Negotiation Support Systems in Budget Negotiations: An Experimental Analysis

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ABSTRACT: This paper reports the results of an experiment investigating the differences between budget negotiations conducted on an electronic negotiation support system (NSS) and those conducted face-to-face. The negotiation setting consisted of a supervisor and a subordinate negotiating a performance budget for the subordinate. Results revealed that when supervisor performance expectations were incongruent with subordinate capability, face-to-face negotiations hit impasse at a significantly higher rate than NSS negotiations. These results held regardless of the amount of concession needed to reach consensus, and they support the contention that single-issue distributive negotiations, such as budget negotiations, can benefit from the use of an NSS. In a secondary analysis of subordinate performance after the budget negotiation, we found that NSS subordinates perceived more task conflict, which positively influenced postnegotiation performance, whereas face-to-face subordinates perceived less relational conflict, which worked through satisfaction to positively influence postnegotiation performance. This result adds to the literature by clarifying the roles that communication mode plays in a negotiation and a negotiation's aftermath.

Journal of Management Information Systems / Winter 2005–6, Vol. 22, No. 3, pp. 351–381.

0742–1222 / 2006 $9.50 + 0.00.

KEY WORDS AND PHRASES: budget negotiation, distributive negotiations, negotiation impasse, negotiation support systems (NSS).

THERE ARE A NUMBER OF ORGANIZATIONAL SETTINGS in which negotiations occur, such as salary, price, and budget negotiations. Although these negotiations have historically occurred in face-to-face settings, the development of negotiation support systems (NSS) in recent years has provided an alternate mechanism for conducting such negotiations. NSS have the potential to mitigate some of the process losses inherent in face-to-face budget negotiations while also offering potential cost savings [48, 49]. The use of NSS to improve negotiation processes and outcomes has received some attention in the information systems literature [44, 45, 46, 48, 49]. However, prior research has not investigated the effects of NSS in the context of budget negotiations. There is a need for research regarding the use of NSS for budget negotiations because they are a type of single-issue distributive negotiation that is important, unique, and common across firms [3, 70]. The objective of this study is to experimentally compare budget negotiations conducted via an NSS to those conducted face-to-face.

Budget negotiations typically occur in face-to-face settings and conclude with the parties either in agreement or at an impasse, but they are unique relative to other forms of negotiation in two respects. First, impasse in standard bilateral monopoly negotiation is resolved by third-party arbitration or withdrawal, but impasse in budget negotiations offers neither option. Budget negotiation impasses are resolved by fiat with the supervisor setting the budget [70]. Second, the outcome of a bilateral monopoly negotiation defines the payoffs to the negotiating parties, but in budget negotiations, payoffs are determined by subordinate performance *after* the budget has been set. Consequently, budget negotiations are only an intermediate step in determining payoffs [29]. In a budget negotiation, impasse takes on added significance because of the potential demotivating effect on subsequent subordinate performance. Fisher et al. [29] report that when budget negotiations reach an impasse, subordinate work performance drops 20 percent, on average, as compared to when the supervisor and subordinate reach agreement on a budget.

The key question addressed in the current study is whether the relatively sterile environment of a computer-mediated budget negotiation can attenuate the confrontational aspects inherent in a face-to-face negotiation setting, potentially reducing an impasse. However, we also investigate the relationships among negotiation modality, perceptions of the negotiation, and postnegotiation subordinate performance. To examine these issues, we conducted an experiment made up of 65 dyads containing a supervisor and subordinate, partitioned by negotiation modality and by whether the information provided to the supervisor regarding subordinate performance was congruent or incongruent with the subordinate's actual capability. The NSS was a Web-based budget negotiation system designed and developed for this study.

Results revealed that when supervisor performance expectations were incongruent with subordinate capability, dyads negotiating face-to-face had a significantly higher rate of impasse than dyads negotiating on the NSS. Moreover, the results showed that in negotiations characterized by incongruent expectations, face-to-face dyads were significantly more likely to reach an impasse regardless of the amount of concession needed. Our findings indicated that persistence in "trying to win" the negotiation was significantly more common in face-to-face negotiations than in NSS negotiations when supervisor performance expectations were incongruent with subordinate capability. In a secondary analysis of postnegotiation subordinate task performance, we found evidence that modality influences postnegotiation behavior through different channels. Experimental participants negotiating on an NSS perceived more task-related conflict, and this issue-based discourse positively influenced postnegotiation performance. Face-to-face participants, on the other hand, perceived less relational (interpersonal) conflict, which increased satisfaction and led to higher postnegotiation performance. Overall, our results provide support for the notion that an electronically mediated negotiation can reduce impasse rates in budget negotiations and add theoretical support to the role of modality on postnegotiation performance issues.

In a recent issue of *Reader's Digest,* it was noted that eBay Motors sold over 450,000 used cars in 2003 [54]. The article goes on to indicate an industry belief that haggling online is easier than haggling in person. This anecdote exemplifies the results of our study. In a single-issue distributive negotiation where negotiators come to the table with divergent positions, computer-mediated communication (CMC) is a superior means of conducting the negotiation. While our study focused on budget negotiations, it appears that CMC can benefit other single-issue distributional negotiations as well.

