AMO*	*Age*	*Gender*	*Negotiation experience*	*English proficiency*
Role	1					
AMO	-.060	1				
Age	-.053	.016	1			
Gender	.045	.048	.033	1		
Negotiation experience	.037	-.052	.055	.209(**)	1	
English proficiency	.135(*)	-.030	-.168(**)	.117	.009	1
Joint outcome	.000	-.077	-.050	.088	.007	.098
Contract balance	.000	-.017	-.026	-.131(*)	-.042	-.018
Number of offers	.000	-.114	-.062	-.053	-.039	.069
Cooperativeness	.000	.029	.004	.082	.071	.102
Outcome satisfaction	.042	.043	.068	.131(*)	.091	.068
Relationship	.083	.103	.077	.033	.065	-.035
Cognitive effort	.146(*)	.054	.006	**.173(**)**	.124	**.221(**)**
Discussion climate	.111	-.034	.046	.087	.083	-.046

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

The correlation between English proficiency and cognitive effort was high. This suggested inclusion of English proficiency as a covariate in testing of hypothesis concerning cognitive effort.

7.1.3 Manipulation Check

Since motivational orientation was induced to create four treatment groups, manipulation checks were necessary to confirm that each orientation was internalized by the subjects. In the ex-post analysis, the checks consisted of questions on the participant's assigned objectives (in Appendix G, questions 18 and 19) and strategies (in Appendix G, questions 20 to 25 related to their orientation). These checks had been adopted from De Dreu and Boles (1998). The responses ranged from strongly agree (coded as "3") to strongly disagree (coded as "-3"). The feedbacks collected on these questions were analyzed with one-way ANOVAs to verify if the manipulations were successful in generating collaborative and competitive orientations. Table 31 describes the results of the manipulations check by comparing the means from the two questions on motivational instructions. Each question asked about the extent to which the negotiators knew the objective of the negotiation. For example, the participants needed to state the extent to which they agreed with the statement: "In the case, I was instructed to care only about my gains". Table 31 shows that individuals assigned to a collaborative orientation agreed more with the collaborative instruction (a mean rating of 1.35) than the competitive instructions (a mean rating of -0.25), while individuals assigned to a competitive orientation answered the reverse (a mean rating of 0.63 for the collaborative instructions and 0.81 for the competitive instructions). These questions were answered differently for

the two orientations with significant p-values of 0.002 for collaborators and 0.045 for competitors.

Although the participants' responses were in accordance with their instructed objectives, another manipulation check was performed to verify whether the strategy they employed in the negotiation corresponded more to one of collaborative or competitive nature (in Appendix G, questions 20, 22 and 24 were for the collaborative orientation, and questions 21, 23 and 25 were for the competitive one). Three questions were asked with the same scale (i.e., a coding of "3" for strongly agree and "-3" for strongly disagree) on each orientation. The Principal Component Analysis found that two distinct factors could be extracted from the items with an eigenvalue of 1.607, explaining 62.8% of variance. An ANOVA was performed for each factor. Table 31 indicates that competitors responded positively to competitive strategies (with a mean of 0.22, p-value = 0.003) and negatively to collaborative strategies (with a mean of -0.17, p-value = 0.001). Collaborators responded in the reverse fashion, with a 0.17 rating (p-value = 0.001) for collaborative strategies and a -0.20 rating (p-value = 0.003) for competitive strategies.

Table 31 ANOVA of manipulation on orientation

	Motivational orientation		*Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*
	Competitive mean (SD)	Collaborative mean (SD)					
Collaborative instructions	-.25(2.35)	1.35(2.07)	49.175	1	49.175	9.960	.002
Competitive instructions	.81(2.19)	.63 (2.11)	18.560	1	18.560	4.066	.045
Collaborative strategies	-0.17 (1.15)	0.17 (1.02)	10.164	1	10.164	10.536	.001
Competitive strategies	0.22 (0.73)	-0.20(0.94)	8.782	1	8.782	9.053	.003

7.1.4 Framing Comparison at the Dyadic Level

The framing effects on dyads were tested by contrasting the gain and loss frames within the collaborative and competitive treatments. Based on the experimental design shown in Table 12, the collaborative dyads in the gain frame (Group 1) were compared with those in the loss frame (Group 3), and the competitive dyads in the gain frame (Group 2) with those in the loss frame (Group 4). The results of the comparisons are found in Table 32, which indicates that the joint outcome, number of offers, and cooperativeness were affected by framing.

Table 32 ANOVA for different frames

Dependent Variable	Sum of Squares	df	F	Sig.	Estimated β	% difference from gain to loss frame	Hypothesis
a) collaborative dyads							
Joint outcome	2875.828	1	21.830	.000	9.499	8.89	H1a
Contract balance	324.602	1	1.643	.202	ns	ns	H2a
Number of offers	969.727	1	31.679	.000	5.516	65.9	H3a
Cooperativeness	1056.450	1	3.908	.050	5.757	53.2	H4a
b) competitive dyads							
Joint outcome	614.916	1	6.474	.012	-4.194	-3.59	H1b
Contract balance	967.168	1	2.138	.146	ns	ns	H2b
Number of offers	320.576	1	5.702	.018	-3.028	-20.9	H3b
Cooperativeness	261.210	1	2.600	.109	ns	ns	H4b

The gain frame was coded as "0", and the loss frame as "1".

The joint outcome was hypothesized to be higher for collaborative dyads in the loss frame (H1a) and competitive ones in the gain frame (H1b). Indeed, collaborative dyads achieved higher joint outcomes in the loss frame, by an average of $9,499 or 8.89% increase (p-value < 0.001), than in the gain frame. Conversely, competitive dyads obtained an average of $4,194 or 3.59% higher joint outcomes in the gain frame as compared to the loss frame (p-value = 0.012).

The contract balances were not significantly different between frames, meaning the H2a for collaborative dyads and H2b for competitive ones were not supported. Table 32 shows p-values above 0.05 concerning these hypotheses.

The number of offers was expected to be larger for collaborative dyads in the loss frame than for those in the game frame (H3a). For competitive dyads the expectation was the reverse (H3b). Not surprisingly, collaborative dyads did propose an estimated 5.516 or 65.9% more offers in the loss frame than in gain frame (p-value < 0.001). Competitive dyads submitted an estimated 3.028 or 20.9% more offers in the gain frame as opposed to the loss frame (p-value = 0.018).

The quality of offers exchanged, measured in terms of cooperativeness, was higher by 5.75% or a factor of 0.532 when collaborative dyads negotiated in the loss rather than in the gain frame. Thus, H4a was supported with a p-value of 0.05. However, cooperativeness was no different between the two frames for competitive dyads (p-value above 0.05), meaning that H4b was not supported.

7.1.5 Motivational Orientation Comparison at the Dyadic Level

This section aims to compare collaborative dyads with competitive dyads in the gain frame (i.e., contrasting Group 1 and Group 2 of the experimental design shown in Table 12) as well as in the loss frame (i.e., contrasting Group 3 and Group 4 in Table 12). The results of these comparisons are shown in Table 33.

Table 33 ANOVA for different motivational orientation

Dependent Variable	Sum of Squares	df	F	Sig.	Estimated β	% difference from collaborative to competitive dyads	Hypothesis
a) gain frame							
Joint outcome	2888.954	1	21.169	.000	9.897	9.27	H5a
Contract balance	3.811	1	.014	.905	ns	ns	H6a
Number of offers	1103.177	1	23.505	.000	6.116	73.1	H7a
Cooperativeness	437.209	1	1.805	.182	ns	ns	H8a
b) loss frame							
Joint outcome	552.482	1	5.889	.016	-3.795	-3.37	H5b
Contract balance	2977.608	1	7.723	.006	8.810	80.6	H6b
Number of offers	226.097	1	5.349	.022	-2.428	-17.5	H7b
Cooperativeness	825.927	1	6.224	.014	-4.640	-28.0	H8b

The collaborative orientation was coded as "0", and the competitive orientation as "1".

In the gain frame, competitive dyads achieved higher joint outcomes, by an average of \$9,827 or 9.27% more than collaborative ones. Table 33 also shows that, in the gain frame, competitive dyads produced, on average an estimated 6.116 or 73.1% more offers than the collaborative ones. Thus, H5a regarding the joint outcome and H7a for the number of offers were supported with p-values less than 0.001. Contract balance (H6a) and cooperativeness (H8a) were not significantly different between collaborative and competitive dyads (i.e., the p-values were above 0.05).

On the contrary, the loss frame favored collaborative dyads over competitive ones in terms of joint outcome, contract balance, number of offers and cooperativeness. The hypotheses concerning the loss frame were all supported (i.e., H5b for joint outcome, H6b for contract balance, H7b for number of offers and H8b for cooperativeness). In the loss frame, the joint outcome for collaborative dyads was, on average, an estimated \$3,795 or 3.37% greater than that for competitive dyads (p-value = 0.016). The

agreements were significantly more balanced between collaborative than competitive negotiators with a p-value of 0.006. In fact, the disparity of profits between the two sides was an estimated $8,810 or 80% higher for competitive pairs than for the collaborative ones. Compared to competitive dyads, the loss frame allowed collaborative dyads to propose an estimated 2.428 or 17.5% more offers (p-value = 0.022) and these offers were 4.64% or 0.280 folds more cooperative (p-value = 0.014).

The results of hypotheses testing at the dyadic level suggest that each frame favored a different orientation. Most hypotheses concerning contract balance were found not to be statistically significant, except those comparing collaborative and competitive dyads in the loss frame. For the process variables, competitive dyads proposed more offers in the gain frame, whereas collaborative dyads proposed more offers and exhibited greater cooperativeness in the loss frame. Overall, ENS framing interacted with motivational orientations to affect the process and outcome at the dyadic level.

7.1.6 Framing Effects at the Individual Level

In addition to examining the framing effect for dyads, individual perceptions were measured to determine the effects of the independent variables. As both general MANOVA model (Table 28) and the Pearson correlation coefficients (Table 30) suggested that English proficiency may influence cognitive effort, Analysis of covariances (ANACOVA) was performed on both orientations according to the following model:

Subjective dependent variable
$= \mu + ENS\ framing + \gamma_1 English\ proficiency$

Table 34 ANACOVA for competitors

	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Outcome satisfaction	1.931(a)	2	.966	.900	.409
	Relationship	1.756(b)	2	.878	.830	.438
	Cognitive effort	6.065(c)	2	3.033	3.216	**.043**
	Discussion climate	.194(d)	2	.097	.094	.910
Intercept (μ)	Outcome satisfaction	.974	1	.974	.908	.342
	Relationship	.007	1	.007	.007	.935
	Cognitive effort	5.692	1	5.692	6.036	.015
	Discussion climate	.099	1	.099	.095	.758
English proficiency	Outcome satisfaction	.667	1	.667	.621	.432
	Relationship	.023	1	.023	.021	.884
	Cognitive effort	5.282	1	5.282	5.600	**.019**
	Discussion climate	.095	1	.095	.092	.763
ENS framing	Outcome satisfaction	1.446	1	1.446	1.348	.248
	Relationship	1.675	1	1.675	1.583	.210
	Cognitive effort	1.247	1	1.247	1.322	.252
	Discussion climate	.079	1	.079	.077	.782

a R Squared = .013 (Adjusted R Squared = -.001); b R Squared = .012 (Adjusted R Squared = -.002); c R Squared = .044 (Adjusted R Squared = .030); d R Squared = .001 (Adjusted R Squared = -.013)

Table 35 ANACOVA for collaborators

	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Outcome satisfaction	1.612(a)	2	.806	.896	.411
	Relationship	.300(b)	2	.150	.179	.836
	Cognitive effort	8.875(c)	2	4.437	4.588	**.012**
	Discussion climate	.898(d)	2	.449	.439	.646
Intercept (μ)	Outcome satisfaction	.759	1	.759	.843	.360
	Relationship	.316	1	.316	.377	.541
	Cognitive effort	6.233	1	6.233	6.444	.013
	Discussion climate	.690	1	.690	.674	.414
English proficiency	Outcome satisfaction	1.229	1	1.229	1.366	.245
	Relationship	.064	1	.064	.076	.784
	Cognitive effort	6.607	1	6.607	6.831	**.010**
	Discussion climate	.716	1	.716	.699	.405
ENS framing	Outcome satisfaction	.719	1	.719	.799	.374
	Relationship	.175	1	.175	.209	.648
	Cognitive effort	.815	1	.815	.842	.361
	Discussion climate	.363	1	.363	.355	.553

a R Squared = .017 (Adjusted R Squared = -.002); b R Squared = .003 (Adjusted R Squared = -.015)
c R Squared = .080 (Adjusted R Squared = .062); d R Squared = .008 (Adjusted R Squared = -.011)

The results, from the ANACOVA for competitors (Table 34) and collaborators (Table 35), indicate that negotiators, independently of their induced motivational orientation, perceived no difference in framing. All p-values for process and outcome variables were above 0.05 as shown in Tables 34 and 35. The only effect on subjective variables was from the covariate English proficiency on cognitive effort (p-value of 0.019 for competitors and 0.010 for collaborators), where an increase of self-reported proficiency positively affected cognitive effort by an estimated factor of 0.174 for competitors and 0.222 for collaborators.

These findings did not support H9a and H9b concerning the impact of ENS framing on the perception of the process. However, the hypotheses regarding the outcomes (H10a for outcome satisfaction and H10b for relationship) were supported. In general, the laboratory experiment showed that the interaction between motivational orientation and ENS framing affected objective variables, but had no impact on individual perceptions (i.e., subjective variables).

7.2 Quasi-field Experiment

As the laboratory experiment was used to establish causality among independent and dependent variables, external validity was tested by running the same experimental conditions with a similar pool of participants, over seven days (instead of two hours). The participants could negotiate anywhere, at any time within the seven days, and using any browser technology they chose. The objective here was to simulate the field settings of electronic commerce.

The data was analyzed following the same procedures set forth by the laboratory experiment. Firstly, the subjective constructs underwent measurement analyses (Section

7.2.1). Secondly, the confounding variables were checked for possible influences on hypotheses testing (Section 7.2.2). Thirdly, independent variable specification was verified to ensure that the experiment was appropriately realized (Section 7.2.3).

The results of hypotheses testing comparing frames within each orientation are described in Section 7.2.4. Section 7.2.5 describes the results of testing of hypotheses contrasting collaborative and competitive dyads within each frame. Finally, Section 7.2.6 examines the hypotheses dealing with subjective variables.

7.2.1 Validation of the Subjective Constructs

The subjective constructs for process (i.e., cognitive effort and discussion climate) and outcomes variables (i.e., relationship and outcome satisfaction) were validated with Principal Component Analysis. Using Varimax and normalization rotation, four factors were extracted from seventeen items. From Table 36 it can be seen that the four factors with eigenvalues above 1 explained 80.7% of variance.

The item loadings are depicted in Table 37. It can be seen that related items converged to one construct with loadings above 0.760 (i.e., convergent validity) and diverged from others with loadings below 0.398 (i.e., discriminant validity). The items had a minimum Cronbach alpha of 0.907, meaning that they had been reliably measured.

Table 36 Total variance explained for quasi-field

Item	Initial Eigenvalue		
	Total	% of Variance	Cumulative %
1	8.657	50.925	50.925
2	2.391	14.065	64.991
3	1.640	9.649	74.639
4	1.032	6.068	**80.707**
5	.578	3.399	84.106
6	.452	2.658	86.764
7	.335	1.968	88.732
8	.326	1.919	90.651
9	.276	1.624	92.275
10	.228	1.339	93.614
11	.215	1.263	94.876
12	.186	1.091	95.968
13	.165	.974	96.941
14	.157	.924	97.865
15	.142	.835	98.700
16	.129	.757	99.457
17	.092	.543	100.000

Table 37 Rotation matrix of measures for quasi-field

Item	Factor loading				Reliability
	Outcome satisfaction	Relationship	Cognitive effort	Discussion climate	Cronbach alpha
OS1	.834	.250	.270	.193	0.940
OS2	.832	.265	.243	.154	
OS3	.817	.256	.216	.193	
OS4	.852	.236	.236	.168	
REL1	.284	.768	.143	.313	0.936
REL2	.280	.782	.146	.319	
REL3	.250	.847	.149	.290	
REL4	.269	.811	.137	.314	
CE1	.217	.147	.834	.122	0.907
CE2	.265	.108	.827	.189	
CE3	.135	.092	.893	.092	
CE4	.217	.131	.798	.173	
DC1	.206	.194	.155	.832	0.916
DC2	.244	.146	.201	.810	
DC3	.162	.398	.115	.760	
DC4	.064	.319	.065	.838	
DC5	.107	.225	.163	.772	

7.2.2 Descriptive Statistics

Although 998 undergraduate business students signed up for the quasi-field experiment, only 490 of them completed negotiations. Out of the 245 negotiations, 25 were removed because the history graphs were not generated by the system to help negotiators follow the progress of offer exchange. Furthermore, 45 observations were discarded because both parties made no effort in the negotiations (i.e., all negotiations where each party made fewer than two attempts to communicate with the other side were taken out). The resulting sample included 350 participants, out of which 190 were induced as collaborators and 160 as competitors. For collaborators, 86 negotiated in the gain frame, while 74 negotiated in the loss frame. For competitors, 64 negotiated in the gain frame and 126 in the loss frame.

The descriptive statistics are presented in Table 38. Overall, the participants were divided into two age groups: the first age group of 20 years old or less (coded with "1"); and the second age group of 21 to 25 years old (coded with "2"). The mean age was 1.77 indicating that most participants belonged to the second group. Gender was evenly distributed with an average of 0.50, whereby men were coded as "1" and women as "0". As for negotiation experience, the more participants considered themselves to be more novices (coded with "1") than experts (coded with "7") with a mean rating of 2.55. They judged their English proficiency to be near excellent (coded with "7"), rather than poor (coded with "1") with a mean of 6.00.

In terms of inherent orientation, 67% of the participants were classified as competitive (out of which 33.0% were extremely competitive), 19% collaborative, and the rest (24%) could not be classified. These inherent orientations were reflected by a

mean value of 1.10 for AMO, whereby competitive orientation was coded with "1", collaborative one with "2", and the remaining with "1.5".