Background and Hypotheses

NSS MAKE NEGOTIATIONS MORE CONVENIENT for physically separated negotiators and can mitigate the cognitive limitations/biases as well as the socioemotional problems inherent in face-to-face negotiation [33]. There has been some research in the information systems literature investigating NSS effects. In multi-item negotiation experiments, Delaney et al. [26] and Foroughi [32] report that the use of an NSS produced higher joint outcomes and better contract balance than negotiations devoid of computer support. Although Delaney et al. [26] found no differences in contract balance between negotiators using an NSS and those using only a decision support system (DSS), they did find some evidence that NSS users achieved higher joint outcomes than negotiators using only a DSS. Moreover, they found that satisfaction was significantly higher for NSS users as compared to negotiators using only a DSS.

These results largely support the hypotheses laid out by Lim and Benbasat [49], indicating that the DSS component of the NSS is responsible for higher, more balanced joint outcomes, whereas the communication component enhances satisfaction. The Lim and Benbasat theoretical framework for NSS does not apply to this research because their boundary conditions precluded single-issue distributive negotiations,

which is our budget negotiation setting. In our single-issue budget negotiation, the DSS component of the NSS is less important because of the simplicity of a single-issue negotiation. Consequently, the communication component of the NSS is of main importance in this research.

Negotiation Mode and Impasse

Social presence theory and media richness theory both predict that communication medium differences should affect task outcomes. Short et al. [63] define social presence as the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships. According to social presence theory, text-based CMC leads to diminished social presence because of the inability of the medium to transmit information about facial expression, direction of looking, and other nonverbal cues. Similarly, media richness theory postulates that face-to-face communication has a multiplicity of cues that are absent in text-based communication [22]. Both theories rely on the fact that a significant portion of a message's meaning is drawn from the intimacy of face-to-face interaction [27].

However, it is an open question whether rich media (face-to-face) facilitates or hinders the process of budget negotiation. In a recent negotiation literature review, Bazerman et al. [9] note that the preponderance of evidence supports face-to-face negotiations over audio and text-based negotiations in terms of truth telling, clarity, and cooperation. On the other hand, Bazerman et al. observe evidence that, under certain conditions, a case can be made for alternatives to face-to-face negotiation. For example, Lewis and Fry [47] found that negotiators with a competitive orientation used fewer pressure tactics and had fewer impasses when there was a barrier to block visual stimuli, whereas negotiators with a cooperative orientation were unaffected by the barrier. Negative effects caused by face-to-face communication have also been found in negotiations between high and low Machiavellian negotiators and when negotiators were held accountable for their outcomes [14, 35].

Evidence exists that the social presence or the media richness inherent in face-to-face negotiations can lead to escalation of conflict depending on the level of tension in the negotiation. Escalation represents an increase in the intensity of conflict, and it has been studied in face-to-face and computer-mediated settings. Across a series of experiments, Van de Vliert and Euwema [71] found that when a confederate escalated conflict in face-to-face meetings, the most common response was forcing behavior, which is defined as dominating, assertive, and self-centered behavior. When conflict escalated in face-to-face meetings, Van de Vliert and Euwema [71] found that forcing behavior was reciprocated with forcing behavior. In a direct response to the Van de Vliert et al. study, Dorado et al. [28] performed an experiment where confederates escalated conflict in computer-mediated meetings. They found that, as the level of conflict escalated, the use of forcing behavior decreased and the use of avoidance behavior increased. Dorado et al. [28] conclude that the norm of reciprocity in face-to-face meetings, where forcing behavior is met with forcing behavior, does not necessarily carry over to computer-mediated meetings.

Conflict and its management are fundamental to the negotiation process [55]. Walton's [78, 79] two-phase model of conflict management has been called the least common denominator relative to the plethora of conflict models in the literature [56]. The model's first phase, differentiation, involves the identification of differences between negotiating parties, the rationale for the differences, and the severity of the differences. In this phase of the model, conflict is open, and exchanges can be sharp. In the second phase, integration, negotiators reconcile their differences through acknowledgment of shared similarities and act to positively manage their conflict as they work to a solution. For a successful negotiation, it is essential for negotiators to effectively move through both differentiation and integration phases. However, the negotiation can be truncated if forcing behavior is met with forcing behavior in the differentiation stage of the negotiation, as has been found to prevail in face-to-face negotiations [31, 71]. On the other hand, in a study of group support systems (GSS), Poole et al. [55] found that hard bargaining tempered by avoidance promoted movement to the integration phase of the negotiation where a balanced outcome could be reached.

Given the zero-sum distribution of a budget negotiation, the negotiation process has the propensity to elicit distributive justice concerns that are interpreted as forcing behavior—that is, the perception that one side is trying to take the lion's share of the allocation.[1] In our production budget negotiation setting, we expect distributive justice concerns and the perception of forcing behavior to be most common when negotiators do not possess a shared understanding of production capability. The absence of a shared understanding in a negotiation has been shown to limit gains from integration as negotiators tend to anchor on their personally held assumptions [9, 67, 80]. Further, Thompson and Hastie [67] found that anchors are set and negotiation frames developed after a very short segment of initial interaction. In this study's negotiation of a production budget, shared understanding is manipulated by setting the supervisor's prenegotiation expectations equivalent to or significantly higher than the subordinate's actual production capability. When supervisor prenegotiation expectations are significantly higher than subordinate performance capability, thus decreasing the extent of shared understanding, we expect negotiators to anchor on their positions, thereby creating distributive justice concerns and perceptions of forcing behavior [67]. In face-to-face negotiations, forcing behavior is expected to be reciprocated with forcing behavior, increasing the likelihood of negotiation impasse [71]. In contrast, forcing behavior in NSS negotiations is expected to be tempered with avoidance behavior that attenuates conflict, thereby reducing the likelihood of a negotiation impasse [28, 55]. The level of shared understanding, operationalized through the congruence of prenegotiation expectations, is designed to act as a moderator in our analysis of the effect of modality on negotiation impasse.

Figure 1 presents our research model for negotiation impasse. Determinants of negotiation impasse in our model are negotiation modality, congruency of prenegotiation expectations, and initial negotiation differences (initial bid/counteroffer differences). Congruency of prenegotiation expectations and negotiation modality are exogenous to the negotiation and are manipulated in our study, but initial negotiation differences,

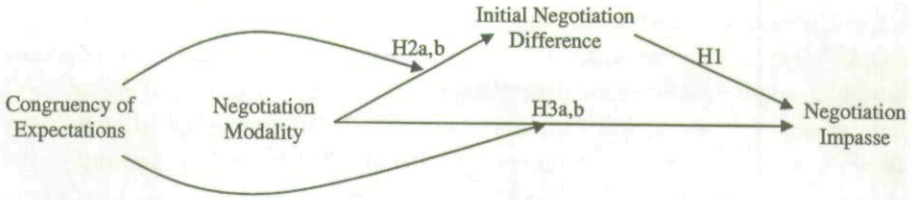


Figure 1. Model of the Effect of Modality on Negotiation Impasse and Related Hypotheses. *Notes:* H1—regardless of the congruency of expectations and negotiation modality, larger initial negotiation differences lead to a greater likelihood of negotiation impasse. *Incongruent* prenegotiation expectations: H2a—when supervisor expectations are *incongruent* with subordinate capability, initial negotiation differences will be large but not different between face-to-face negotiations and NSS negotiations; H3a—when supervisor expectations are *incongruent* with subordinate capability, face-to-face negotiations will experience more impasse than do NSS negotiations, controlling for the severity of initial negotiation differences. *Congruent* prenegotiation expectations: H2b—when supervisor expectations are *congruent* with subordinate capability, initial negotiation differences will be larger in face-to-face negotiations than NSS negotiations; H3b—when supervisor expectations are *congruent* with subordinate capability, there will be no difference in impasse between face-to-face negotiations and NSS negotiations, controlling for the severity of initial negotiation differences.

as characterized by initial bid/counteroffer differences, are endogenous to the negotiation and are revealed when the negotiation commences. Our first hypothesis deals with the effect of initial negotiation differences on impasse, apart from our experimental manipulations of expectation congruency and negotiation modality. Following Walton's framework, an unsuccessful negotiation is premised upon the inability to resolve differences in early stages of the negotiation—that is, differences large enough to prevent an integration phase of the negotiation from occurring [78, 79]. In a distributional negotiation, such as our budget negotiation, more severe early stage negotiation differences make it difficult for the negotiating parties to appreciate the relative positions taken and create concern for the level of concession needed to reach consensus [67]. We expect that larger initial negotiation differences, as characterized by initial bid/counteroffer differences, will lead to a greater likelihood of negotiation impasse, which is our first hypothesis.

> *H1: Regardless of the congruency of expectations and negotiation modality, larger initial negotiation differences lead to a greater likelihood of negotiation impasse.*

The relationship between negotiation modality and initial bid/counteroffer difference is expected to be moderated by the congruence or incongruence of prenegotiation expectations. Incongruent prenegotiation expectations can independently produce severe initial bid/counteroffer differences in a negotiation. Negotiators that start a negotiation absent a shared understanding of subordinate production capability are expected to have large initial differences, regardless of modality. On the other hand,

when congruent prenegotiation expectations exist, we expect that face-to-face negotiations will experience more severe initial differences than do NSS negotiations. This expectation is based on the finding by Poole et al. [55] that face-to-face negotiators tended to bargain harder in the early stages of negotiation. Poole et al. found that face-to-face negotiators use of initial hard bargaining was effective because it was not likely to precipitate a contentious relationship. They did not observe the hard bargaining strategy in computer-mediated negotiations and suggested that the richness and norms of face-to-face communication allowed the use and success of the strategy. Without the pressure of incongruent prenegotiation expectations, we expect results similar to Poole et al. [55]. When a budget negotiation begins and the supervisor and subordinate share an understanding of subordinate production capability, we expect face-to-face negotiators to initially bargain harder under the assumption that large initial differences can be integrated later in the rich face-to-face modality. The preceding discussion leads to our next hypotheses.