Table 38 Descriptive statistics for quasi-field

Variables	Overall Mean (SD) n= 350	Motivational orientation			
		Competitive n=160		Collaborative n=190	
		Gain Frame Mean (SD) n=86	Loss Frame Mean (SD) n=74	Gain Frame Mean (SD) n=64	Loss Frame Mean (SD) n=126
Confounding					
Age	1.70(0.88)	2.13 (1.00)	1.82 (0.81)	1.83(0.89)	1.28(0.63)
Gender	0.51(0.50)	0.50 (0.50)	0.68 (0.47)	0.42(0.50)	0.46(0.50)
Role	0.50(0.50)	0.50 (0.50)	0.50 (0.50)	0.50(0.50)	0.50(0.50)
Negotiation experience	2.55 (1.53)	2.29 (1.54)	2.64 (1.67)	2.75(1.53)	2.56(1.42)
English proficiency	6.00(1.12)	5.87(1.13)	5.97 (1.19)	6.05(1.14)	6.07(1.06)
AMO	1.10(0.58)	1.05(0.61)	1.08 (0.57)	1.13(0.60)	1.13(0.54)
Objective					
Joint outcome	106.40(9.46)	107.27(10.70)	105.75 (7.48)	103.22(9.02)	107.80(9.52)
Contract balance	24.06(20.95)	28.64(23.35)	22.35(21.04)	25.00(17.72)	21.49(20.35)
Number of offers	5.44(3.34)	5.49(3.94)	6.92 (4.12)	3.88(1.67)	5.32(2.57)
Cooperativeness	8.85(17.57)	8.97(19.68)	4.94 (11.42)	9.85(21.14)	10.58(16.92)
Subjective					
Outcome satisfaction	1.01(1.00)	0.93(1.09)	1.01(0.78)	1.21(0.89)	1.05(1.10)
Relationship	0.90(1.00)	0.79(1.05)	0.87(1.07)	0.85(1.08)	1.05(0.88)
Cognitive effort	1.22(1.00)	1.19(1.10)	1.30(0.87)	1.25(1.05)	1.15(0.95)
Discussion climate	0.98(1.00)	1.06(0.99)	1.10 (0.90)	0.94(1.04)	0.86(1.04)

For the objective outcomes, the mean joint outcome was $106,400 for all treatments. The collaborative dyads in the loss frame performed the best with a mean joint outcome of $107,800. However, these dyads performed worst with a mean joint outcome of $103,220, in the gain frame. The highest contract balance was achieved by

collaborative dyads in the loss frame with an average difference of $21,490 between the two parties, and the lowest one was reached by competitive dyads in the gain frame with a mean difference of $28,640. Competitive dyads produced the highest number of offers, with an average of 6.92 offers in the loss and 5.49 in the gain frame. Collaborative dyads produced 5.32 offers in the loss and 3.88 offers in the gain frame. The measure of cooperativeness was highest for collaborative dyads with the mean value of 10.58% in the loss frame. It was the lowest for competitive dyads with the mean value of 4.95%, in the same frame.

The individual evaluation of the process and outcome were measured with items on a seven point Likert-type scale with the highest value of "3" (e.g., strongly agree) and the lowest of "-3" (e.g., strongly disagree). The Principal Component Analysis (from Section 7.2.1) demonstrated that the seventeen items could be reduced to four constructs. Outcome satisfaction was rated highest by collaborators in the gain frame (an average rating of 1.21) and lowest by competitors in the same frame (an average rating of 0.93). Relationship was rated highest by collaborators in the loss frame (an average rating of 1.05), while competitors in the gain frame gave it the lowest rating (an average rating of 0.79). The mean rating for cognitive effort was lowest for collaborators in the loss frame (an average rating of 1.15), but highest for competitors in the same frame (an average rating of 1.30). Discussion climate was rated highest by competitors in the loss frame (an average rating of 1.10) and lowest by collaborators in the same frame (an average rating of 0.86).

A general MANOVA was executed to explore the links among independent, confounding and dependent variables. The significant values for motivational orientation,

ENS framing and the interaction of the two are shown in Table 39. The table indicates that there were no significant confounding effects by role, AMO, age, gender, negotiation experience and English proficiency. Only motivational orientation (p-value < 0.001), ENS framing (p-value < 0.001) and the interaction between the two (p-value < 0.036) influenced the dependent variables.

Table 39 General MANOVA for quasi-field

Effect		Value	F	Hyp. df	Error df	Sig.
Intercept	Pillai's Trace	.776	286.676	4.000	331.000	.000
	Wilks' Lambda	.224	286.676	4.000	331.000	.000
	Hotelling's Trace	3.464	286.676	4.000	331.000	.000
	Roy's Largest Root	3.464	286.676	4.000	331.000	.000
Role	Pillai's Trace	.000	.012	4.000	331.000	1.000
	Wilks' Lambda	1.000	.012	4.000	331.000	1.000
	Hotelling's Trace	.000	.012	4.000	331.000	1.000
	Roy's Largest Root	.000	.012	4.000	331.000	1.000
AMO	Pillai's Trace	.005	.387	4.000	331.000	.818
	Wilks' Lambda	.995	.387	4.000	331.000	.818
	Hotelling's Trace	.005	.387	4.000	331.000	.818
	Roy's Largest Root	.005	.387	4.000	331.000	.818
Age	Pillai's Trace	.005	.455	4.000	331.000	.769
	Wilks' Lambda	.995	.455	4.000	331.000	.769
	Hotelling's Trace	.005	.455	4.000	331.000	.769
	Roy's Largest Root	.005	.455	4.000	331.000	.769
Gender	Pillai's Trace	.024	1.998	4.000	331.000	.094
	Wilks' Lambda	.976	1.998	4.000	331.000	.094
	Hotelling's Trace	.024	1.998	4.000	331.000	.094
	Roy's Largest Root	.024	1.998	4.000	331.000	.094
Negotiation experience	Pillai's Trace	.008	.632	4.000	331.000	.640
	Wilks' Lambda	.992	.632	4.000	331.000	.640
	Hotelling's Trace	.008	.632	4.000	331.000	.640
	Roy's Largest Root	.008	.632	4.000	331.000	.640
English proficiency	Pillai's Trace	.004	.309	4.000	331.000	.872
	Wilks' Lambda	.996	.309	4.000	331.000	.872
	Hotelling's Trace	.004	.309	4.000	331.000	.872
	Roy's Largest Root	.004	.309	4.000	331.000	.872
Motivational orientation	Pillai's Trace	.060	5.309	4.000	331.000	.000
	Wilks' Lambda	.940	5.309	4.000	331.000	.000
	Hotelling's Trace	.064	5.309	4.000	331.000	.000
	Roy's Largest Root	.064	5.309	4.000	331.000	.000
ENS framing	Pillai's Trace	.081	7.283	4.000	331.000	.000
	Wilks' Lambda	.919	7.283	4.000	331.000	.000
	Hotelling's Trace	.088	7.283	4.000	331.000	.000
	Roy's Largest Root	.088	7.283	4.000	331.000	.000
Motivational orientation * ENS framing	Pillai's Trace	.030	2.594	4.000	331.000	.036
	Wilks' Lambda	.970	2.594	4.000	331.000	.036
	Hotelling's Trace	.031	2.594	4.000	331.000	.036
	Roy's Largest Root	.031	2.594	4.000	331.000	.036

The Pearson correlation coefficients are presented in Table 40. The insignificant coefficient between motivational orientation and ENS framing implies that multicollinearity was not a concern in the quasi-field experiment.

Table 41 shows that most confounding variables did not significantly correlate with the dependent variables. This finding is in accordance with the insignificant values reported by the MANOVA test (Table 39).

Table 40 Correlation of independent and dependent variables for quasi-field

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1. Motivational orientation	1									
2. ENS framing	-.102	1								
3. Joint outcome	-.017	-.079	1							
4. Contract balance	-.075	.123 (*)	-.267 (**)	1						
5. Number of offers	-.194 (**)	-.162 (**)	.156 (**)	-.211 (**)	1					
6. Cooperativeness	.091	.023	.345 (**)	-.027	.116 (*)	1				
7. Discussion climate	-.092	.028	.013	.110	-.036	.007	1			
8. Outcome satisfaction	.043	.038	.033	.014	-.006	.047	.000	1		
9. Relationship	.073	-.082	.032	-.043	-.074	.023	.000	.000	1	
10. Cognitive effort	-.023	-.005	-.123 (*)	.059	.009	-.058	.001	-.002	-.001	1

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Table 41 Correlation among confounding and dependent variables for quasi-field

	Role	*Age*	*Gender*	*Negotiation experience*	*English proficiency*	*AMO*
Role	1					
Age	-.040	1				
Gender	.043	.066	1			
Negotiation experience	.066	.070	.289(**)	1		
English proficiency	.091	-.161(**)	.070	.025	1	
AMO	.034	-.069	.022	.067	.009	1
Joint outcome	.000	.020	.062	.054	.014	-.004
Contract balance	.000	.052	-.036	.030	.062	-.049
Number of offers	.000	.035	.035	-.101	-.029	.006
Cooperativeness	.000	-.017	.006	-.051	.011	.027
Discussion climate	-.066	.004	-.019	.036	-.012	-.010
Outcome satisfaction	.055	-.017	.061	.098	.076	.122(*)
Relationship	-.021	-.108	.029	.043	-.045	.039
Cognitive effort	.011	.032	.180(**)	.065	.042	-.064

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

7.2.3 Manipulation Check

The manipulation checks on motivational orientation consisted of: (1) verifying the participants' understanding of the motivational objectives given in the case (in Appendix G, questions 18 and 19), and (2) examining the motives underlying the strategies used by the participants (in Appendix G, questions 20 to 25). The results from the manipulations checks are shown in Table 42. Regarding the motivational instructions, participants who were provided with competitive objectives answered positively to the question relating to competitive orientation (mean values of 1.86 for questions 19 in Appendix G), but negatively to the question relating to collaborative instructions (mean value of -0.58 for question 18 in Appendix G). Participants with induced collaborative attitude gave the reverse answers: a mean value of 2.06 for collaborative instructions and one of -0.12 for competitive instructions.

When asked about their strategy, participants in the competitive treatments reported an inclination towards competitive strategies (mean value of 0.21 for questions 21, 23 and 25 in Appendix G) rather than collaborative strategies (mean value of -0.28 for questions 20, 22 and 24 in Appendix G). Again, the collaborative treatments had the reverse results with the mean value of 0.21 for collaborative strategies and -0.19 for competitive ones. The p-values for all checks were significant (p-value < 0.001). Therefore, it can be concluded that collaborative and competitive orientations were successfully induced.

Table 42 Manipulation checks for quasi-field

	Motivational orientation		Sum of Squares	df	Mean Square	F	Sig.
	Competitive mean (SD)	Collaborative mean (SD)					
Collaborative instruction	-0.58(2.35)	2.06(1.30)	362.799	1	362.799	110.992	.000
Competitive instruction	1.86(1.49)	-0.12(2.23)	453.730	1	453.730	127.385	.000
Collaborative strategies	-0.28(1.20)	0.21(0.71)	14.563	1	14.563	15.247	.000
Competitive strategies	0.21(0.92)	-0.19(1.04)	11.955	1	11.955	12.405	.000

7.2.4 Framing Comparison at the Dyadic Level

Following the same experimental design as shown in Table 12, the gain and loss frames were compared within each orientation. Within collaborative dyads, the gain frame (Group 1) was contrasted with the loss frame (Group 3), and the same comparison was made within competitive dyads (Group 2 with Group 4). The findings are presented in Table 43. As it can be seen, the joint outcome and number of offers were affected by framing for collaborative dyads, while for competitive ones only the number of offers was influenced by framing.

Table 43 describes the ANOVAs, which compared the differences between a gain and loss frames. The collaborative dyads in the loss frame achieved a significantly better joint outcome by an estimated \$4.579 or an increase of 4.44% as compared to the gain frame (p-value = 0.002). They also made an estimated 1.442 or 37.2% more offers in the loss frame than in the gain frame (p-value < 0.001). Contract balance and cooperativeness were not significantly different between the two frames for collaborative dyads. Thus, H1a for joint outcome and H3a for number of offers were supported, while H2a for contract balance and H4a for cooperativeness were not supported.

Table 43 ANOVA of different frames for quasi-field

Dependent Variable	Sum of Squares	df	F	Sig.	Estimated β	% difference from gain to loss frame	Hypothesis
a) collaborative dyads							
Joint outcome	889.843	1	10.167	.002	4.579	4.44	H1a
Contract balance	523.459	1	1.375	.242	ns	ns	H2a
Number of offers	88.309	1	16.564	.000	1.442	37.2	H3a
Cooperativeness	22.740	1	.067	.796	ns	ns	H4a
b) competitive dyads							
Joint outcome	89.044	1	1.015	.315	ns	ns	H1b
Contract balance	1482.820	1	2.969	.087	ns	ns	H2b
Number of offers	75.363	1	4.655	.032	1.376	25.1	H3b
Cooperativeness	625.259	1	2.322	.130	ns	ns	H4b

The gain frame was coded as "0", and the loss frame as "1".

For competitive dyads, there was no significant difference between the gain and loss frames, except that they produced 3.028 or 25.1% more offers in the loss frame than in the gain frame (p-value = 0.032), which contradicted H3a. The hypotheses that relate to outcomes (i.e., H1b for joint outcome and H2b for contract balance) as well as those for the process (i.e., H3b for number of offers and H4b for cooperativeness) were not supported.

7.2.5 Motivational Orientation Comparison at the Dyadic Level

The comparison of motivational orientations within frames highlighted whether ENS framing favors one orientation over another. According to the experimental design shown in Table 12, collaborative dyads were compared with competitive ones in the gain frame by contrasting Group 1 with Group 2, while in the loss frame the comparison was made between Group 3 and Group 4. Table 44 explains the results of comparing motivational orientations (i.e. competitive vs. collaborative) within the same frame.

The gain frame allowed competitive dyads to reach significantly better joint outcomes by an estimated $4.055 or 3.93% more than collaborative ones. H5a for joint outcomes was supported with a p-value of 0.015. The gain frame also induced competitive dyads to produce an estimated 1.613 or 41.6% more offers compared to collaborative ones, supporting H7a with a p-value of 0.003. The contract balance and cooperativeness were not significantly different between competitive and collaborative dyads in the gain frame, and hence H6a and H8a were not supported.

Table 44 ANOVA of different motivational orientation for quasi-field

Dependent Variable	Sum of Squares	df	F	Sig.	Estimated β	% difference from collaborative to competitive dyads	Hypothesis
a) gain frame							
Joint outcome	603.202	1	6.009	.015	4.055	3.93	H5a
Contract balance	486.048	1	1.088	.299	ns	ns	H6a
Number of offers	95.512	1	9.446	.003	1.613	41.6	H7a
Cooperativeness	28.367	1	.069	.794	ns	ns	H8a
b) loss frame							
Joint outcome	190.340	1	2.437	.120	ns	ns	H5b
Contract balance	50.977	1	.120	.730	ns	ns	H6b
Number of offers	111.630	1	10.709	.001	1.547	29.1	H7b
Cooperativeness	1449.530	1	6.314	.013	-5.576	-52.7	H8b

The collaborative orientation was coded as "0", and the competitive orientation as "1".

In the loss frame, the only difference was in the process where competitive dyads made an estimated 1.547 or 29.1% more offers (p-value = 0.001), but they exhibited 5.576% less cooperativeness (p-value = 0.013) than collaborative ones. Therefore, only H8b was supported, while H7a, which stated an expectation that collaborative dyads would make more offers than competitive ones in the loss frame, was not supported. The hypotheses concerning outcomes were not supported for joint outcome (H5b) and for contract balance (H6b).

7.2.6 Framing Effects at the Individual Level

Perceptions on framing were determined by seventeen items asked in the post-questionnaire. The ANOVAs on outcome satisfaction, relationship, cognitive effort and discussion climate demonstrated no significant effect for collaborative, as well as competitive individuals (all p-values are above 0.05). These findings indicate that ENS framing did not affect perception of the process (cognitive effort and discussion climate) or that of outcome (outcome satisfaction and relationship). The non-significant differences in Table 45 imply that H10a and H10b regarding the outcome were supported, while H9a and H9b related to the process were not.

Table 45 ANOVA on subjective variables for quasi-field

Dependent Variable	Sum of Squares	df	F	Sig.	Estimated β
Collaborative individuals					
Outcome satisfaction	2.536	1	2.442	.120	ns
Relationship	1.565	1	1.776	.185	ns
Cognitive effort	.259	1	.262	.610	ns
Discussion climate	.250	1	.231	.632	ns
Competitive individuals					
Outcome satisfaction	.234	1	.244	.622	ns
Relationship	.202	1	.179	.673	ns
Cognitive effort	.581	1	.568	.452	ns
Discussion climate	.054	1	.059	.808	ns

7.3 Contrasting Laboratory and Quasi-field Results

The comparison between laboratory and quasi-field experiments showed that the laboratory setting supported more of the hypotheses related to objective processes and outcomes. There was less control over the quasi-field experiments. Subtle relationships could not be identified at significant level, perhaps due to other confounding factors and/or influences.

The comparison of joint outcomes in Figure 20 demonstrates that the effects found in the laboratory setting were diminished in the quasi-field experiment. When comparing frames within each orientation, the difference from gain to loss frame was significant for collaborative dyads in both settings, but this was not the case for the competitive ones. In the laboratory, the profits for collaborative dyads were higher by 8.89% when negotiating in the loss rather than in the gain frame. The difference was only 4.44% in the quasi-field settings for them. In the laboratory, competitive dyads in the loss frame made 3.59% less profits when compared to the gain frame. This effect was not significant in the quasi-field settings.
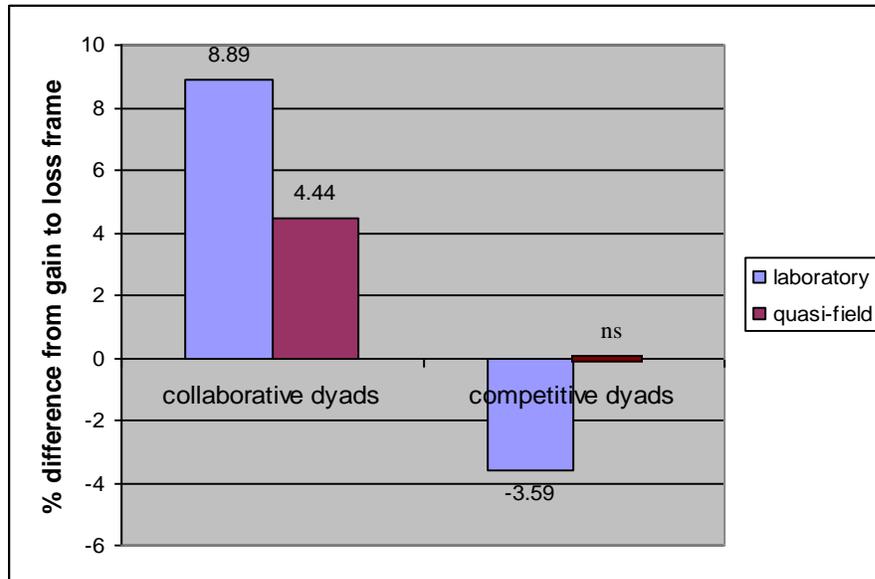
Figure 20 Joint outcomes between frames within orientations

Therefore, strong effects in the laboratory, such as those observed for collaborative dyads, were reproduced in the quasi-field, but weaker ones, such as those observed for competitive dyads, were not seen in the quasi-field.

The other significant difference between the laboratory and quasi-field experiments was the number of offers made by each orientation, as shown in Figure 21. Collaborative dyads in the laboratory setting produced more offers as compared to quasi-field one. In the laboratory, they proposed 65.9% more offers in the loss as compared to the gain frame. This percentage was decreased in the quasi-field to 37.2%. For the competitive dyads, the results from quasi-field experiment actually conflicted with the results from the laboratory one. The competitive dyads made more offers in the loss frame (25.1% more offers) than they did in the gain frame. This finding challenges the observations in the laboratory that competitive dyads produce more offers in the gain than loss frame.
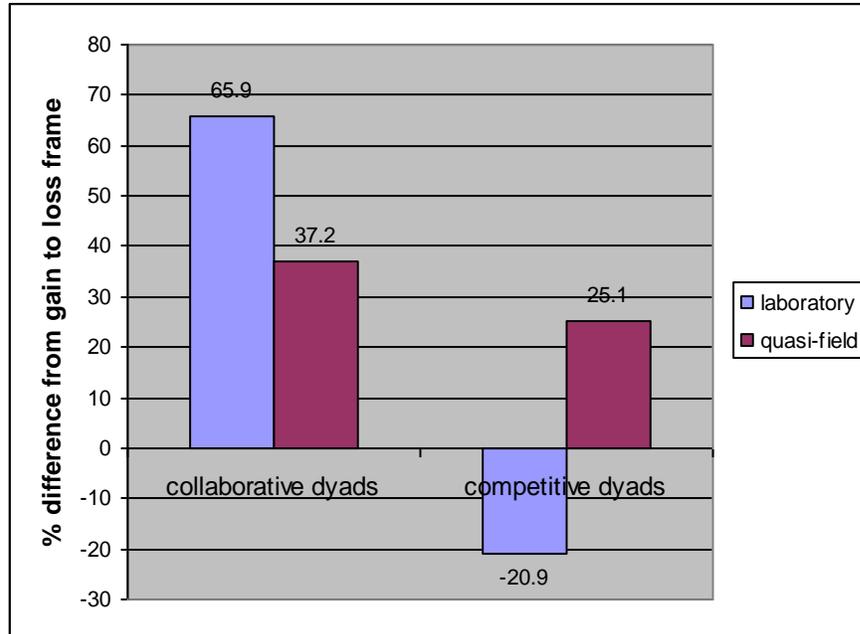
Figure 21 Number of offers between frames within orientations

When the joint outcomes were compared within frames for both settings, the same pattern emerged as with the comparison of frames within orientations. The difference between orientations, observed in the laboratory, was only found for strong effects in the quasi-field.
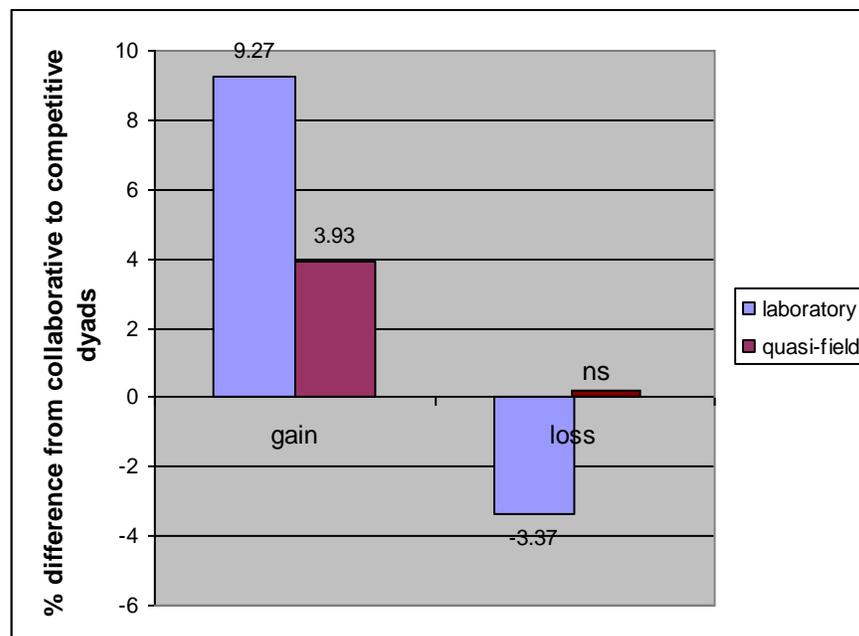
Figure 22 Joint outcome between orientations within frames

Figure 22 depicts the difference between competitive and collaborative dyads. In the laboratory, the gain frame allowed competitive dyads to make 9.27% more profit than collaborative ones. In the quasi-field, this difference was lessened to 3.93%. The loss frame had no impact in the quasi-field (i.e., collaborative dyads obtained 3.37% higher joint gain than collaborative ones in the laboratory but not in the quasi-field setting).
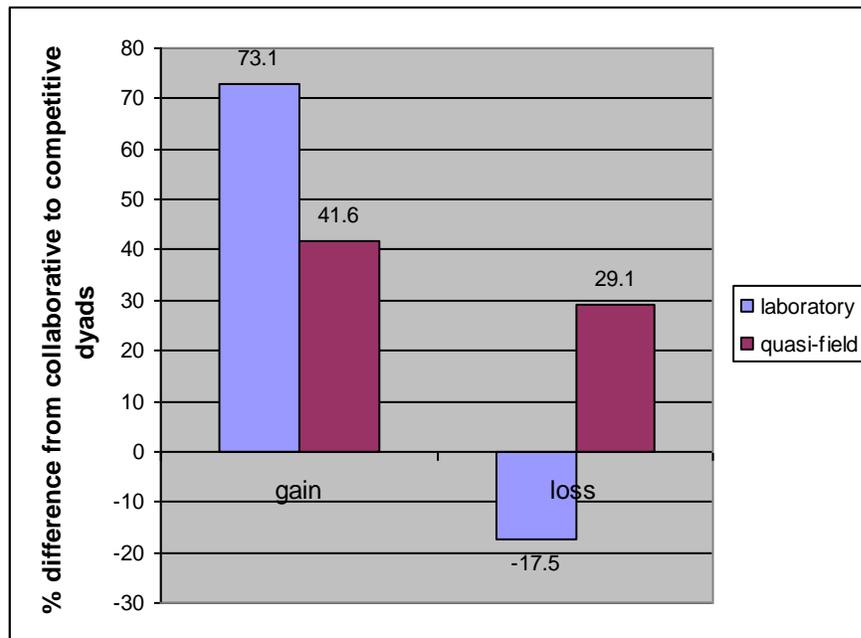
Figure 23 Number of offers between orientations within frames

In Figure 23, the difference between the number of offers for collaborative and competitive dyads is depicted. In terms of comparing different orientations in the gain frame, the difference between the two orientations was less in the quasi-field setting than in the laboratory (i.e., from 73.1% difference in the laboratory to 41.6% difference in the quasi-field). However, the results were even reversed in the loss frame. Instead of the collaborative dyads proposing more offers in the loss frame, it was the competitive dyads who produced 29.1% more offers.

In terms of the cooperativeness, the two settings produced similar results in both frames, as shown in Figure 24. In the gain frame, cooperativeness was not significant in both settings, while in the loss frame it was significantly higher for collaborative than competitive dyads (i.e., 28.0% higher in the laboratory and 52.7% in the quasi-field).
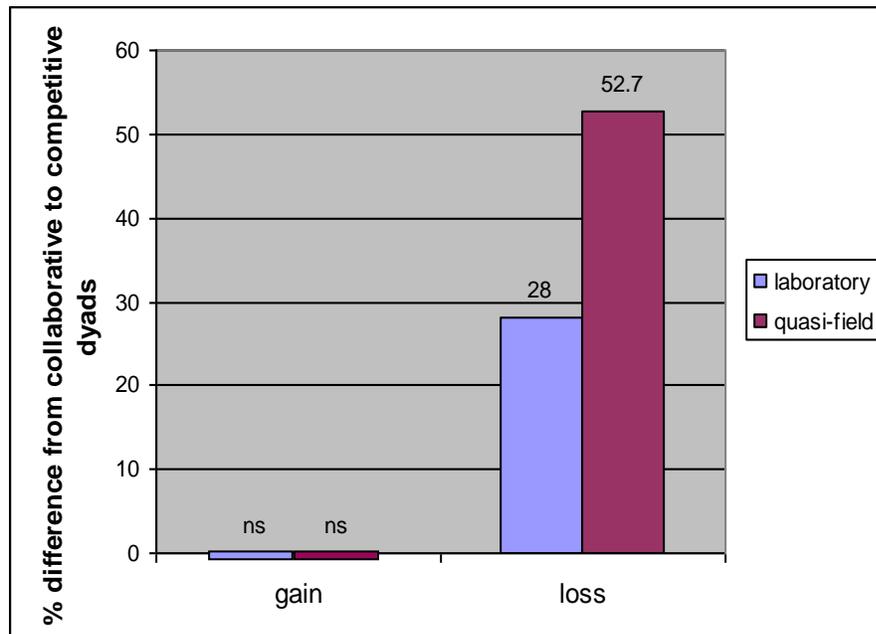
Figure 24 Cooperativeness between orientations within frames

7.4 Summary of Results

Before the hypotheses were tested, validations were performed on: (1) confirming the items used to measure the subjective variables, (2) verifying the effect of confounding variables, and (3) checking that the proper motivational orientation was induced in the treatments. These verifications showed that the laboratory and quasi-field experiments were appropriately implemented in terms of establishing subjective constructs, limiting confounding effects and inducing the motivational orientation needed for each treatment.

The laboratory experiment captured data that was mostly supportive of the hypotheses. It clearly demonstrated that collaborative dyads achieved better joint

outcomes in the loss frame, while competitive dyads reached greater joint outcome in the gain frame. For the process, collaborative dyads proposed more offers and exhibited greater cooperativeness in the loss frame. The competitive dyads only proposed more offers in the gain frame. The framing effect was strongest for collaborative dyads. However, the participants in collaborative and competitive treatments did not perceive any difference in outcome and process (outcome satisfaction, relationship, cognitive effort and discussion climate). This means that the perceptions of the negotiators did not match the objective effects measured.

The quasi-field experiment only supported some of the findings demonstrated in the laboratory setting. When comparing frames, the joint outcome was higher for collaborative dyads in the loss than in the gain frame in both settings. For competitive dyads, the gain frame was only better than the loss frame in the laboratory setting. The comparisons of competitive dyads in the loss frame with the gain frame and with collaborative dyads in the loss frame were not significant. Again, the effect of framing was strongest for collaborative dyads. For the process in the quasi-field setting, competitive dyads produced more offers in the loss than they did in the gain frame (contrary to the result from laboratory).

A summary of the hypotheses testing is shown in Table 46 for the dyadic level and Table 47 for the individual level. The transcripts from two sample negotiations are shown in Appendix L.

Table 46 Summary of hypotheses at the dyadic level

Treatment		Dependent variable	Hypothesis	Laboratory	Quasi-field
Comparing frames within each motivational orientation					
a. Collaborative		Joint outcome	*H1a: Loss >Gain*	Supported	Supported
		Contract balance	*H2a: Loss >Gain*	ns	ns
		Number of offers	*H3a: Loss >Gain*	Supported	Supported
		Cooperativeness	*H4a: Loss >Gain*	Supported	ns
b. Competitive		Joint outcome	*H1b: Gain >Loss*	Supported	ns
		Contract balance	*H2b: Gain >Loss*	ns	ns
		Number of offers	*H3b: Gain >Loss*	Supported	ns
		Cooperativeness	*H4b: Gain >Loss*	ns	ns
Comparing motivational orientations within each frame					
a. Gain frame		Joint outcome	*H5a: Competitive > Collaborative*	Supported	Supported
		Contract balance	*H6a: Competitive > Collaborative*	ns	ns
		Number of offers	*H7a: Competitive > Collaborative*	Supported	Supported
		Cooperativeness	*H8a: Competitive > Collaborative*	ns	ns
b. Loss frame		Joint outcome	*H5b: Collaborative > Competitive*	Supported	ns
		Contract balance	*H6b: Collaborative > Competitive*	Supported	ns
		Number of offers	*H7b: Collaborative > Competitive*	Supported	ns
		Cooperativeness	*H8b: Collaborative > Competitive*	Supported	Supported

Table 47 Summary of hypotheses at the individual level

Treatment	Dependent variable	Hypothesis	Laboratory	Quasi-field
Comparing frames for the process				
Both orientations	Cognitive effort	*H9a: Gain > Loss*	ns	ns
	Discussion climate	*H9b: Gain > Loss*	ns	ns
Comparing frames for the outcome				
Both orientations	Outcome satisfaction	*H10a: Gain = Loss*	Supported	Supported
	Relationship	*H10b: Gain = Loss*	Supported	Supported

8 Discussion

ENSs facilitate decision-making and mediate interactions among negotiators. In the process, the system presents information to a negotiator that inadvertently frames the interaction with the other negotiator. Thus far, the assessment of ENSs has focused mostly on a cost benefit framework, media richness theory and IS success without much investigation into framing or motivation theories. The thesis examines impact of ENS framing on negotiation process and outcome for dyads with different motivational orientations. Experiments were conducted in both a laboratory and quasi-field settings to integrate framing and motivational research at the dyadic and individual levels.

Section 8.1 discusses the results of framing at the dyadic level by looking at the difference: (1) between gain and loss frame within collaborative and competitive orientation, and (2) between the two orientations within each frame. Section 8.2 examines the reality and perception gap at the individual level by describing the non-significant effects on the subjective variables. Finally, Section 8.3 reflects on the manipulation of motivational orientation on a contextual dimension, and English proficiency as a confounding variable.

8.1 Framing Effect on Collaborative and Competitive Dyads

This study began with the fundamental conjecture that different motivational orientations benefit from different framings of potential outcomes. More specifically, the expectation was that collaborative dyads benefit from a loss frame as it prevents them from making large unfavorable concessions, while competitive dyads profit from a gain frame, which promotes concession-making and reduces conflict escalation.

The theory underlying these differences was formulated by Kahneman and Tversky (1979), who showed for one-shot decision-problems that when outcomes are framed differently, people make different choices. This is especially prevalent for negotiators who make more concessions and accept more offers in the gain as opposed to the loss frame (Bazerman, Magliozzi et al. 1985). Although De Dreu, Carnevale et al. (1995) advocated that potential outcomes should be presented in the gain frame to encourage consensus building, they also alluded to the disadvantage of heightened concession-making for collaborators. The loss frame could discourage large concessions and benefit collaborators (Trötschel and Gollwitzer 2007) .

This study empirically tested the interaction of framing and motivational orientation by using an ENS. The system not only displayed outcomes in either a positive net profit schedule (gain frame) or an expense schedule (loss frame), but also guided the process by presenting offers as profits or expenses throughout the negotiation. The results from the laboratory and quasi-field experiments suggest that:

(1) The collaborative dyads proposed more offers and achieved higher joint outcome in the loss as opposed to the gain frame, but the reverse framing effect is not necessarily true for competitive dyads;

(2) The collaborative dyads were more susceptible to framing than competitive ones;

(3) The gain frame clearly favored competitive dyads over collaborative ones;

(4) The gain frame caused greater disparity between collaborative and competitive dyads;

(5)   The loss frame allowed collaborative dyads to propose more cooperative offers;

(6)   Contract balance was mostly not affected by the interaction of framing and motivational orientation; and

(7)   There exists a gap between the objective and subjective variables regarding the process and outcome.

8.1.1 Framing within Collaborative and Competitive Dyads

In a series of experiments, Trötschel and Gollwitzer (2007) showed that social motives interact with framing, which led the collaborative dyads to easily settle on unfavorable solutions in the gain frame as opposed to the loss frame. The results from this laboratory study support the claim that there is interaction between ENS framing and motivational orientation. Collaborative dyads were found to achieve better joint outcomes in the loss frame than in the gain frame, in both laboratory and quasi-field settings.

On the other hand, competitive dyads obtained higher joint outcomes in the gain frame as opposed to the loss frame only in the laboratory and not in the quasi-field setting. The findings obtained from the laboratory experiment support the conclusions drawn by Bazerman, Magliozzi et al. (1985), who had incentivized all participants to behave competitively and observed that they achieved better joint outcomes in the gain frame. This framing effect within competitive dyads was also present in the laboratory setting of Olekalns (1997) and Schei, Rognes et al. (2006), but not for Olekalns (1994), who used a very small sample size that may have prevented the establishment of a framing effect. The quasi-field experiment showed no significant framing effect within competitive dyads because (1) external influences from the natural setting diminished the

relationship between independent and dependent variables (Siah 2005), and (2) competitive dyads were less sensitive to framing than collaborative ones (De Dreu, Carnevale et al. 1995). The laboratory experiments were conducted in artificial environments that served mostly to isolate the effects of the confounding or extraneous variables. When this environment was challenged in more realistic settings, weak effects, such as those relating to competitive dyads, were found to be not significant.

In the laboratory, collaborative dyads produced more offers and these were of better quality (i.e., greater measure of cooperativeness) in the loss frame than in the gain frame. Competitive dyads produced more offers in the gain as opposed to the loss frame. The dissimilarity between both orientations is due to the gain frame promoting concession-making as suggested by Carnevale and Pruitt (1992). Therefore in the gain frame, competitors were encouraged to make more offers and smaller concessions, while collaborators made less offers and large concessions, which later limited the possibility of exploring each other's preferences (i.e., through further concessions).