H2a: When supervisor expectations are incongruent *with subordinate capability, initial negotiation differences will be large but not different between face-to-face negotiations and NSS negotiations.*

H2b: When supervisor expectations are congruent *with subordinate capability, initial negotiation differences will be larger in face-to-face negotiations than NSS negotiations.*

The key relationship in Figure 1 is between negotiation modality and negotiation impasse, and this relation is expected to be moderated by the level of congruence of prenegotiation expectations. While a shared understanding with respect to negotiation issues cannot ensure consensus, it can act to reduce the perception of forcing behavior because negotiators understand one another's positions [9, 24, 67]. Absent a shared understanding, negotiators are more likely to misinterpret negotiation differences as forcing behavior designed to win the negotiation [28]. Rahim [58] and Rahim and Bonoma [59] align forcing behavior with the dominating style of conflict management because it involves a win–lose orientation with forcing behavior used to win position. Following the literature, forcing behavior in face-to-face negotiations is reciprocated, and reciprocated forcing behavior results in impasses because it does not allow for compromise [55, 71]. In NSS negotiations, on the other hand, forcing behavior should more commonly be met with conflict avoidance behavior that mitigates the deleterious effects of conflict. As Rahim et al. [60] point out, avoidance is an uncooperative style of conflict management because it involves ignoring conflict, but it can be advantageous when it allows "cooling down" or acquiescence [38, 55]. Relative to face-to-face negotiations, NSS negotiations characterized by incongruent prenegotiation expectations should have less impasse since avoidance behavior can foster acquiescence [55].

Given that reciprocated forcing behavior leads to an impasse and prevails in face-to-face negotiations, we predict that modality produces a separate determinant of impasse independent of the severity of initial negotiation difference, but this modality

effect is conditional upon the absence of a shared understanding of subordinate production capability [31, 71]. Our hypotheses are as follows.

> *H3a: When supervisor expectations are* incongruent *with subordinate capability, face-to-face negotiations will experience more impasse than do NSS negotiations, controlling for the severity of initial negotiation differences.*
>
> *H3b: When supervisor expectations are* congruent *with subordinate capability, there will be no difference in impasse between face-to-face negotiations and NSS negotiations, controlling for the severity of initial negotiation differences.*

In summary, we predict that the more severe the initial negotiation difference, the more likely an impasse is to result. When prenegotiation expectations are congruent, we predict that face-to-face negotiators will naturally take an initial harder bargaining position increasing initial negotiation differences [55]. We predict no direct effect of negotiation modality on an impasse when prenegotiation expectations are congruent because a shared understanding of subordinate production capability should not lead to the perception of forcing behavior. On the other hand, when negotiators begin a negotiation with incongruent prenegotiation expectations, we expect that belief asymmetry will create relatively severe initial differences and produce a signal of forcing behavior, regardless of modality. In face-to-face negotiations, a signal of forcing behavior is expected to be reciprocated and lead to an impasse, whereas, in NSS negotiations, a signal of forcing behavior is expected to most often be met with avoidance, thereby reducing the likelihood of impasse. Therefore, we predict two determinants of impasse when incongruent prenegotiation expectations exist: (1) the magnitude of initial negotiation differences and (2) the face-to face negotiation modality. Because impasse and the initial negotiation differences are dyadic phenomenon, the aforementioned hypotheses are based upon a dyadic unit of analysis.

Negotiation Mode and Postnegotiation Performance

A unique aspect of budget negotiations is that the negotiation's outcome (i.e., the negotiated or supervisor-set budget) does not represent closure. Payoffs to subordinates and supervisors are determined by postnegotiation subordinate performance in relation to the budget. Fisher et al. [30] demonstrate that postnegotiation subordinate performance is influenced by the negotiation outcome, and they suggest that this is a function of subordinate commitment to the budget. In the same vein, Locke and Latham [50] indicate that goal commitment is higher when the goal-setting process is viewed as legitimate, and they suggest that legitimacy is influenced by perceptions of the goal-setting process. Following Locke and Latham [50], we expect that subordinates' perceptions of the negotiation process will affect postnegotiation subordinate performance, and, unique to this study, we expect that these perceptions are influenced by the negotiation's modality. We focus only on subordinate perceptions and not supervisor perceptions because only subordinates perform the postnegotiation task. Figure 2 illustrates the proposed relationships and hypotheses.