In the quasi-field, collaborative dyads also proposed more offers in the loss than gain frame, but to a lesser extent than in the laboratory. Surprisingly, competitive dyads also proposed more offers in the loss than gain frame, which did not lead them to better outcomes. The increased number of offers in the natural setting suggests that the contention, from negotiating in a loss frame, caused competitive dyads to maintain their position with more offers when they were given more time to do so.

These findings could explain the discrepancy of results between ENS studies that related usage of system to negotiation outcomes. For example, Foroughi, Perkins et al. (1995) found that more agreements and higher joint outcome were reached with decision

support, but there were no significant difference between the numbers of offers for different ENS (with and without decision support). Lai, Doong et al. (2006) showed that collaborative negotiators, who sent more offers, reached more agreements. The difference between Foroughi, Perkins et al. (1995) and Lai, Doong et al. (2006) was the motivational orientation behind the negotiations. Foroughi, Perkins et al. (1995) induced all participants to be competitive, whereas Lai, Doong et al. (2006) used a field experiment that encouraged participants to exhibit their inherent orientations, which were later measured and clustered into collaborative and non-collaborative orientations. From this study, it is suggested that usage (in terms of number of offers) played a more important role towards collaborative dyads reaching better negotiation outcomes as claimed by Lai, Doong et al. (2006) than it did for competitive ones as found by Foroughi, Perkins et al. (1995).

8.1.2 Comparing Motivational Orientations within Frames

When outcome and process results were compared within the same frame in the laboratory, it was found that the gain frame engendered competitive dyads to achieve higher joint outcome and propose more offers, while the loss frame allowed collaborative dyads to reach higher joint outcome and better contract balance, make more offers, and exhibit greater cooperativeness. The results concerning the outcome variables are in accordance with those found in Trötschel and Gollwitzer's experiments (2007). In the quasi-field experiment, the effects of the gain frame were replicated but to a lesser extent (see Figure 20 and Figure 21 for the gain frame). The loss frame produced only greater cooperativeness for collaborative dyads, and the number of offers was found to be greater for competitive rather than collaborative dyads in the loss frame.

Both experimental settings demonstrated that, in the gain frame, competitive dyads achieved higher joint outcome and proposed more offers than collaborative ones. The findings confirm those from the motivational studies (Olekalns, Smith et al 1996; Olekalns 1997; Schei and Rognes 2003; Schei, Rognes et al. 2006), which have mostly been conducted in the gain frame. Again, the explanation rests with the impact of the gain frame to encourage concession-making, which helps competitive dyads but harms collaborative ones.

Although, in the laboratory, the loss frame affected all outcome and process variables, these effects on the joint outcome and number of offers were less than those seen in the gain frame (refer to Table 33). By implementing the loss frame in the quasi-field, the joint outcome was not significantly different between orientations, and the number of offers was actually higher for competitive instead of collaborative dyads. However, cooperativeness was significantly higher for collaborative than competitive dyads in both experiments. Once more, the results suggest that the loss frame helped collaborators to resist making large concessions, so that they were able to explore possibilities for mutual benefits. This coincides with the findings of Trötschel and Gollwitzer (2007), who demonstrated that collaborative dyads used integrative strategies (i.e., increased mutual value) (1) more frequently in the loss than in the gain frame, and (2) more than competitive dyads in the loss frame. Even though the number of offers was greater in the quasi-field for competitive dyads than collaborative dyads, the extended time in this setting may have allowed competitors to make more offers, but not necessarily the cooperative ones.

Compared to the gain frame, the less significant (in the laboratory) and non-significant (in the quasi-field) effects of the loss frame on outcome variables suggest that, if a general frame is to be employed then, the loss frame would not favor one type of orientation over another. Therefore, the general premise advocating the gain frame in negotiation (Bazerman, Magliozzi et al. 1985; Bazerman 1986; De Dreu, Carnevale et al. 1994; Olekalns 1994; De Dreu, Carnevale et al. 1995; De Dreu and McCusker 1997; O'Connor and Carnevale 1997; Bazerman, Curhan et al. 2000; Trötschel and Gollwitzer 2007) is questionable This thesis argues that the best scenario would be to know the motivational orientation of the negotiators beforehand and then implement the appropriate framing.

In regards to contract balance, this variable mostly was not insignificantly affected by the treatments, except when comparing collaborative and competitive dyads in the laboratory. The results in the laboratory showed that, when compared with collaborative dyads, competitive ones in the loss frame arrived at unbalanced solutions.

8.2 Gap between Reality and Perceptions

Thompson and Hastie (1990) and Bazerman, Curhan et al. (2000) suggested that economic outcomes are not necessarily reflected by individual perceptions. This study, however, hypothesized that the increased effort and decreased cooperation attributed to the loss frame (De Dreu, Carnevale et al. 1995; Trötschel and Gollwitzer 2007) would impact the participants' evaluation of the process. The results for both the laboratory and quasi-field experiments indicated that ENS framing does not affect perceptions of cognitive effort, discussion climate, relationship and outcome satisfaction. Such a gap

between perception and reality was also observed by Lim and Yang (2008) when they assessed the effects of multilingual ENS.

The indifference to framing (i.e., the lack of perceived differences between frames) would allow an ENS to be implemented in either frame without affecting subjective evaluations. This means that the system owner could employ whichever frame without the users perceiving a difference in the process and/or outcome.

8.3 *Manipulation of Orientation and Confounding Variables*

Motivational orientations have been shown to be governed by two antecedents (contextual effects and inherent individual differences), which have been equally successful at generating different dyadic compositions for experimentation (De Dreu and Weingart et al. 2000). Most often, researches used the context (through incentives and instructions) to induce the different orientations and a manipulation check would be performed ex-post to verify the operationalization (e.g., Olekalns, 1994). However, some researchers preferred to measure the participants' inherent orientation and then paired them into desired dyadic compositions (e.g., De Dreu and Van Lange, 1995).

This study, in the laboratory and quasi-field experiments, combined both methods (i.e., AMO was first assessed and then instruction were given to induce the collaborative and competitive orientations). The manipulation checks showed that collaborators and competitors responded correctly to questions regarding their motivational instructions. Collaborators and competitors also selected corresponding strategies that were indicative of their induced orientation as specified by De Dreu, Beersma et al. (2006). Although most participants were inherently competitive (68% in the laboratory and 66% in the quasi-field), they followed their instructions and applied matching strategies.

Furthermore, AMO was tested as a confounding variable on the dependent variables, and no effects were found (see Table 28 and Table 39), whereas the induced motivational orientations influenced the objective variables. The contextual manipulation of orientation appeared to trump the participants' inherent orientation. This puts into question the findings from studies that employed AMO to create different dyadic composition, but rewarded participants for their individual performances (competitive manipulation), such as the work by Olekalns and Smith (1999).

Regarding other confounding variables, English proficiency was shown to affect perceptions on cognitive effort in the laboratory (see Table 34 and Table 35). As globalization has increased trade, universities have headed towards a more diverse student population. This study took into account this trend and included English proficiency as a possible confounding factor. The results indicate that cognitive effort was affected by English proficiency in the laboratory. The quasi-field setting was not influenced by this confounding variable because participants were not required to take part or be punished for abandoning the process (i.e., they were incentivized with bonus marks). Those who found the case or the process difficult (e.g., based on their English proficiency) and quit the experiment were not counted in the results. However, the students from the laboratory were required to participate in the negotiations as part of their assignment. In each setting, they were rewarded with a maximum of 2% toward their final grade for trying to follow the objectives of their treatment group.

In sum, the two settings and manipulation checks expanded the conclusions drawn on ENS framing for different motivational orientation and even explained the discrepancies in the literature.

9 Conclusion

The reviews in Section 2 and Section 4 showed that most behavioral studies were conducted with face-to-face negotiations, while ENS studies, described in Section 3, generally examined competitive negotiations in the gain frame. As technology plays a more active role in negotiations, the contributions of the study not only serve negotiation and IS researchers by integrating decision theory, motivational theory and design research, but also ENS designers. This work showcases the relationship between people and technology as well as that between people interacting with each other through technology.

Motivational theory classifies negotiators into two main orientations (collaborators and competitors) based either on their predisposition or the objective of the negotiation task. A review of motivational orientation studies demonstrates that the dyadic composition is the most influential factor in predicting outcomes, and that technology, protocol and outcome framing can moderate the negotiation process. However, very few studies have examined the impact of technology on motivational orientation, and likewise little is known about framing effects on the process.

The goal of ENSs is to facilitate learning (of the problem, solutions and counterpart) and communications by helping users reach agreements that are favourable both for the individuals and dyads. Over the years, the emphasis on decision support has grown considerably, especially for complex negotiations that involve multiple issues and parties. The assessment of ENS studies shows that most research focuses on a cost benefit framework, media richness theory and IS models of success without much consideration of cognitive theories of negotiation. If decision support tool is to structure,

transform and summarize information, then the implications of such support needs to be understood, especially as they relate to the manipulation of outcome information. So far, outcome framing has been examined in face-to-face negotiations using different profit schedules. As ENSs facilitate decision-making and moderate interactions between both sides, they inevitably frame outcomes throughout the process by the information presented. Depending on which frame is presented, negotiators behave differently.

This study showed that, in the laboratory, collaborative dyads proposed more offers and achieved higher joint outcomes in the loss rather than in the gain frame, but competitive ones had the reverse results from the framing effect. Moreover, the parameters of the laboratory experiment (e.g., case, incentive structure and ENS) were applied to a quasi-field setting, whereby, similar participants were given seven days to negotiate without the help of a facilitator and using any browser technology at their convenience. The quasi-field setting had not been used in framing experiments and it contributed to expanding the validity of the findings.

In general, the advantage of laboratory experiments is that the effects of independent variables on dependent ones can be amplified through the manipulation of the environment (Kerlinger and Lee 2000). Conversely, the quasi-field setting relaxed the requirements of the laboratory controls (e.g., negotiators were not limited to 45 minutes of exchange as in the laboratory). The more natural setting showed that the joint outcomes of collaborative dyads were affected by framing and that there was an interaction between orientations and frames. These differences reflect the need for laboratory settings to incorporate important elements in the natural environment. For example, ENS facilitates asynchronous interactions by letting users logon and logoff over

long periods of time. Such circumstance would be difficult to reproduce in a laboratory setting and would play an important role in the study of ENSs. Therefore, the quasi-field setting is more ideal for mimicking negotiations over many days with confounding effects that cannot be controlled in the laboratory.

The comparison of experimental settings indicate that: (1) the collaborative dyads are more susceptible to framing than competitive ones, (2) the gain frame encourages concession-making, which favors competitive dyads over collaborative ones, (3) the disparities between the two orientations, in terms of joint outcomes and number of offers, are greater in the gain frame, and (4) the loss frame promotes cooperativeness for collaborative dyads as compared to competitive ones.

9.1 Implications for Research

For negotiation researchers, these results highlight the significance of context in negotiation experiments. Any experiment that uses incentives, instructions and an ENS must take into account the biases that these introduce to the participants. Especially for collaborative negotiators who are more affected by framing. Studies on mixed dyads in the different frames would provide more insight on the dynamics of motivational orientation and ENS framing interactions.

For the ENS designers, the implications of these findings are that, before framing outcomes to users, it is important to first ascertain the motivational orientation of the dyad. Then, according to the orientation of the dyad, the proper framing can lead to more offers being made and higher mutual gains. If orientation cannot be determined in advance or a ubiquitous frame must be implemented (e.g., the system is hard-coded to show all offers as gains), then the loss frame should be employed, since it allows for less

disparity between collaborative and competitive dyads. The subjective variables show that framing was not perceived by the negotiators, suggesting that the ENS can be implemented in any frame without causing adverse perceptions. System owners can influence joint outcomes by displaying information in either the gain or loss frame.

For IS researchers, the contributions at the methodological level include the following: (1) multi-level studies can provide different results (e.g., if this study was only conducted at the individual level, using only perceptions, no significant effects would be found); (2) the context can be more important than individual differences when examining system usage; (3) English proficiency, which is rarely measured unlike gender, age or experience, can be a confounding variable, especially when online systems are used in a global setting; and (4) the combination of a laboratory and quasi-field setting reveals strong and weak effects.

This study indicates that the gain frame was favorable for competitive dyads and unfavorable for collaborative ones because it encouraged concession-making. Conversely, the loss frame distracts competitors from making concessions. De Dreu and Carnevale (1995) suspected that the loss frame causes competitors to resist concession-making until either one side gives in or walks away. Three observations from the laboratory experiment supported such an explanation: (1) the only dyad that did not reach an agreement was the one given the competitive orientation in the loss frame; (2) the quality of offers (measured in terms of cooperativeness) was lower for competitive than collaborative dyads in the loss frame; and (3) the contract balance was greater for the collaborative dyads than the competitive ones in the loss frame. Therefore, any approach or manipulation that affects the judgment of concessions can produce greater gains for

both orientations, as long as competitors are encouraged to make concessions and collaborators are discouraged from doing so.

9.2 Implications for Practice

For negotiators, this thesis provides some practical recommendations. Since the motivational orientation and framing were manipulated in the experiments, negotiators can also do the same. If the dyadic composition is known, then the framing of the problem and offers can be established through communications with the other party. For example, one may say: "accepting this offer will give you a profit of x." to induce a gain frame. If the dyadic composition is competitively oriented, then a greater emphasis must be placed on establishing a gain frame and/or promoting concession-making as competitors are less influenced by framing than collaborators.

Alternatively, if the counterpart has a set frame in gains or losses (e.g., some people unequivocally see "the glass as half empty", i.e. in negative terms) then the orientation may be induced by changing the objective of the negotiation. For example, one may say: "whatever deal we reach, I can give you x percentage of my profit from the settlement". The motivational orientation may be changed by affecting any one or all of the four contextual dimensions (substantive, relational, divergent and emotional).

9.3 Limitations and Future Research

The major limitation of this study is the generalizability of the findings. As negotiation is a complex process that includes many stages, the case addressed only the conduct of negotiation and more specifically the discussion involving two integrative and one distributive issues. The experiment controlled for external factors (e.g., power, past

history, etc), which are found in real-life negotiations, in order to isolate the effects of framing. Another limitation is that each participant negotiated once, which may have influenced the subjective assessment of framing.

Another limitation of this study is that only offers were analyzed, the messages between negotiators were not considered. The text-based communication between negotiators can provide further clues on the effects of framing, such as whether competitive dyads were more willing to reveal their preferences in the gain versus the loss frame.

In order to expand on the present study, several avenues can be explored. Firstly, mixed frames could be used to investigate theories on frame adoption, which would show the differences between a buyer (who is believed to be negotiating in a loss frame) and a seller (who is believed to be negotiating in a gain frame). Secondly, motivational orientations could be mixed to form mixed dyads. Experiments on mixed dyads could show whether the competitor's dominance over collaborator exists only in the gain frame or is also present the loss frame. Thirdly, a repeated measure design may enhance the subjective findings on framing effects, because participants who get to experience both frames could provide a better comparison of the two. Finally, a different scenario (e.g., one involving ethics in an organization) could extend the findings beyond business negotiations and increase the external validity of the findings.

References

Amann, M., I. Bertok, J. Cofala and F. Gyarfas (1999). Cost-effective Control of Acidification and Ground-level Ozone. <u>IIASA Interim Reports</u>. Laxenburg, IIASA.

Axelrod, R. M. (1997). *The Complexity of Cooperation*. Princeton, NJ, Princeton University Press.

Bakos, Y. (1998). "The Emerging Role of Electronic Marketplaces on the Internet." *Comm. ACM* **41**(8): 35-42.

Barki, H. and J. Hartwick (2001). "Interpersonal Conflict and Its Management in Information System Development." *MIS Quarterly* **25**(2): 195-228.

Bazerman, M. (1983). "Negotiator Judgment: A Critical Look at the Rationality Assumption." *American Behavioral Scientist* **27**: 211-228.

Bazerman, M. (1986). *Judgment in Managerial Decision Making*. New York, NY, Wiley.

Bazerman, M., J. R. Curhan, D. A. Moore and K. L. Valley (2000). "Negotiation." *Annual Review of Psychology* **51**: 279-314.

Bazerman, M. H., T. Magliozzi and M. A. Neale (1985). "Integrative Bargaining in a Competitive Market." *Organizational Behavior and Human Performance* **34**: 294-313.

Beersma, B. and C. K. De Dreu (2002). "Integrative and Distributive Negotiation in Small Groups: Effects of Task Structure, Decision Rule, and Social Motive." *Organizational Behavior and Human Decision Processes* **87**: 227-252.

Beersma, B. and C. K. De Dreu (2005). "Conflict's Consequences: Effects of Social Motives on Postnegotiation Creative and Convergent Group Functioning and Performance." *Journal of Personality and Social Psychology* **89**: 358-374.

Ben-Yoav, O. and D. Pruitt (1984a). "Accountability to Constituents: A Two-edged Sword." *Organizational Behavior and Human Performance* **34**(3): 283-295.

Ben-Yoav, O. and D. Pruitt (1984b). "Resistance to Yielding and the Expectation of Cooperative Future Interaction in Negotiation." *Journal of Experimental Social Psychology* **34**: 323-335.

Bettman, J. R. and M. Sujan (1987). "Effects of Framing on Evaluation of Comparable and Noncomparabel Alternatives by Expert and Novice Consumers." *Journal of Consumer Research* **14**(September): 141-154.

Bichler, M., G. Kersten and S. Strecker (2003). "Towards a Structured Design of Electronic Negotiations." *Group Decision and Negotiation* **12**(4): 311-335.

Blake, R. and J. S. Mouton (1964). *The Managerial Grid*. Houston TX, Gulf.

Boehm, B. W. and R. Ross (1989). "Theory-W Software Project Management Principles and Examples " *IEEE Transactions on Software Engineering* **15**(7): 902-916.

Bottom, W. P. (1998). "Negotiator Risk: Sources of Uncertainty and the Impact of Reference Points on Negotiated Agreements." *Organizational Behavior and Human Decision Process* **76**(2): 89-112.

Boudreau, M., D. Gefen and D. Straub (2001). "Validation in IS Research: A State-of-the-art Assessment." *MIS Quarterly* **25**(1): 1-24.

Brett, J. M., D. L. Shapiro and A. L. Lytle (1998). "Breaking the Bonds of Reciprocity in Negotiations " *Academy of Management Journal* **41**: 410-424.