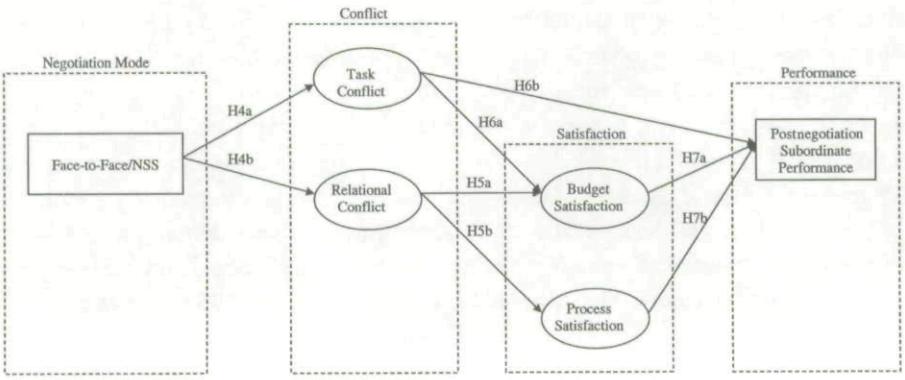


Figure 2. Theoretical Research Model—Postnegotiation Subordinate Performance

Negotiation Mode

Social information processing theory argues that users of CMC adapt to the lack of nonverbal cues by changing their linguistic strategies [74]. Tests of the theory have found that CMC partners use deeper probes during focused communication [75, 76]. In essence, CMC partners substitute more concentrated verbal cues to make up for the lack of nonverbal cues [40]. This substitution is important in communication that has the purpose of uncertainty reduction—the key facet of a budget negotiation. Strategies to gather uncertainty-reducing information can be passive, indirect, or interactive [11]. Passive strategies involve casual observation; indirect strategies involve proactive, but passive, efforts to gather information; and interactive strategies involve direct interchange [10]. While all of these information gathering strategies are available in face-to-face settings, only interactive strategies in the form of nonverbal direct interrogation are available in pairwise CMC [61]. Following this availability argument, Tidwell and Walther [69] found that partners in CMC used a larger amount of direct interrogation in reducing uncertainty than did face-to-face partners. Based on social information processing theory and the evidence in support of it, subordinates using an NSS with only direct interrogation available are expected to use it to make deeper issue-related probes relative to subordinates negotiating face-to-face. This interrogation is expected to focus on the negotiation task and therefore produce a perception of higher task-related conflict by NSS subordinates than by face-to-face subordinates, which is our next hypothesis.

> *H4a: Subordinates using an NSS will perceive higher levels of task conflict relative to subordinates negotiating face-to-face.*

In face-to-face communication, a more balanced set of uncertainty reduction strategies are used due to availability and social appropriateness [69]. Interactive strategies of uncertainty reduction are riskier than passive and indirect strategies because direct questioning can violate the norms of social appropriateness. Communication research has found that, in face-to-face communication, interactants balance their use

of uncertainty-reducing strategies to appear polite [12, 13]. In addition, social penetration theory indicates that, in face-to-face communication, issues of relationship develop previous to deeper revelations, but the literature indicates that, in CMC, answers to questions requiring deeper revelations are often requested early in relationships [1, 77]. Although less efficient, face-to-face communication aimed at reducing uncertainty is bound by rules of appropriateness that are less threatening and more polite than those practiced in CMC [77]. Accordingly, we expect that the norms of face-to-face communication will create a perception of less relational (i.e., interpersonal) conflict for face-to-face subordinates and, by contrast, NSS subordinates will perceive higher relational conflict, leading to the following hypothesis.

H4b: Subordinates using an NSS will perceive higher levels of relational conflict relative to subordinates negotiating face-to-face.

Perceptions of process can affect after-process performance, and, accordingly, we expect that perceptions of the budget negotiation process will have carryover effects when subordinates are required to perform a postnegotiation task [52]. We hypothesize that negotiation modality influences postnegotiation behavior by working through perceptions borne from the negotiation. Implicit in H4a and H4b is that perceived conflict mediates the effect of modality on postnegotiation subordinate performance by capturing differences in the nature of the discourse used in the negotiation.[2]

Conflict

Prior research indicates that conflict is multidimensional [25]. Findings indicate that conflict can have either an enhancing effect or a negative effect, depending on its type. Task conflict is functional, and it is focused on how to achieve a common objective [41, 42, 43]. Dysfunctional conflict tends to focus on personal incompatibilities. This type of conflict is referred to as relational conflict, and it transpires when disagreement is perceived as personal criticism [21, 25, 39]. In a summary of the literature, Simons and Peterson [64] conclude that task conflict can be productive because it engenders a cognitive understanding of task issues. They conclude that relational conflict is counterproductive because effort and energy are pulled away from the issue at hand and focused on the individual.

Research on group-based conflict has most often studied satisfaction and performance as causally dependent on the level of conflict [25]. In a meta-analysis of this literature, De Dreu and Weingart [25] analyzed the relationship between task and relational conflict and satisfaction and performance. Relational conflict was found to produce a consistently strong negative relationship with satisfaction. Proximate to the systems literature, Barki and Hartwick [7] found that relational conflict had a significantly negative effect on process satisfaction in system development environments. De Dreu and Weingart [25] indicate that the satisfaction results are not surprising given that relational conflict is interpersonal and emotional and therefore likely to trigger an affective response. Our next hypotheses follow.

H5a: Negotiation conflict perceived as relational will have a negative relationship with how satisfied the subordinate is with the negotiated budget.

H5b: Negotiation conflict perceived as relational will have a negative relationship with how satisfied the subordinate is with the negotiation process.

De Dreu and Weingart's [25] meta-analysis shows that task conflict has a more tenuous relationship with satisfaction than does relational conflict. Task conflict can include constructive discussions that focus on outcomes. Disagreements over task have the ability to take on a productive orientation. Regardless, De Dreu and Weingart found that task conflict still tended to decrease satisfaction. Whereas task conflict has the propensity to be beneficial, empirics indicate that experiencing such conflict does not engender a sense of satisfaction. Therefore, we expect that task conflict emanating from disparate viewpoints on budget size leads to dissatisfaction, which is the basis for our next hypothesis.