Burnham, T. C., K. McCabe and V. L. Smith (2000). "Friend-or-Foe Intentionality Priming in an Extensive Form Trust Game." *Journal of Economic Behavior & Organization* **43**: 57-73.

Carnevale, P. J. D. (2007). "Positive Affect and Decision Frame in Negotiation." *Group Decision and Negotiation* **17**(1): 51-63.

Carnevale, P. J. D. and C. K. De Dreu (2005). "Laboratory Experiments on Negotiation and Social Conflict." *International Negotiation* **10**: 51-65.

Carnevale, P. J. D., C. K. De Dreu, K. Rank, P. Keenan and S. Gentile (1994). Frames in Bilateral Negotiation: Loss Aversion versus Risk Attitude., University of Illinois at Urbana-Champaign.

Carnevale, P. J. D. and A. M. Isen (1986). "The Influence of Positive Affect and Visual Access on the Discovery of Integrative Solution in Bilateral Negotiation." *Organizational Behavior and Human Decision Process* **37**(1-13).

Carnevale, P. J. D. and P. Keenan (1990). Decision Frame and Social Goals in Integrative Bargaining: The likelihood of Agreement versus the Quality. 3rd Annu. Meet. Int. Assoc. Confl. Manage. Vancouver, B.C.

Carnevale, P. J. D. and E. J. Lawler (1986). "Time Pressure and the Development of Integrative Agreements in Bilateral Negotiations." *Journal of Conflict Resolution* **30**: 636-659.

Carnevale, P. J. D. and T. M. Probst (1998). "Social Values and Social Conflict in Creative Problem Solving and Categorization." *Journal of Personality Social Psychology* **74**(5): 1300-1309.

Carnevale, P. J. D. and D. Pruitt (1992). "Negotiation and Mediation." *Annual Review of Psychology* **43**: 531-582.

Chavez, A., D. Dreilinger, R. Guttman and P. Maes (1997). A Real-life Experiment in Creating an Agent Marketplace. Software Agents and Soft Computing. H. S. Nwana and N. Azarmi, Springer-Verlag**:** 160-179.

Chen, E., R. Vahidov and D. Neumann (2009). E-market Framework: The Assessment and Comparison of Auction, Negotiation and Decision Support. ASAC. Niagara Falls, Canada.

Chen, E., G. Kersten and R. Vahidov (2005). "Agent-supported Negotiations on E-marketplace." *International Journal of Electronic Business* **3**(1): 28-49.

Cohen, J. (1988). *Statistical Power Analysis for Behavioral Science*. Hillsdale, NJ, Erlbaum.

Croson, R. T. (1999). "Look at Me When You Say That : An Electronic Negotiation Simulation." *Simulation and Gaming* **31**(1): 23-37.

Curhan, J. R., H. A. Elfenbein and H. Xu (2005). What Do People Value When They Negotiate? Mapping the Domain of Subjective Value in Negotiation. IACM 18th Annual Conference; Marketing Science Institute Report, MIT Sloan Working Paper No. 4544-05.

Daft, R. L. and R. H. Lengel (1986). "Organizational Information Requirements, Media Richness and Structural Design." *Management Science* **32**(5): 554-5571.

Davis, F. D., R. P. Bagozzi and P. R. Warshaw (1989). "User Acceptance of Information Technology: A Comparison of Two Theoretical Models." *Management Science* **35**(8): 982-1003.

Davis, G. (1974). *Management Information Systems: Conceptual Foundations, Structure, and Development*. New York, NY, McGraw-Hill.

Dawes, R. M. (1980). "Social Dilemmas." *Annual Review of Psychology*: 169-93.

Dawes, R. M. (1988). *Rational Choice in an Uncertain World*. San Diego, Hartcourt Brace Jovanovich.

De Dreu, C. K., B. Beersma, K. Stroebe and M. Euwema (2006). "Motivated Information Processing, Strategic Choice, and the Quality of Negotiated Agreement." *Journal of Personality Social Psychology* **90**(6): 927-943

De Dreu, C. K. and T. Boles (1998). "Share and Share Alike or Winner Take All? Impact of Social Value Orientation on the Choice and Recall of Decision Heuristics in Negotiation." *Organizational Behavior and Human Decision Process* **76**(253-267).

De Dreu, C. K. and P. J. D. Carnevale (2003). "Motivational Bases of Information Processing and Strategy in Conflict and Negotiation." *Advances in Experimental Social Psychology* **35**: 235-293.

De Dreu, C. K., P. J. D. Carnevale, B. J. M. Emans and E. van de Vliert (1994). "Effects of Gain-Loss Frames in Negotiation: Loss Aversion, Mismatching and Frame Adoption." *Organizational Behavior and Human Decision Process* **60**: 90-107.

De Dreu, C. K., P. J. D. Carnevale, B. J. M. Emans and E. van de Vliert (1995). "Outcome Frames in Bilateral Negotiation: Resistance to Concession Making and Frame Adoption." *European Review of Social Psychology* **6**: 97-125.

De Dreu, C. K., E. Giebels and E. Van de Vliert (1998). "Social Motives and Trust in Integrative Negotiation : The Disruptive Effects of Punitive Capability." *Journal of Applied Psychology* **83**(3): 408-422.

De Dreu, C. K. and C. McCusker (1997). "Effects of Gain-loss Frames on Cooperation in Two-person Social Dilemmas: A Transformational Analysis." *Journal of Personality and Social Psychology* **72**: 1093-1106.

De Dreu, C. K. and P. A. M. Van Lange (1995). "The Impact of Social Value Orientations on Negotiator Cognition and Behavior." *Personality and Social Psychology Bulletin* **21**(11): 1178-1188.

De Dreu, C. K., L. R. Weingart and S. Kwon (2000). "Influence of Social Motives on Integrative Negotiation: A Meta-analytic Review and Test of Two Theories." *Journal of Personality Social Psychology* **78**(5): 889-905.

De Moor, A. and H. Weigand (2004). "Business Negotiation Support: Theory and Practice." *International Negotiation* **9**: 31-57.

Delaney, M. M., A. Foroughi and W. C. Perkins (1997). "An Empirical Study of the Efficacy of a Computerized Negotiation Support System." *Decision Support Systems* **20**: 185-197.

DeLone, W. and E. McLean (1992). "Information Systems Success: The Quest for the Dependent Variable." *Information Systems Research* **3**(1): 60-95.

DeSanctis, G. and R. B. Gallupe (1987). "A Foundation for the Study of Group Decision Support Systems." *Management Science* **33**(5): 589-609.

Deutsch, M. (1949). "A Theory of Cooperation and Competition." *Human Relations* **2**:199-231.

Deutsch, M. (1958). "Trust and Suspicion." *Journal of Conflict Resolution* **2**: 265-279.

Doong, H.-S. and H. Lai (2007). "Exploring Usage Continuance of E-negotiation Systems: Expectation and Disconfirmation Approach." *Group Decision and Negotiation* **17**(2): 111-116.

Dore, R. (1983). "Goodwill and the Spirit of Market Capitalism." *British Journal of Sociology* **34**: 459-482.

Eng, T.-Y. (2004). "The Role of E-marketplaces in Supply Chain Management." *Industrial Marketing Management* **33**(2): 97-105.

Fang, L., K. W. Hipel and D. M. Kilgour (1993). *Interactive Decision Making: The Graph Model for Conflict Resolution*. New York, NY, Wiley-Interscience.

Fisher, R. and W. Ury (1981). *Getting to Yes: Negotiating Agreement Without Giving In* Boston, MA, Houghton Mifflin.

Foroughi, A., W. C. Perkins and M. T. Jelassi (1995). "An Empirical Study of An Interactive, Session-oriented Computerized Negotiation Support System (NSS)." *Group Decision and Negotiation* **4**: 485-512.

Foroughi, A., W. C. Perkins and L. M. Jessup (2001). "A Comparison of Audio-Conferencing and Computer Conferencing in a Dispersed Negotiation Setting." *Journal of Organizational and End User Computing* **17**(3): 1-26.

Galin, A., M. Gross and G. Gosalker (2007). "E-negotiation Versus Face-to-face Negotiation What Has Changed – If Anything?" *Computers in Human Behavior* **23**(1): 787-797.

Giebels, E., C. K. De Dreu and E. Van de Vliert (2003). "No Way Out or Swallow the Bait of Two-Sided Exit Options in Negotiation: The Influence of Social Motives and Interpersonal Trust." *Group Process Intergroup Relations* **6**(4): 369-386.

Gross, M. A. and L. K. Guerrero (2000). "Managing Conflict Appropriately and Effectively: An Application of the Competence Model to Rahim's Organizational Conflict Styles." *International Journal of Conflict Management* **11**(3): 200-226.

Guo, X. and J. Lim (2007). "Negotiation Support Systems and Team Negotiations: The Coalition Formation Perspective" *Information and Software Technology* **49**: 1121-1127.

Harris, M. J. (1991). "Controversy and Culmination: Meta-analysis and Research on Interpersonal Expectancy Effects." *Personality and Social Psychology Bulletin* **17**(316-322).

Hermann, M. and N. Kogan (1977). Effects of Negotiators' Personalities on Negotiating Behaviors. Negotiations: Social-psychological Perspectives. Beverly Hills, CA, Druckman, D.**:** 247-274.

Herniter, B. C., E. Carmel and D. R. Vogel (1990). A Comparison of Visual Displays of Negotiation Support Systems. Proceedings of the Twenty-Third Annual Hawaii International Conference on System Sciences, Kailua-Kona, HI.

Hill, T. R. and B. Jones (1996). "A Prototype NSS Based on Problem Structure and Suggestions Toward More Comprehensive Negotiation Support " *Group Decision and Negotiation* **5**: 411-432.

Holsapple, C. W., H. Lai and A. B. Whinston (1996). "Implications of Negotiation Theory for Research and Development of Negotiation Support Systems." *Group Decision and Negotiation* **6**(3): 255-274.

Jain, B. and J. Solomon (2000). "The Effect of Task Complexity and Conflict Handling Styles on Computer-supported Negotiations." *Information & Management* **37**(4): 161-168.

Jelassi, T. and A. Foroughi (1989). "Negotiation Support Systems: An Overview of Design Issues and Existing Software." *Decision Support System* **5**(2): 167-181.

Jennings, N. (2001). "An Agent-based Approach for Building Complex Software Systems." *Communications of the ACM* **44**(4): 35-41.

Johnson, M. D. (1984). "Consumer Choice Strategies for Comparing Noncomparable Alternatives." *Journal of Consumer Research* **11**(December): 741-753.

Jones, B. and M. T. Jelassi (1990). "The Effect of Computer Intervention and Task Structure on Bargaining Outcome." *Theory and Decision* **28**(3): 355-374.

Kahneman, D. (1992). "Reference Points, Anchors, Norms, and Mixed Feelings." *Organizational Behavior and Human Decision Process* **51**: 296-312.

Kahneman, D., J. L. Knetsch and R. H. Thaler (1990). "Experimental Tests of the Endowment Effect and the Coarse Theorem." *Journal of Political Economy* **98**(6): 1325-1348.

Kahneman, D. and A. Tversky (1979). "Prospect Theory: An Analysis of Decisions under Risk." *Econometrica* **47**: 263-291.

Kahneman, D. and A. Tversky (1995). Conflict Resolution : A Cognitive Perspective. Barriers to Conflict Resolution. R. H. Arrow, L. Mnookin, L. Ross, A. Tversky and R. Wilson. New York, Norton & Co.**:** 44-61.

Keeney, R. L. and H. Raiffa, Eds. (1991). *Structuring and Analyzing Values for Multi-issue Negotiations*. Negotiation Analysis. Ann Arbor, University of Michigan Press.

Kerlinger, F. N. and H. B. Lee (2000). *Foundations of Behavioral Research*. Wadsworth, Thompson Learning Inc.

Kersten, G. (1987). "NEGO--Group Decision Support System." *Information and Management* **8**: 237-246.

Kersten, G. (2003). The Science and Engineering of E-negotiation: An Introduction. Proceedings of the 36th Annual Hawaii International Conference on System Sciences, Hawaii.

Kersten, G. (2004). E-negotiation Systems: Interaction of People and Technologies to Resolve Conflicts. UNESCAP Third Annual Forum on Online Dispute Resolution, Melbourne, Australia, July 5-6.

Kersten, G. and H. Lai (2007). "Negotiation Support and E-negotiation Systems: An Overview." *Group Decision and Negotiation* **16**(6): 553-586.

Kersten, G. E. and S. J. Noronha (1999). "WWW-based Negotiation Support: Design Implementation, and Use." *Decision Support Systems* **25**: 135-154.

Kilmann, R. H. and K. W. Thomas (1977). "Developing a Forced Choice Measure of Conflict Handling Behavior: The MODE Instrument " *Educational and Psychological Measurements* **37**(309-335).

Kirchler, E., B. Maciejovsky and M. Weber (2005). "Framing Effects, Selective Information, and Market Behavior: An Experimental Analysis." *Journal of Behavior Finance* **6**(2): 90-100.

Koeszegi, S., R. Vetchera and G. Kersten (2004). "National Cultural Differences in the Use and Perception of Internet-based NSS: Does High or Low Context Matter?" *International Negotiation* **9**(1): 79-109.

Koeszegi, S. T., K. J. Srnka and E. M. Pesendorfer (2004). Electronic Negotiations: A Comparison of Different Support Systems. CORS/INFORMS Banff, Canada.

Kohne, F., M. Schoop and D. Staskiewicz (2005). An Empirical Investigation of the Acceptance of Electronic Negotiation Support System Features. Proceedings of the European Conference on Information Systems (ECIS), Regensburg, Germany.

Kramer, R. M. and P. J. D. Carnevale (2001). Trust and Intergroup Negotiation. Blackwell Handbook of Social Psychology. M. Hogg and S. Tindale. Oxford, UK, Blackwell Publishers. **3**.

Lai, H., H.-S. Doong and C. C. Kao (2006). "Negotiators' Communication, Perception of Their Counterparts, and Performance in Dyadic E-negotiations." *Group Decision and Negotiation* **15**(5): 429-447.

Lax, D. A. and J. K. Sebenius (1986). *The Manager as Negotiator: Bargaining for Cooperation and Competitive Gain*. New York, NY, Free Press.

Levin, I. P. and G. J. Gaeth (1988). "Framing of Attribute Information Before and After Consuming the Product." *Journal of Consumer Research* **15**: 374-378.

Levin, I. P., S. L. Schneiderb and G. J. Gaethc (1998). "All Frames Are Not Created Equal: A Typology and Critical Analysis of Framing Effects." *Organizational Behavior and Human Decision Process* **76**(2): 149-188.

Lilien, G. L., A. Rangaswamy, G. H. Van Bruggen and K. Starke (2004). "DSS Effectiveness in Marketing Resource Allocation Decisions: Reality vs. Perception." *Information Systems Research* **15**(3): 216-235.

Lim, J. (2000). "An Experimental Investigation of the Impact of NSS and Proximity on Negotiation Outcomes." *Behavior and Information Technology* **19**(5): 329-338.

Lim, J. (2003). "A Conceptual Framework on the Adoption of Negotiation Support Systems." *Information and Software Technology* **45**(8): 469-477.

Lim, L.-H. and I. Benbasat (1993). "A Theoretical Perspective of Negotiation Support Systems." *Journal of Management Information Systems* **9**(3): 27-44.

Lim, J. and Y.P. Yang (2008). "Exploring Computer-based Multilingual Negotiation Support for English-Chinese Dyads: Can We Negotiate in Our Native Languages?" *Behavior and Information Technology* **27**(2): 139-151.

Lo, G. and G. E. Kersten (2003). "Aspire: An Integrated Negotiation Support System and Software Agents for E-business Negotiation." *International Journal of Internet and Enterprise Management* **1**(3): 293-315.

Loewenstein, G., L. Thompson and M. H. Bazerman (1989). "Social Utility and Decision Making in Interpersonal Contexts." *Journal of Personality and Social Psychology* **57**: 426-41.

Lynch, J. G., Jr. (1999). "Theory and External Validity." *Academy of Marketing Science* **27**(Summer): 367-376.

Maes, P. (1994). "Agents That Reduce Work and Information Overload." *Communications of the ACM* **37**(7): 30-40.

Malhotra, D. and M. Bazerman (2008). "Psychological Influence in Negotiation: An Introduction Long Overdue." *Journal of Management* **34**(3): 509-531.

Malone, T. W., Y. Yates and R. I. Benjamin (1987). "Electronic Markets and Electronic Hierarchies: Effects of Information Technology on Market Structure and Corporate Strategies." *Communications of the ACM* **30**(6): 484-497.

Markus, M. L. and E. Christiaanse (2003). "Adoption and Impact of Collaboration Electronic Marketplaces " *Information Systems and E-Business Management* **1**(2).

Marteau, T. M. (1989). "Framing of Information: Its Influence Upon Decisions of Doctors and Patients." *British Journal of Social Psychology* **28**: 89-94.

Matwin, S., S. Szpakowics, Z. Koperczak, G. Kersten and W. Michalowski (1989). "Negoplan: An Expert System Shell for Negotiation Support." *IEEE Expert* **Winter**: 50-61.

McClintock, C. (1977). Social Motives in Settings of Outcome Interdependence Negotiations: Social Psychological Perspective. D. Druckman. Beverly Hills, CA, Sage**:** 49-77.

McGrath, J. E. and A. B. Hollingshead (1993). Putting the Group Back in Group Support Systems: Some Theoretical Issues about Dynamic Processes in Groups with Technological Enhancements. Group Support Systems: New Perspectives. L. M. Jessup and J. S. Valacich. New York, Macmillan**:** 78-96.

Mennecke, B. E., J. S. Valacich and B. C. Wheeler (2000). "The Effects of Media and Task on User Performance: A Test of the Task-Media Fit Hypothesis." *Group Decision and Negotiation* **9**(6): 507-529.

Meyerowitz, B. E. and S. Chaiken (1987). "The Effect of Message Framing on Breast Self-examination Attitudes, Intentions, and Behavior." *Journal of Personality and Social Psychology* **52**(500-510).

Montazemi, A. R., J. J. Siam and A. Esfahanipour (2008). "Effect of Network Relations on the Adoption of Electronic Trading Systems." *Journal of Management Information Systems* **25**(1): 233-266.

Montoya-Weiss, M. M., A. P. Massey and M. Song (2001). "Getting It Together: Temporal Coordination and Conflict Management in Global Virtual Teams." *Academy of Management Journal* **44**(6): 1251-1262.