H6a: Negotiation conflict perceived as task related will have a negative relationship with how satisfied the subordinate is with the negotiated budget.

We make no hypothesis for task conflict with respect to satisfaction with the negotiation process due to the nature of task conflict. Task conflict focuses on an outcome, which, in our setting, is the negotiated budget.

The relationship between conflict and task performance is complex [25]. Jehn [41, 42] is credited with coining the term *task conflict,* and her work is considered seminal to the notion that task conflict can enhance task performance. However, of the 24 studies analyzed by De Dreau and Weingart [25], only six report a positive correlation between level of task conflict and task performance. When type of task is considered as a moderator, they find that production tasks are more likely the beneficiary of task conflict than decision tasks. De Dreau and Weingart [25] conclude that the simplicity of production tasks allow task conflict to bring issues to the fore without creating a debilitating conflict-based cognitive load. Our single-issue negotiation does not require the balancing of multiple issues, and our negotiation is focused on a production task. Accordingly, we expect that task conflict has the propensity to enhance postnegotiation subordinate performance, and our final conflict-based hypothesis is as follows.

H6b: Negotiation conflict perceived as task related will have a positive relationship with postnegotiation subordinate production performance.

Satisfaction

Few empirical settings offer the ability to measure satisfaction with respect to a phenomenon and then directly measure performance. Taken from the marketing literature, one such setting is the relationship between merchandise and service quality, customer satisfaction, and store performance [2, 53, 82]. Empirics from this literature indicate that customer satisfaction enhances performance and fully mediates the effects

of perceived merchandise and service quality on buying behavior [4]. Theoretically, this finding aligns with Bagozzi's [5] framework that indicates appraisal leads to an affective response, which then leads to behavior. These empirics and theory, although not proximate to the systems literature, are relevant to our budget negotiation setting. As noted, we expect that monitoring processes in the negotiation results in perceived conflict. Further, evaluation of the negotiation process and outcome are expected to generate affective responses—that is, satisfaction with negotiation and satisfaction with the final budget. Following Bagozzi's framework, satisfaction is expected to enhance postnegotiation subordinate performance and fully mediate the effects of perceived conflict emanating from the negotiation. This leads to our satisfaction-based hypotheses:

H7a: Satisfaction with the final budget will have a positive relationship with postnegotiation subordinate production performance.

H7b: Satisfaction with the negotiation process will have a positive relationship with postnegotiation subordinate production performance.

H4 through H7 support the analysis of the channels through which negotiation modality affects postnegotiation behavior. Because perceptions drawn from the negotiation are an individual phenomenon, H4 through H7 are based upon an individual unit of analysis.

Method

Setting

WE USED A LABORATORY EXPERIMENT TO STUDY the effect of communication modality on budget negotiation, and the basic experimental design crossed communication mode in the negotiation (NSS and face-to-face) with prenegotiation expectations (congruent and incongruent). The experimental unit was a dyad that consisted of a supervisor and subordinate. In prenegotiation trials, subordinates acquired knowledge of their performance capability on a simple decoding task, and this knowledge was not shared with supervisors. Supervisors were given information that they believed to be an average performance measure for some randomly selected group of subordinates. However, each supervisor was being told exactly their subordinate's capability (i.e., performance on the final subordinate practice trial) plus a constant of either five or 20. Congruent prenegotiation expectations existed when supervisor's believed average subordinate capability was only five units higher than the subordinate's actual capability. Conversely, incongruent prenegotiation expectations existed when supervisors believed that an average subordinate could produce 20 more than their subordinate actually produced in their final practice trial.[3] Dyads negotiated a production budget for the decoding task. Subordinates opened the negotiation, but supervisors retained final budget-setting authority [30]. Competing incentives existed between supervisors and subordinates, and postnegotiation subordinate performance deter-

mined payoffs for negotiating dyads. Following Fisher et al. [29, 30], compensation contracts were as follows:

$$P_{subordinate} = \begin{cases} F & \text{if } X \le B \\ F + A(X - B) & \text{if } X > B \end{cases} \quad (1)$$

$$P_{supervisor} = \begin{cases} R(DX - F) & \text{if } X \le B \\ R\big(DX - (F + A(X - B))\big) & \text{if } X > B, \end{cases} \quad (2)$$

where P is compensation; F is subordinate fixed compensation; A is subordinate compensation per unit of production over budget; X is postnegotiation subordinate performance; B is budget; D is profit, exclusive of subordinate compensation, per unit produced; and R is supervisor's percentage of firm profit.

Equation (1) represented the subordinate's contract, and it is a budget-based, slack-inducing contract with slack defined as the difference between the subordinate's ability and the budget—that is, subordinates prefer positive slack. Subordinates maximized their compensation as the budget approached zero and they produced to their capability.[4] The supervisor's contract in Equation (2) was based on firm profits, and supervisors maximized their compensation as subordinate production increased and subordinate compensation decreased. The parameters used in this experiment for the contracts described in Equations (1) and (2) were as follows: F = \$1.00, A = \$0.20, D = \$0.08, and R = 100 percent.[5]

As Fisher et al. [29] note, a budget above the subordinate's capability provided no incentive for the subordinate to exert effort. A low budget ensured subordinates incremental compensation for incremental effort and motivated subordinates to their capability maximum. Supervisor incentives were more complex because they had to trade off the production-enhancing aspects of low budgets and their concomitant high subordinate compensation against production-reducing aspects of high budgets and their concomitant low subordinate compensation. In essence, supervisors wanted budgets that motivated significant subordinate effort but one that did not contain significant amounts of slack.

Experimental Participants and Design

Participants consisted of 174 graduate students at a large southwestern university. Participants were part of a single graduating class that was participating in a seminar series when recruited for the experiment. Formal discussions with the department chairman indicated that these students had been through classes, program mixers, and this seminar series together. Our participants had a strong group affiliation and represent an "ingroup" [52].[6] Participants were given class credit for participating in the experiment. At recruitment, they listed experimental sessions that they could attend, their ten best acquaintances in the seminar, and completed the Rahim Organization Conflict Inventory (ROCI) [57]. Participants were assigned to sessions based

upon their stated attendance availability. Within experimental sessions, participants were randomly assigned to dyads; within dyads, participants were randomly assigned the role of either supervisor or subordinate; and then each dyad was randomly assigned to a treatment cell. After dyad assignments, the acquaintance lists were checked to determine if a negotiating dyad contained participants that knew one another—when dyads contained acquaintances, they were randomly reassigned within that experimental session.[7]

Procedure

Our experimental task was identical to that of Fisher et al. [29, 30], and theirs was adapted from a task created by Chow [17]. The task involved the decoding of numbers to letters. Participants received paper decoding sheets that acted as keys for each experimental decoding trial. Participants first performed a two-minute practice decoding trial to make certain that they understood the decoding task. All participants then completed three, five-minute decoding trials. (Separate and distinct decoding sheets were provided for the practice, each trial, and the final postnegotiation performance trial.) Subordinates were paid $0.005 (one-half cent) for each correctly decoded item in a five-minute trial to ensure effort. Moreover, they received continuous real-time feedback on the number of items correctly and incorrectly decoded during a decoding trial. Supervisors also performed three, five-minute decoding trials, but they were not paid, nor were they given any feedback with respect to their performance. This was done so that supervisors understood their subordinate's task, but they were not biased in the budget-setting process by exact knowledge of their own performance.

Worked examples were used to illustrate the compensation schemes, and these were followed by a set of questions on the compensation schemes. An incorrect response to a compensation scheme question resulted in an explanation to ensure that participants understood the economic incentives inherent in the budget negotiation outcome. The next step in the experiment involved the supervisor and subordinate negotiating the budget. Participants were not aware of whom their negotiation partner was, nor were they aware of whether they would be a supervisor or a subordinate until immediately before the negotiation.

In the face-to-face treatment, each dyad was taken to a separate breakout room where the negotiation was conducted. Participants were then told whether they were the supervisor or subordinate and were asked to introduce themselves. They were then handed a folder containing negotiation instructions, formulas for calculating supervisor and subordinate pay, and a bid/offer sheet. In addition, the supervisor's folder contained a sheet indicating average subordinate performance with either the subordinates final practice trial total plus five or plus 20 (i.e., the congruent/incongruent prenegotiation expectations manipulation). Participants were given identical calculators and were instructed to write all bids and counteroffers on a bid/offer sheet.

In the NSS treatment, each subject was seated at a desktop computer with an empty seat between participants. Subordinates were at the back of the room while supervi-

sors were at the front of room. Before commencing with the actual negotiation, participants were trained using a single-user version of the NSS that only showed each subject's own comments and automatically responded with fixed counteroffers when the subject entered an offer. The training system also offered pop-up windows explaining system functionalities, and participants were encouraged to ask questions if they did not understand any NSS component.

The NSS was a Web-based system containing multiple frames: a display of bids and counteroffers, a text box for entering bids and counteroffers, a payoff calculator, a chat window, a textual display of all chat, a large bold display of each negotiator's name, and for supervisors, a display of average subordinate performance (see Figure 3).[8] The NSS's primary purpose was to facilitate electronic communication, but it also offered decision support by calculating payoffs for "what if" analyses during negotiations. Moreover, the NSS forced each participant to confirm his or her bid upon submission and disallowed counterintuitive bids (i.e., counteroffers that were lower than the bid or bids from previous counteroffers). The NSS automatically terminated negotiations when a bid and counteroffer were equal or after the supervisor's fourth round counteroffer, at which point the NSS showed the final budget in large bold type.

In all negotiations, subordinates began the negotiation with a bid. Supervisors made counteroffers to all bids. One round equaled one bid and its counteroffer. The negotiation terminated when a bid and counteroffer were equal or at the end of round four.[9] After a negotiation was concluded and the budget set, subordinates completed the final five-minute decoding trial upon which payoffs were based. Finally, supervisors and subordinates completed a series of perception instruments to finish the experiment.

At this point, supervisors and subordinates were paid in cash. All experimental elements were conducted on a computer except face-to-face negotiations.[10] All experimental sessions were completed in a contiguous four-day span: six NSS sessions and ten face-to-face sessions.