Neale, M. A. and M. Bazerman (1985). "The Effects of Framing and Negotiators Overconfidence on Bargaining Behavior and Outcome." *Academy of Management Journal* **28**(1): 34-49.

Neale, M. A. and M. Bazerman (1991). *Cognition and Rationality in Negotiation*. New York, NY, Free Press.

Negroponte, N. (1997). Agents: From Direct Manipulation to Delegation. Software Agents. J. Bradshaw. Menlo Park, CA, AAAI Press/ MIT Press**:** 57-66.

Nunamaker, J. F., A. R. Dennis, J. S. Valacich and D. R. Vogel (1991). "Information Technology for Negotiating Groups: Generating Options for Mutual Gain." *Management Science* **37**(10): 1325-1346.

Nunnally, J. and I. Bernstein (1994). *Psychometric Theory*. New York, McGraw-Hill.

Nyhart, J. D. and C. Goeltner (1987). Computer Models as Support for Complex Negotiations. International Conference for Society for General System Research, Budapest: 40-48.

O'Connor, K. M. and P. J. D. Carnevale (1997). "A Nasty But Effective Negotiation Strategy: Misrepresentation of A Common-value Issue." *Personality and Social Psychology Bulletin* **23**: 504-515.

Olekalns, M. (1994). "Context, Issues and Frame as Determinants of Negotiated Outcomes." *British Journal of Social Psychology* **33**: 197-210.

Olekalns, M. (1997). "Situational Cues as Moderators of the Frame-outcome Relationship." *British Journal of Social Psychology* **36**: 191-209.

Olekalns, M. and P. Smith (2005). "Cognitive Representations of Negotiation." *Australian Journal of Management* **30**(1): 57-76.

Olekalns, M., P. Smith and R. Kibby (1996). "Social Value Orientations and Negotiator Outcomes." *European Journal of Social Psychology* **26**: 299-313.

Olekalns, M. and P. L. Smith (1999). "Social Value Orientations and Strategy Choices in Competitive Negotiations " *Personality and Social Psychology Bulletin* **25**(6): 657-668.

Olekalns, M. and P. L. Smith (2003a). "Social Motives in Negotiation: The Relationships Between Dyad Composition, Negotiation Processes and Outcomes." *International Journal of Conflict Management* **14**: 233-254.

Olekalns, M. and P. L. Smith (2003b). "Testing the Relationships Among Negotiators' Motivational Orientations, Strategy Choices, and Outcomes." *Journal of Experimental Social Psychology* **39**(2): 101-117.

Payne, J. W., J. R. Bettman and E. J. Johnson (1993). *The Adaptive Decision Maker*. New York, NY, Cambridge University Press.

Pesendorfer, E. M. and S. Koeszegi (2006). "Hot Versus Cool Behavioural Styles in Electronic Negotiations: The Impact of Communication Mode." *Group Decision and Negotiation* **15**(2): 141-155.

Pesendorfer, E. M. and S. Koeszegi (2007). "Social Embeddedness in Electronic Negotiations." *Group Decision and Negotiation* **16**(4): 399-415.

Pinkley, R. L. and G. B. Northcraft (1994). "Conflict Frames of Reference: Implications for Dispute Process and Outcomes." *Academy of Management Journal* **37**(1): 193-205.

Poole, M. S. and G. DeSanctis (1990). Understanding the Use of Group Decision Support Systems: The Theory of Adaptive Structuration. Organizations and Communication Technology. Beverley Hills, CA, Sage.

Powell, W. W. (1990). "Neither Market nor Hierarchy: Networks Forms of Organization." *Research in Organizational Behavior* **12**: 295-336.

Pruitt, D. (2005). "Field Experiments on Social Conflict." *International Negotiation* **10**: 33-49.

Pruitt, D. (1981). "Negotiation Behavior." *Academic Press*.

Pruitt, D. G. (1998). Social Conflict. Handbook of Social Psychology. D. Gilbert, S. T. Fiske and G. Lindzey. New York, NY, McGraw-Hill. **2:** 470-503.

Pruitt, D. G. and J. Z. Rubin (1986). *Social Conflict: Escalation, Stalemate, and Settlement*. New York, NY, Random House.

Purdy, J. M., P. Nye and P. V. Balakrishnan (2000). "The Impact of Communication Media on Negotiation Outcomes." *International Journal of Conflict Management* **11**(2): 162-187.

Raiffa, H. (1982). *The Art and Science of Negotiations* Cambridge, Belknap.

Rangaswamy, A. and R. G. Shell (1997). "Using Computer to Realize Joint Gains in Negotiations: Towards an "Electric Bargaining Table"." *Management Science* **43**(8): 1147-1163.

Rapoport, A. (1968). "Prospects for Experimental Games." *Journal of Conflict Resolution* **12**: 461-470.

Rhoades, J. A. and P. J. D. Carnevale (1999). "The Behavioral Context of Strategic Choice in Negotiation: A Test of the Dual Concern Model." *Journal of Applied Social Psychology* **29**(9): 1777-1802.

Ritov, I. (1996). "Anchoring in Simulated Competitive Market Negotiation." *Organizational Behavior and Human Decision Process* **67**(1): 16-25.

Rubin, J. Z. (1991). Some Wise and Mistaken Assumptions about Conflict and Negotiation. Negotiation Theory and Practice. J. W. Breslin and J. Z. Rubin. Cambridge, MA, PON Books**:** 3-12.

Rubin, T. L. and K. W. Thomas (1976). "Support for Two-dimensional Model of Conflict Behavior." *Organizational Behavior and Human Decision Process* **15**: 143-155.

Russo, J. E., V. H. Medvec and M. G. Meloy (1996). "The Distortion of Information during Decisions." *Organizational Behavior and Human Decision Process* **66**(102-110).

San Pedro, J., F. Burstein and H. Linger (2004). E-Negotiation Support for Boundary Conflict Resolution. Decision Support in an Uncertain and Complex World: The IFIP TC8/WG8.3 International Conference, Prato, Italy.

Savage, G. T., J. D. Blair and R. L. Sorenson (1989). "Consider both relationship and substance when negotiating." *Academy of Management Executive* **3**(1): 37-47.

Schei, V. and J. K. Rognes (2003). "Knowing Me, Knowing You: Own Orientation and Information about the Opponent's Orientation in Negotiation." *International Journal of Conflict Management* **14**(1): 43-60.

Schei, V., J. K. Rognes and C. K. De Dreu (2006). The Invisible Hand in Negotiation : Are Individualistic Orientations Collectively Valuable? Discussion paper, Norwegian School of Economics and Business Administration. Department of Strategy and Management.

Schelling, T. C. (1960). *The Strategy of Conflict* Boston, MA, Harvard University Press.

Schoop, M. (2003). "Negoisst: A Negotiation Support System for Electronic Business-to-business Negotiations in E-commerce " *Data and Knowledge Engineering* **47**(3): 371-401.

Schoop, M. and C. Quix (2001). "DOC.COM: A Framework for Effective Negotiation Support in Electronic Marketplaces." *Computer Networks* **37**(2): 153-170.

Sebenius, J. (1992). "Negotiation Analysis: A Characterization and Review." *Management Science* **38**: 1-21.

Sheffield, J. (1995). "The Effect of Communication Medium on Negotiation Performance " *Group Decision and Negotiation* **4**(2): 159-179.

Shell, R. G. (2001). "Bargaining Styles and Negotiation: The Thomas-Kilmann Conflict Mode Instrument in Negotiation Training " *Negotiation Journal* **17**(2): 155-174.

Siah, C. Y. (2005). "All that Glitter is Not Gold: Examining the Perils and Obstacles in Collecting Data on The Internet." *International Negotiation* **10**: 115-130.

Silver, M. S. (2008). On the Design Features of Decision Support Systems: The Role of System Restrictiveness and Decisional Guidance. Handbook on Decision Support Systems. F. Burstein and C. W. Holsapple. Heidelberg, Germany, Springer. **2:** 261-291.

Soh, C. and M. L. Markus (2002). B2B E-Marketplaces-A Strategic Archetypes Approach. International Conference on Information Systems, Barcelona, Spain.

Starke, K. and A. Rangaswamy (2000). Computer-Mediated Negotiations: Review and Research Opportunities. Encyclopedia of Microcomputers. A. Kent and J. G. Williams. New York, NY, Marcel Dekker. **25:** 47-72.

Stibel, J. M. (2005). "Increasing Productivity through Framing Effects for Interactive Consumer Choice." *Cognitive Technical Work* **7**: 63-68.

Suh, K. S. (1999). "Impact of Communication Medium on Task Performance and Satisfaction: An Examination of Media-Richness Theory." *Information and Management* **35**: 295-312.

Sycara, K. (1991). "Problem Restructuring in Negotiation." *Management Science* **37**(10): 1248-1268.

Tenbrunsel, A. E. and D. M. Messick (1999). "Sanctioning Systems, Cooperation and Decision Construals." *Administrative Science Quarterly* **44**: 694-707.

Thaler, R. H. (1980). "Towards a Positive Theory of Consumer Choice." *Journal of Economic Behavior & Organization* **1**: 39-60.

Thiessen, E. M. and D. P. Loucks (1992). "Computer-Assisted Negotiation of Multi-objective Water Resources
Conflicts." *Water Resources Bulletin, American Water Resources Association* **28**(1): 163-177.

Thompson, L. (1990). "Negotiations Behaviour and Outcomes: Empirical Evidence and Theoretical Issues." *Psychological Bulletin* **108**: 515-532.

Thompson, L. (2007). *The Truth About Negotiations* Upper Saddle River, FT Press.

Thompson, L. and R. Hastie (1990). "Social Perception in Negotiation." *Organizational Behavior and Human Decision Processes* **47**(1): 98-123.

Thompson, L. and G. Loewenstein (1992). "Egocentric Interpretations of Fairness and Interpersonal Conflict." *Organizational Behavior and Human Decision Processes* **51**(2): 176-197.

Trötschel, R. and P. M. Gollwitzer (2007). "Implementation Intentions and the Willful Pursuit of Prosocial Goals in Negotiations." *Journal of Experimental Social Psychology* **43**: 579-598.

Tversky, A. (1969). "Intransitivity of Preferences." *Psychological Review* **76**: 105-110.

Tversky, A. and D. Kahneman (1981). "The Framing of Decisions and the Psychology of Choice." *Science* **211**(January): 453-458.

Tversky, A. and D. Kahneman (1986). "Rational Choice and the Framing of Decisions." *Journal of Business* **59**(4): 5251-5278.

Van de Vliert, E. and H. C. M. Prien (1989). *The Difference in the Meaning of Forcing in the Conflict Management of Actors and Observers*. New York, NY, Praeger.

van Kleef, G. A., C. K. De Dreu and A. S. R. Manstead (2004). "The Interpersonal Effects of Anger and Happiness in Negotiations." *Journal of Personality Social Psychology* **86**(1): 57-76.

Van Lange, P. A. M., W. Otten, E. M. N. De Bruin and e. al. (1997). "Development of Prosocial, Individualistic, and Competitive Orientation: Theory and Preliminary Evidence." *Journal of Personality Social Psychology* **73**: 733-746.

Vetchera, R. (2006). "Inconsistent Behaviour in Electronic Negotiations – An Exploratory Analysis." *Electronic Markets* **16**(3): 201-211.

Vetschera, R., G. Kersten and S. Koszegi (2004). "User Assessment of Internet-Based Negotiation Support Systems: An Exploratory Study." *Journal of Organizational Computing and Electronic Commerce* **16**(2): 123-148.

von Neumann, J. and O. Morgenstern (1947). *Theory of Games and Economic Behavior*. Princeton, NJ, Princeton University Press.

Walton, R. E. and R. B. McKersie (1965). *A Behavioral Theory of Labor Negotiations* New York, NY, McGraw-Hill.

Weber, M., G. E. Kersten and M. J. Hine (2006). "Visualization in e-Negotaition: An Inspire ENS Graph is Worth 334 words, on Average". *Electronic Markets* **16**(3): 186-200.

Weingart, L. R., R. J. Bennett and J. M. Brett (1993). "The Impact of Consideration of Issues and Motivational Orientation on Group Negotiation Process and Outcome." *Journal of Applied Psychology* **78**: 504-517.

Weingart, L. R., E. Hyder and M. J. Prietula (1996). "Knowledge Matters: The Effect of Tactical Descriptions on Negotiation Behavior and Outcome." *Journal of Personality Social Psychology* **70**: 1205-1217.

Wilson, R. B. (1989). Exchange. <u>Allocation, Information, and Markets</u>. J. Eatwell, M. Milgate and P. Newman. New York, W.W. Norton**:** 83-93.

Yang, Y.P., J. Lim, Y. Zhong, X. Guo and X. Li "Who Is Taking over Control? A Psychological Perspective in Examining Effects of Agent-based Negotiation Support Technologies" *Lecture Notes on Artificial Intelligence* **4562**: 222-231.

Yuan, Y., M. Head and M. Du (2003). "The Effects of Multimedia Communication on Web-Based Negotiation." *Group Decision and Negotiation* **12**(2): 89-109.

Appendix A: Case of Retailer and Producer of Movies

HYPERFLIC

You own an online retail store, called HYPERFLIC, selling independent films that buyers can view through streaming. You are in negotiation with UBERSHIFT, a producer of independent, European films. Both parties have settled on the industry standard of price per film, but three other issues still need to be discussed. These issues are: delivery time, discount terms and financial terms.

- *Delivery time* refers to the lag time between the release of the movie and the upload of the movie by UBERSHIFT to your server.
- *Discount terms* describe the markdown that UBERSHIFT provides you for selling the films.
- *Financial terms* center on the percentage of the price that you pay UBERSHIFT before they upload the movie to your server. The rest of the price is paid three months after you received the film.

The following table shows your **profit schedule** for the negotiation. It helps you determine what each option within an issue is worth to you.

Issues

Delivery time		Discount terms		Financial terms	
0 day	$20,000	10%	$30,000	0 %	$50,000
1 day	$17,500	9 %	$26,250	13 %	$43,750
2 day	$15,000	8 %	$22,500	25 %	$37,500
3 day	$12,500	7 %	$18,750	38 %	$31,250
4 day	$10,000	6 %	$15,000	50 %	$25,000
5 day	$7,500	5 %	$11,250	63 %	$18,750
6 day	$5,000	4 %	$7,500	75 %	$12,500
7 day	$2,500	3 %	$3,750	88 %	$6,250
8 day	$0	2 %	$0	100%	$0

This profit schedule applies only to you. **UBERSHIFT uses a different profit schedule**.

For example: based on the profit schedule, if you and your counterpart agree to the delivery time of 7 days, a discount term of 6% and a financial term of 13%, then your total profit is $61,250.

		Options	Profit
	Delivery time	7 days	$2,500
Issues	Discount terms	6 %	$15,000
	Financial terms	13%	$43,750
Your total profit			$61,250

Negotiation objective:

Collaborators   UBERSHIFT is an important producer that has made (and will make) many lucrative films, and therefore, the welfare of your counterpart is important to you. **Your goal is to try to earn as much profit for you and for UBERSHIFT as possible**.

Competitors   UBERSHIFT is new producer that may (or may not) stay in business, and therefore, you care only about your gains. **Your goal is try to earn as much profit for you as possible.**

UBERSHIFT

You are a producer of independent, European films, called UBERSHIFT. As a new method of distribution, you plan to sell your products to HYPERFLIC, an online retail store of independent films that allows buyers to view movies through streaming. In the contract negotiation, both parties have settled on the industry standard of price per film, but three other issues still need to be discussed. These issues are: delivery time, discount terms and financial terms.

- *Delivery time* refers to the lag time between the release of the movie and the upload of the movie to HYPERFLIC's server.
- *Discount terms* describe the markdown that you provide HYPERFLIC for the sale of the films.
- *Financial terms* center on the percentage of the price that you receive from HYPERFLIC before you upload the movie to their server. The rest of the price is paid three months after they received the film.

The following table shows your **profit schedule** for the negotiation. It helps you determine what each option within an issue is worth to you.

Issues

Delivery time		Discount terms		Financial terms	
8 day	$50,000	2 %	$30,000	100 %	$20,000
7 day	$43,750	3 %	$26,250	88 %	$17,500
6 day	$37,500	4 %	$22,500	75 %	$15,000
5 day	$31,250	5 %	$18,750	63 %	$12,500
4 day	$25,000	6 %	$15,000	50 %	$10,000
3 day	$18,750	7 %	$11,250	38 %	$7,500
2 day	$12,500	8 %	$7,500	25 %	$5,000
1 day	$6,250	9 %	$3,750	13 %	$2,500
0 day	$0	10 %	$0	100%	$0

This profit schedule applies only to you. **HYPERFLIC uses a different profit schedule**.

For example: based on the profit schedule, if you and your counterpart agree to the delivery time of 7 days, a discount term of 6% and a financial term of 13%, then your total profit is $61,250.

	Options	Profit
Delivery time	7 days	$43,750
Issues Discount terms	6 %	$15,000
Financial terms	13%	$2,500
Your total profit		$61,250

Negotiation objective:

Collaborators   HYPERFLIC is an important retailer that has sold (and will sell) many independent films, and therefore, the welfare of your counterpart is important to you. Y**our goal is to try to earn as much profit for you and for HYPERFLIC as possible**.

Competitors   HYPERFLIC is new retailer that may (or may not) stay in business, and therefore, you care only about your gains. **Your goal is try to earn as much profit for you as possible.**

Appendix B: Workflow
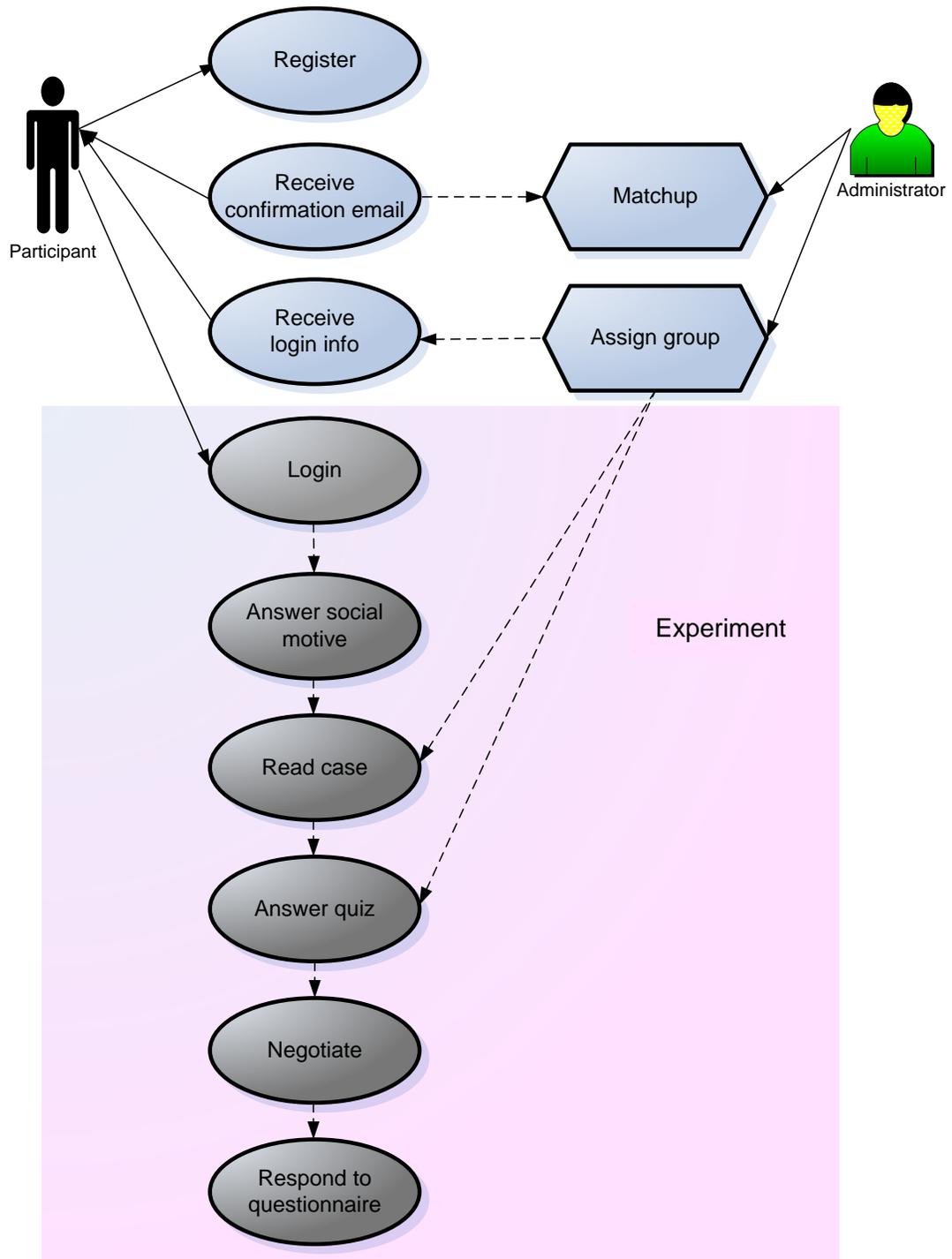
Appendix C: Recruitment process for participants

The proliferation of e-markets and collaborative systems are an integral part of the globalization of business operations and creation of virtual team environments. On one hand, Web 2.0, social network, wikis and document sharing tools are some of the technologies that support collaborative decision making to encourage new product development. On the other hand, supply chains are expanded to partners across continents through the use of e-market systems that bring demand and supply of online participants to balance.

This proposal suggests the teaching of e-market and collaborative systems to students through three stages:

Lecture: The first stage consists of a lecture on such systems by (1) defining these systems, (2) highlighting their present use in business, and (3) suggesting potential application for creating new business models or enhancing present operations. (The time required depends on that allocated by the instructor.)

Experiment: The second stage gives students a practical experience with an e-negotiation system (type of e-market system), which enables them to learn first-hand the functions of negotiating a contract online. The experiment is composed of the following activities:

- Assessment of disposition (either collaborative or competitive) ---(15 min)
- Read a business contract case ---(15 min)
- Answer a quiz on the case ---(10 min)
- Negotiate with a counterpart by exchanging offers and messages ---(30 min)
- Answer a post-questionnaire on system features and evaluation of outcomes ---(20 min)

The total activities will take about 1½ hours that take place outside of class. A website will be setup for students to register and select the different sessions that they can present themselves in.

The students will be given a grade on participation and performance (z-score advocated by Raiffa 1982). Depending on whether the students participated in a collaborative or competitive treatment, the performance is based on the profit that the individual achieves for the company in a competitive setting and both parties get in a collaborative setting.

Short report: The third stage asks students identify issues that a mobile service company would use in online negotiations with potential customers. In addition, they need to describe two advantages and disadvantages associated to using a collaborative and competitive strategy.

The overall grade for this learning experience is:
Experiment participation (40%) + Experiment performance (40%) + Short report (20%)

The contribution to the course is:
- Introduction to e-market and collaborative systems and their place in business
- First hand experience with an e-negotiation system
- Discover the application of such systems in the industry

Appendix D: Assessment of Motivational Orientation

In this task, we ask you to imagine that you have been randomly paired with another person (the *Other*). The *Other* is someone you do not know and that you will not meet in the future.

Imagine a situation in which you and the *Other* can choose separately one of three available options. You decide without knowing the option chosen by the *Other*. Likewise, the *Other* does not know your choice when deciding.

Each option gives points for yourself and the *Other*. For example, if the options available for each one are:
(1) you get **250**, other gets **250**
(2) you get **500**, other gets **0**
(3) you get **0**, other gets **500**

After each one has picked an option, the total points you receive is the sum of points from your choice and that of the *Other*. For example, if you choose option (2) and the *Other* picks option (1). You get a total of **750** points. The more points you receive, the better for you.

Please keep in mind that there is no right or wrong answer—choose the option that you, for whatever reason, prefer most. Below are nine independent situations. Please tell us which one of the three available options you prefer in each situation.

		A	B	C
1	You get	**480**	**540**	**480**
	Other gets	**80**	**280**	**480**
	Your choice	○	○	○

		A	B	C
2	You get	**560**	**500**	**500**
	Other gets	**300**	**500**	**100**
	Your choice	○	○	○

		A	B	C
3	You get	**520**	**520**	**580**
	Other gets	**520**	**120**	**320**
	Your choice	○	○	○

		A	B	C
4	You get	**500**	**560**	**490**
	Other gets	**100**	**300**	**490**
	Your choice	○	○	○

		A	B	C
5	You get	**560**	**500**	**490**
	Other gets	**300**	**500**	**90**
	Your choice	○	○	○

		A	B	C
6	You get	**500**	**500**	**570**
	Other gets	**500**	**100**	**300**
	Your choice	○	○	○

		A	B	C
7	You get	510	560	510
	Other gets	510	300	110
	Your choice	○	○	○

		A	B	C
8	You get	550	500	500
	Other gets	300	100	500
	Your choice	○	○	○

		A	B	C
9	You get	480	490	540
	Other gets	100	490	300
	Your choice	○	○	○

Appendix E: Quiz

Example quiz for Collaborators

Questions	Answer options
1. HYPERFLIC is a	(1) online retail store selling independent films (2) producer of independent European films (3) software producer
2. UBERSHIFT is a	(1) online retail store selling independent films (2) producer of independent European films (3) software producer
3. The three issues for negotiation are	(1) financial terms, price per film, discount terms (2) price per film, delivery time and discount terms (3) delivery time, discount terms and financial terms
4. For example: if you send an offer for a delivery time of 4 days (worth $25,000), discount terms of 6 percent (worth $15,000) and financial terms of 5 percent (worth $10,000), and your counterpart accept this offer, then your total profit is (in thousands of $)	(1) 50 (2) 25 (3) 45
5. Your objective in this negotiation is to	(1) earn as much profit for myself as I can (2) earn as much profit for myself and my counterpart as I can

Answers: 1(1), 2(2), 3(3), 4(1), 5(2)

Appendix F: Instruction for Experiments

You are participating in an experiment that involves negotiating with another person (the counterpart). All interactions take place on this website. The moment you receive the signal to start negotiations, you have 45 minutes to negotiate with your counterpart, who is in another laboratory. After 45 minutes, your will be asked to end negotiations even if you have not reached an agreement.

 Please, follow the instructions shown on your screen that will guide you through the experiment. Once you have reach an agreement or you wish to terminate all interaction with your counterpart, click "End negotiation". "End negotiation" will terminate all interaction with your partner, so please be sure when you click on this button. The final step requires you to fill out a questionnaire. The questionnaire is imperative to completing your participation in the experiment.

Your identity is never revealed throughout the experiment. All communication between you and the other participant must remain anonymous. You are not allowed to reveal your real name or any personal information that can identify you to the other participant, and vice versa.

As responses from the other participant may take some time, your patience is highly appreciated during the experimental process.

Appendix G: Questionnaire on Subjective Variables and Manipulation Check

The sections measure: a) Outcome satisfaction, b) relationship, c) cognitive effort, d) discussion climate, and e) manipulation check for motivational orientation.

Based on your experience in this negotiation, please answer the following questions as accurately as possible.

	Very satisfied	Satisfied	Somewhat satisfied	Neither satisfied nor dissatisfied	Somewhat dissatisfied	Dissatisfied	Very dissatisfied
a) How satisfied (or dissatisfied) are you with…							
1. the achieved outcome?	O	O	O	O	O	O	O
2. the results compared to your expectations?	O	O	O	O	O	O	O
3. the outcome when looking at what you originally wanted?	O	O	O	O	O	O	O
4. the solution being favorable for you?	O	O	O	O	O	O	O

	Strongly agree	Agree	Partially agree	Neither agree nor disagree	Partially disagree	Disagree	Strongly disagree
b) In the negotiation…							
5. my counterpart listened to my concerns.	O	O	O	O	O	O	O
6. a good foundation was set for future relationships with my counterpart.	O	O	O	O	O	O	O
7. my counterpart acted in good faith.	O	O	O	O	O	O	O
8. my counterpart was honest.	O	O	O	O	O	O	O

	Very easy	Easy	Partially easy	Neither easy nor difficult	Partially difficult	Difficult	Very difficult
c) In the negotiation process…							
9. acting in my role was…	O	O	O	O	O	O	O
10. meeting the objectives of the case was…	O	O	O	O	O	O	O
11. making decisions was…	O	O	O	O	O	O	O
12. interacting in the business scenario was…	O	O	O	O	O	O	O

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree	Strongly disagree
d) During the negotiation...							
13. the atmosphere was agreeable.	O	O	O	O	O	O	O
14. I felt comfortable.	O	O	O	O	O	O	O
15. my counterpart listened to me.	O	O	O	O	O	O	O
16. the interaction was sociable.	O	O	O	O	O	O	O
17. I could openly discuss disagreements	O	O	O	O	O	O	O
e) In the case…							
18. I was instructed to try to reduce expenses for me only. *(loss frame)*	O	O	O	O	O	O	O
19. I was instructed to try to reduce expenses for me and my counterpart. *(loss frame)*	O	O	O	O	O	O	O
In negotiation, …							
20. Always gave others the benefit of the doubt.	O	O	O	O	O	O	O
21. Your loss is my gain.	O	O	O	O	O	O	O
22. Take a problem solving approach.							
23. The best defense is a good offense.							
24. Negotiate fair.							
25. Winner takes all.	O	O	O	O	O	O	O

The questionnaire was built from items adapted from other studies on negotiation and ENS. First a list of items was selected for each constructs, then three senior and five junior researchers revised the items to help construct the questionnaire.

Questions measuring **outcome satisfaction**

1	*How satisfied (or dissatisfied) are you with the quality of the outcome which you and the other party reached?* (original from Suh 1999) How satisfied (or dissatisfied) are you with the achieved outcome?
2	*Did the negotiation meet your prior expectation?* (Vetchera et al. 2004) How satisfied (or dissatisfied) are you with the results compared to your expectations?
3	*To what extent are you confident that the outcome is optimal?* (Suh 1999) How satisfied (or dissatisfied) are you with the outcome when looking at what you originally wanted?
4	*To what extent does the final solution reflect your input* (Suh 1999) How satisfied (or dissatisfied) are you with the solution being favorable to you?

Questions measuring **relationship**

5	*Do you feel your counterpart listened to your concerns?* (Curhan et al. 2000)
	In the negotiation, my counterpart listened to my concerns.
6	*Did the negotiation build a good foundation for a future relationship with your counterpart?* (Curhan et al. 2000)
	In the negotiation, a good foundation was set for future relationships with my counterpart.
7	*During the negotiation, at times, I felt suspicious about the other negotiator's statement.* (Jones and Jelassi 1990)
	In the negotiation, my counterpart acted in good faith.
8	*During the decision-making task, the others were honest with me.* (Beersma and De Dreu 2002)
	In the negotiation, my counterpart was honest.

Questions measuring **cognitive effort**

9	*In the negotiation process, acting in my role was…* (Chen et al. 2009)
	In the negotiation process, acting in my role was…
10	*In the negotiation process, meeting the objectives of the case was…* (Chen et al. 2009)
	In the negotiation process, meeting the objectives of the case was…
11	*In the negotiation process, making decisions was…* (Chen et al. 2009)
	In the negotiation process, making decisions was…
12	*In the negotiation process, interacting in the business scenario was…* (Chen et al. 2009)
	In the negotiation process, interacting in the business scenario was…

Questions measuring **discussion climate**

13	*During the decision-making task, the atmosphere was agreeable.* (Beersma and De Dreu 2002)
	During the negotiation process, the atmosphere was agreeable.
14	*During the decision-making task, I felt comfortable.* (Beersma and De Dreu 2002)
	During the negotiation process, I felt comfortable.
15	*During the decision-making task, the others listened to me.* (Beersma and De Dreu 2002)
	During the negotiation process, my counterpart listened to me.
16	*During the negotiation, our interaction was sociable.* (Beersma and De Dreu 2002)
	During the negotiation process, the interaction was sociable.
17	*During the negotiation, for the most part, the other negotiator and I could discuss our disagreements* (Foroughi et al. 1995)
	During the negotiation, I could openly discussion disagreements

Appendix H: Facilitation Instructions

Thank you for your involvement in our experiments. You should receive these instructions at least 2 days prior to the experiment. In order to maintain consistency from one experiment to another we ask you to please follow instructions closely. Please restrict communication with the participants to a minimum.

1. Meet project manager

Check

A. Make sure you know how to use FirstClass Chat (If you do not have a FirstClass account, one will be provided for you) ☐

B. Read these instructions beforehand and contact the manager should you have questions. **You must meet the manager 15 minutes before the schedule start time for experiments at GM 903-07** ☐

C. Collect from the manager the **Facilitator's folder**, which contains: ☐
   - Pen
   - Facilitator note sheet
   - Copy of Instructions for Facilitators
   - AMO questionnaire
   - Public Information sheet (General instructions)
   - Private Information sheet
   - System Guide sheet
   - Handouts for participants
   - List of participants
   - Questionnaires

D. Know which lab (2nd or 5th floor) you are assigned to and your co-facilitator's FirstClass username ☐

E. Go to your lab ☐
   - 2nd floor lab (210)
   - 5th floor lab (502-03)

2. Setup lab for experiment

A. **Login to every computer** in the lab: ☐
   - 2nd floor lab, username: `dsmis` password: `dsmis`
   - 5th floor lab, username: `lc` password: `lc`

B. Login to FirstClass on the **facilitator's computer** and initiate chat session with co-facilitator and manager. ☐
   - 2nd floor lab, use the computer in the 1st row closest to the door
   - 5th floor lab, use the computer next to the door

C. Setup the participants' computers: ☐
   - check system time if synchronized on all machines
   - open the browser
   - check the screen setting (1024 X 768 pixels)
   - leave only address bar on browser and lock the Toolbars
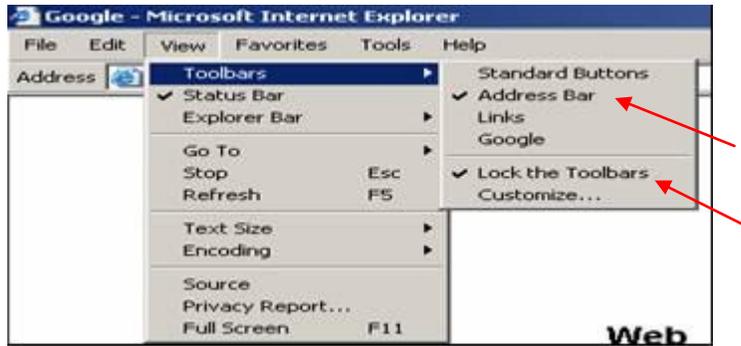
D. Go to: `http://invite.concordia.ca/inspireinternet/index.cfm` ☐
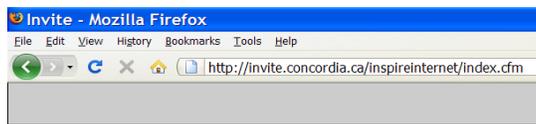
E. Place **numbers** on key boards and **handouts** at each station ☐

3. Greet participants

A. Welcome the participants, check their name off the list, and assign them to the ☐
computer that matches their number card.

B. Wait for manager to report the number of participants sent to the lab. ☐
- Count the number of participants
- Once the number of participants in the lab matches that reported by the manager →Confirm the number of participants with manager
- **At this time no more participants may join the experiment**
- **Messenger co-facilitator you will greet the participants**

C. Read aloud the following instructions:

- "**Welcome to our experiment**"
- "**Please do not touch the system until I signal the start of experiments**"
- "**Please do not speak to other participants in the lab**"
- "**Please do not use any other items, other than what I give you**"
- "**Please turn off all cell phones**"

D. Receive signal from manager that match-up is successful
- Ask participant to enter their student id number and sign in
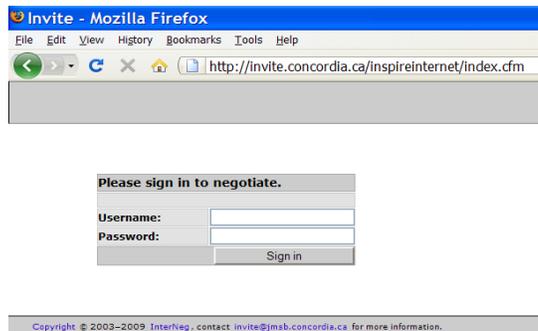
E. Verify that **all** participants see the welcome page
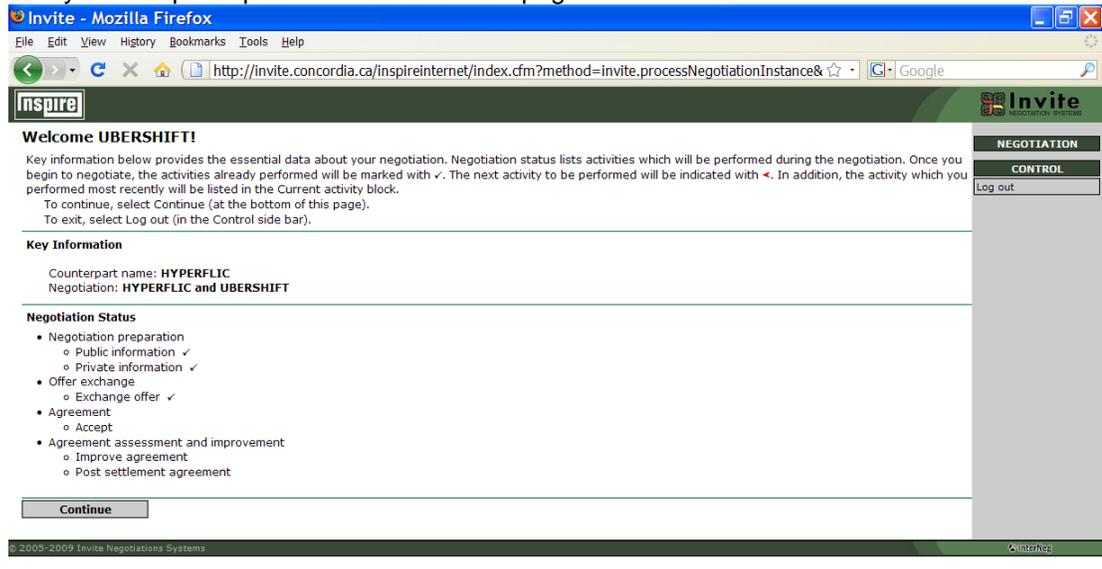
F.
- Confirm that participants in **both** labs have signed the consent form and see the above screen ☐
- Post on FirstClass that you are ready for **AMO**

G. Ask students to click continue on the welcome page ☐

Tell the participants:

"**The next page that you see is a short personality test. There are no right or wrong answers**"

H. Read the instructions for the AMO ☐

I. Make sure participants see this screen once they completed AMO ☐

J. Read the public instructions aloud ☐
   Ask if they have any questions
K. Make sure participants see this screen once they completed public information ☐

L. Read the private instructions aloud ☐
   Ask if they have any questions
M. Tell participants they will proceed to a **quiz** to help them understand the case ☐
O. Ask participants to turn to **System Guide** and tell them aloud: ☐

   - **"You are about to engage in negotiation with your counterpart"**

- **"You do so by proposing offers and sending messages to communicate with your counterpart"**
- **"The negotiation activities are on your right hand side: send message and offer, read last offer and view history"**

Read the orange box

- **"Once your time is up we will ask you to click end negotiation, but don't press it in the meantime or your session with be terminated and we can't get it back"**
- **"The bottom picture shows the view graph function that allows you to see the progress of the offers"**
- **"Click refresh to view new offers from the counterpart"**
- **"Once you have reached an agreement, just click End Negotiation. Don't worry about post-settlement analysis"**
- **"When we ask you to evaluate the Invite system at the end of negotiations, please disregard the screenshots shown before and consider the screens starting from now"**

- Ask if they have any questions
- Tell participants to click "continue"

P. Instruct participants:

"**After this point, please refrain from talking out loud. And if you have any questions, please raise your hand at any time and I will come to you.**"

Q. Inform co-facilitator that you are ready for negotiations and coordinate start time to 45 min and to start negotiations.

4. Start negotiation

A. Inform participants: ☐

- "**You have 45 minutes to negotiate**"
- "**Please proceed to make an offer and/or send a message**"

B. Write start and end time on board ☐

C. During negotiations, if participants finish negotiating before the deadline ☐
- go to them
- ask them to click on `End negotiation` and proceed to E

D. After the deadline, instruct participants to click `End negotiation` ☐

E. Instruct participants: **"Please proceed to Post-questionnaire and raise your hand** ☐
when you are done".

G. Inform manager and co-facilitator that you are done ☐

5. End experiment

A. When participants raise their hand to signal an end, ☐
- Thank them for their participation and tell them they can leave
- collect the printouts and consent form

B. Wait for everyone to leave ☐
- tidy up the lab
- logout and turn off computers
- lock the lab door

Watch out for:

A. Participants, who talk to each other and look at other screens.

B. Participants with difficulties, remind them that they can ask questions if they have any problems.

- Especially be careful not to give your opinion on the experiment, systems, negotiation etc. when answering questions, because this can bias the outcome.

- If there is a software problem, e-mail Shikui (FirstClass)

Logging back in a participant that terminated his browser window

Troubleshooting:

If the participants accidentally close their window **before** they start negotiating on Invite, they may log back in by going to:
http://invite.concordia.ca/inspireinternet/

Appendix I: System Guide

(1) Offer construction page

     (a) Gain Frame

Your profit of an offer represents the gains (in thousand $) you get compared to the worst ($0) possible offer.
If you make an offer with the value of 10 and it is accepted, then it means you gain $10,000 of profit.
The greater the value means the higher the profits.

(b) Loss Frame

Your expense for an offer represents the losses (in thousand $) compared to the best ($0) possible offer.
If you make an offer with the value of 10 and it is accepted, then it means you lose $10,000 of profit. **The greater the value means the higher the losses.**

(2) View history page
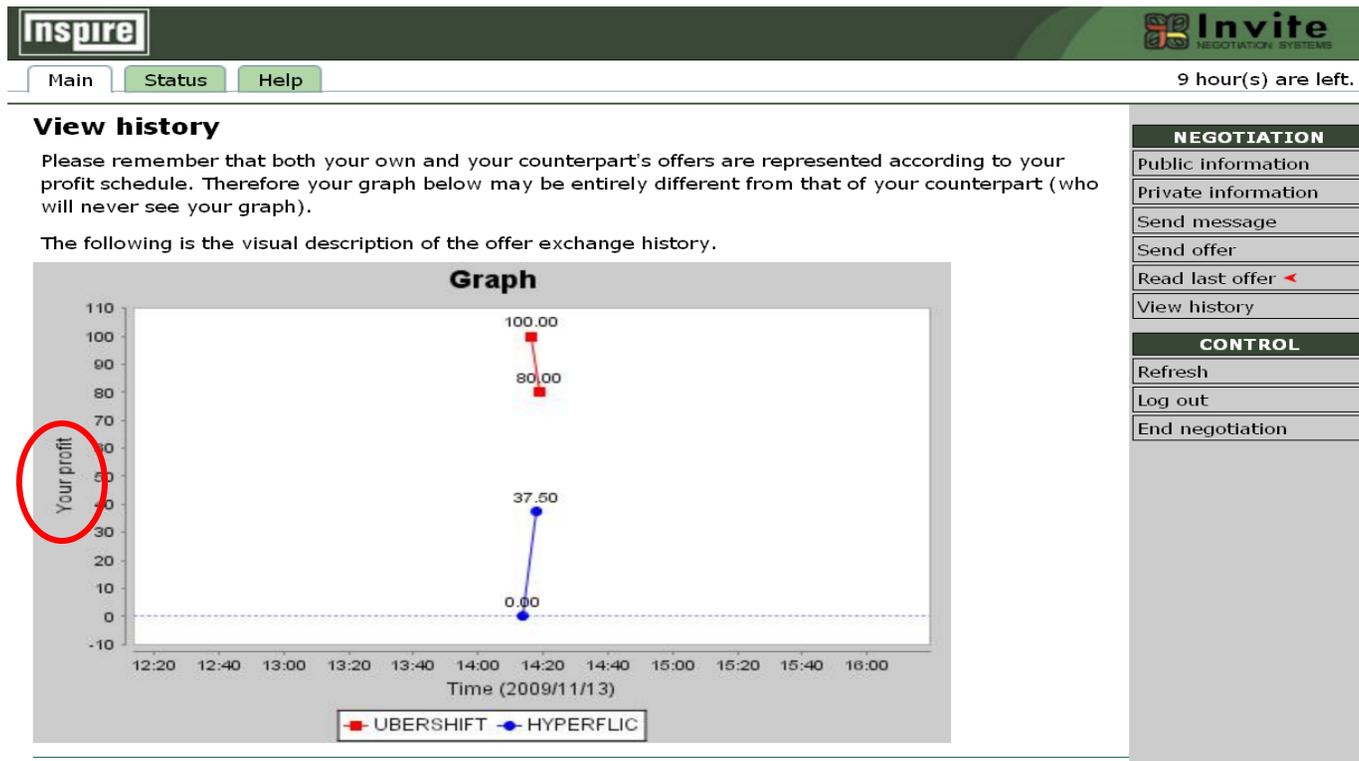
In the gain frame, the y-axis is presented as profit. In the loss frame, the same axis is shown as expense.

(2) Agreement page

Once you have reach an agreement or you wish to terminate all interaction with your counterpart, click "End negotiation".

Don't press "End negotiation", if you still wish to exchange offers and messages. Your negotiation **can't be reset** once you press this button.

Appendix J: Registration Form

Appendix K: Consent Form

This is to confirm that I agree to release the data collected in this experiment to the InterNeg research team headed by Dr. Gregory Kersten of the Department of Decision Sciences & MIS, John Molson School of Business, Concordia University.

A. Purpose
I have been informed that:

- The purpose of the research is to investigate the use and effectiveness of information technologies in electronic negotiation.

B. Procedures
I will:

- Participate in an experiment of no more than 2 hours;
- Follow the instructions given during the process;
- Use a computer and web browser to negotiate with another party; and
- Fill out questionnaires.

C. Conditions for participation
I understand that:

- The experimenters cannot impose any negative consequences on me should I decide to withdraw from the experiment. I am free to withdraw my consent and discontinue my participation in the experimental process at anytime.
- My identification information in this study is fully anonymous to the researchers.
- Only the instructor for the course will know my identity.
- The data for this study may be publish without revealing information that can identify me;
- I have the right to see any research report arising from data that I have contributed.

I have carefully studied the above and understand this agreement. By printing my name and signing this form, I freely consent and voluntarily agree to participate in this study.

Name: _____   Signature: _____
     (please print)

Date: _____

Appendix L: Sample Transcripts

The following is an unedited transcript of a participant playing the role of the retailer

(Hyperflic) in a **collaborative, loss frame** treatment.

UBERSHIFT accepted this offer on 2009-11-20 18:56:33 (GMT)

HYPERFLIC's(your) offer: 2009-11-20 18:51:52(GMT)

Issue	Option
Delivery time	8 days
Discount terms	6%
Financial terms	0%

I think we should both go for this offer. It's the lowest possible one if we want

This costs me $35, and you too right?

Your expense for this offer: 35

HYPERFLIC's(you) message: 2009-11-20 18:51:09(GMT)

nope those aren't my financial terms

UBERSHIFT's message: 2009-11-20 18:49:10(GMT)

```
35000
are your financial terms
100% = 0
88 = 6.25
... = 12.50
18.75
25
31.25
37.50
```

HYPERFLIC's(you) message: 2009-11-20 18:48:08(GMT)

my amount for your latest offer was 46.25

What was your amount for my latest offer? 8 days, 6% discount and 0% financial.

UBERSHIFT's message: 2009-11-20 18:46:37(GMT)

35000

UBERSHIFT's offer: 2009-11-20 18:46:11(GMT)

Issue	Option
Delivery time	7 days
Discount terms	9%
Financial terms	50%

just w ant to check w hat your amount is for this offer?

Your expense for this offer: 46.25

HYPERFLIC's(your) offer: 2009-11-20 18:45:40(GMT)

Issue	Option
Delivery time	8 days
Discount terms	6%
Financial terms	0%

How much does this come out to for you?

Your expense for this offer: 35

HYPERFLIC's(you) message: 2009-11-20 18:43:49(GMT)

oh
ok, gimme a second to see if I can come up w ith something that gives us
a low er than 50,000 expense. If not, w e should settle on the 50/50.
I'll respond in like 2 mins w ith a possible offer. If its no good,
let's go 50/50

UBERSHIFT's message: 2009-11-20 18:41:49(GMT)

nope,
those are the rates for my days?
those are the rates for your financial?
btw I think no matter w hat w e do the expenses w ill also total 100000
for both of us. So w e have to find something that w ill give us 50/50,
because thats the best possible thing.

HYPERFLIC's(you) message: 2009-11-20 18:40:05(GMT)

Your
latest one comes out to 55,000 for me, so I'd rather split it 50/50, so
you both have good and the same expenses. Unless there's a w ay to make
us both guess less than 50,000.
For the financial terms table, are your rates the follow ing?
100% = 0
88 = 6.25
... = 12.50

UBERSHIFT's message: 2009-11-20 18:37:11(GMT)

if I put 4,6 and 50 I get 50000 also. Do you think w e can go low er?

UBERSHIFT's offer: 2009-11-20 18:35:44(GMT)

58750, how about this one?

Issue	Option
Delivery time	5 days
Discount terms	7%
Financial terms	63%

Your expense for this offer: 55

HYPERFLIC's(you) message: 2009-11-20 18:34:49(GMT)

If I put it at 4, 6% and 50%, my total comes out to $50,000. Same for you?

HYPERFLIC's(your) offer: 2009-11-20 18:33:59(GMT)

How much will this offer come out for you?

Issue	Option
Delivery time	3 days
Discount terms	6%
Financial terms	38%

Your expense for this offer: 41.25

UBERSHIFT's message: 2009-11-20 18:32:58(GMT)

my
lowest expense is 12500 just like you
but the offer you sent me has the expense of 87500. If I do the same,
your expenses would be 87500 while mine would be 12500. So what happens
if we put it in the middle, say like 4 days, 6% and 50%?

HYPERFLIC's(you) message: 2009-11-20 18:31:48(GMT)

yup, they are delivery time, discount terms and financial terms

HYPERFLIC's(you) message: 2009-11-20 18:31:18(GMT)

Yup,
we should pick in between my lowest possible expenses and your lowest
possible expenses. My lowest expenses (without any "zero expense
choices") is 12500.
So if yours is something like 9500, we should settle on something that
will make both our expenses in between.

UBERSHIFT's message: 2009-11-20 18:30:43(GMT)

its exactly what I said before, the lowest expense for me will be the highest for you
so we have to pick something in the middle
by the way what are the factors you are using in calculating the expenses. Delivery Time, Discount terms, and F

HYPERFLIC's(your) offer: 2009-11-20 18:29:25(GMT)

Issue	Option
Delivery time	1 days
Discount terms	9%
Financial terms	13%

what does your lowest possible offer add up to if you don't have any expenses of zero?

Your expense for this offer: 12.5

UBERSHIFT's message: 2009-11-20 18:28:44(GMT)

6250 + 3750 + 2500 = 12500

im sure that when we use my lowest epxenses, it will make your expenses higher, and vise versa.

So we probably have to pick something in between

HYPERFLIC's(you) message: 2009-11-20 18:26:48(GMT)

How bout we each see how the lowest possible expenses we can have for the month. Besides zero.

If I pick my most beneficial situation, I will have expenses of 2500 + 3750 + 6250. So $12500

what are your lowest possible expenses?

UBERSHIFT's message: 2009-11-20 18:26:13(GMT)

did you get my other message?

HYPERFLIC's(you) message: 2009-11-20 18:25:16(GMT)

Hello

UBERSHIFT's offer: 2009-11-20 18:25:09(GMT)

Issue	Option
Delivery time	5 days
Discount terms	3%
Financial terms	50%

hey, how are you doing?
Since the goal is to minimize the expenses for both of us, how would like like to

Your expense for this offer: 63.75

The following is an unedited transcript of a participant playing the role of the producer

(Ubershift) in a **competitive, gain frame** treatment.

You accepted this offer on 2009-11-13 20:50:05 (GMT)
HYPERFLIC's offer: 2009-11-13 20:46:27(GMT)

Issue	Option
Delivery time	8 days
Discount terms	6%
Financial terms	0%

> What say you we split it at 6%? That halves my possible profit from Discount, but I think it will halve it for you as w

Your profit for this offer: 65

UBERSHIFT's(your) offer: 2009-11-13 20:44:36(GMT)

> The
> delivery time is good for me and I am willing to give you the deal on
> the financial terms. How would you say these discount terms work for
> you?

Issue	Option
Delivery time	8 days
Discount terms	5%
Financial terms	0%

Your profit for this offer: 68.75

HYPERFLIC's offer: 2009-11-13 20:40:41(GMT)

> Financial terms are good for me, and I can give you your delivery time if you rais

Issue	Option
Delivery time	8 days
Discount terms	7%
Financial terms	0%

Your profit for this offer: 61.25

UBERSHIFT's(your) offer: 2009-11-13 20:38:14(GMT)

Issue	Option
Delivery time	8 days
Discount terms	2%
Financial terms	0%

The issue that is most important to me is deliver time. How about this offer? What in this works for you and what d

Your profit for this offer: 80

HYPERFLIC's offer: 2009-11-13 20:36:01(GMT)

Issue	Option
Delivery time	3 days
Discount terms	9%
Financial terms	13%

I need lower financing terms from your end. What issue is most important for you?

Your profit for this offer: 25

UBERSHIFT's(you) message: 2009-11-13 20:33:56(GMT)

I am doing well as well. Thank you for asking.

UBERSHIFT's(your) offer: 2009-11-13 20:32:58(GMT)

Issue	Option
Delivery time	6 days
Discount terms	5%
Financial terms	63%

I'm sorry but the terms of your last offer do not work for me. How about this offer?

Your profit for this offer: 68.75

HYPERFLIC's offer: 2009-11-13 20:30:53(GMT)

Issue	Option
Delivery time	2 days
Discount terms	8%
Financial terms	0%

I am doing well today, thanks for asking. How are you?

Your profit for this offer: 20

UBERSHIFT's(your) offer: 2009-11-13 20:28:54(GMT)

Issue	Option
Delivery time	6 days
Discount terms	4%
Financial terms	75%

Hello. I hope that you are doing well today. This is my opening offer.

Your profit for this offer: 75

HYPERFLIC's offer: 2009-11-13 20:28:08(GMT)

Issue	Option
Delivery time	0 days
Discount terms	10%
Financial terms	0%

Your profit for this offer: 0