Variable Determination

The first three hypotheses focus on the issue of negotiation impasse and have the negotiation dyad as the unit of analysis. Aside from the manipulations of negotiation modality and prenegotiation expectations discussed in the previous section, these hypotheses required variables for negotiation impasse and initial negotiation difference. Impasse was defined as a negotiation that reached its conclusion, and the supervisor's final counteroffer did not match the subordinate's final bid [29]. Initial negotiation difference was determined as the first round subordinate bid reduced by the supervisor's counteroffer.

H4 through H7 focus on a model of postnegotiation subordinate performance. Model variables were based upon self-reported perceptions and actual postnegotiation performance. Self-reported perceptions of negotiation conflict and satisfaction were taken from validated scales. Conflict perceptions were measured with a scale developed

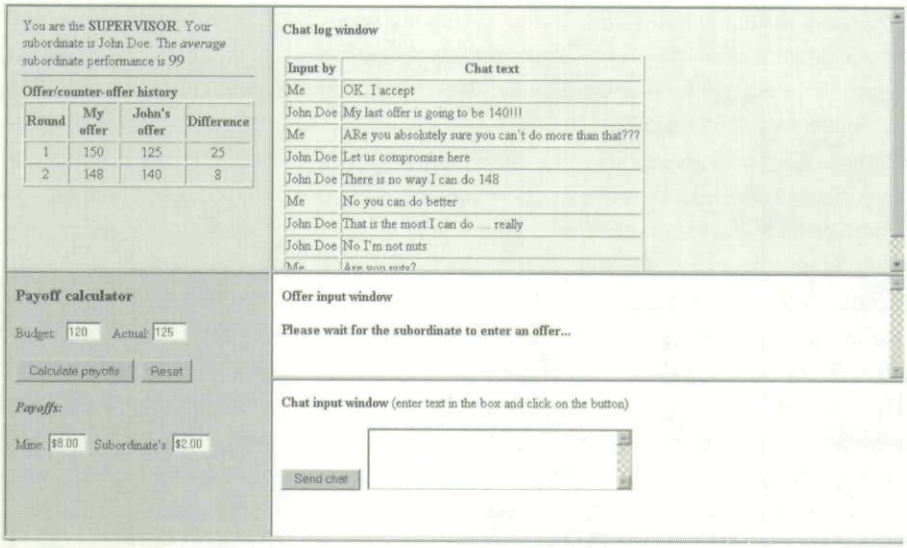


Figure 3. Negotiation Support System Interface.
Notes: This is the supervisor's screen. The subordinate screen is identical with the following exceptions: no average performance is given, and the subject is told they are the subordinate.

and validated by Miranda and Bostrom [51], and it measured perceived task conflict and relational conflict. Perceived satisfaction dealt with budget and negotiation process satisfaction and was measured with a scale developed and validated by Green and Taber [36]. Postnegotiation subordinate performance was subordinate performance in the postnegotiation five-minute decoding trial. The negotiated budget and subordinate performance on this final trial determined experimental payoffs.

Validation of the scale-based, latent perception variables was performed with PLS (partial least squares) Graph Version 3.00 Build 1017. PLS is a structural equation modeling tool that uses least squares parameter estimation to minimize the residual variances of all dependent variables [15]. Simulation studies have shown PLS to be a robust procedure as compared to modeling via covariance analysis because PLS makes comparatively minimal demands on sample size and assumed distributional form [16].

We evaluated the psychometric properties of task conflict, relational conflict, process satisfaction, and budget satisfaction. This was done using a confirmatory factor analysis based on a measurement model where all latent constructs were operationalized as correlated constructs specified without causal paths [81]. We assessed internal consistency reliability, convergent validity, and discriminant validity through the measurement model using PLS [15, 20, 81]. Internal consistency reliability was calculated as $(\Sigma\lambda_i^2)/[(\Sigma\lambda_i^2) + \Sigma(1 - \lambda_i^2)]$, where λ_i refers to the ith component loading and $(1 - \lambda_i^2)$ refers to the ith error variance [15]. Internal consistency reliability is similar to Cronbach's alpha, but it weights each factor by its loading as opposed to assuming equal weights. Similar to Cronbach's alpha, internal consistency reliabilities above 0.70 are considered adequate.

Comparable to Yi and Davis [81], convergent and discriminant validity were determined by examining the square root of the average variance extracted (AVE) from a latent variable and comparing it to latent variable correlations and the magnitude of standardized latent variable construct loadings and cross-loadings. AVE is a measure of the amount of variance captured in a latent variable relative to its measurement error, and it is calculated as follows: $\Sigma\lambda_i^2/[\Sigma\lambda_i^2 + \Sigma(1 - \lambda_i^2)]$, with λ_i defined as before. The heuristic used for AVE acceptability is 50 percent, meaning that 50 percent or more of indicator variance is accounted for by the latent variable, and the square root of the AVE ($\sqrt{50}$ percent = 0.707) should be greater than correlations among latent variables, indicating more variance is shared within a construct than between constructs. Likewise, latent variable item loadings should be greater than 0.707, and items should load most highly on constructs that they are supposed to measure. All our latent constructs are made up of reflective indicators and can appropriately use the aforementioned reliability and validity tests [15].

Table 1 shows scale item loadings and cross-loadings for all latent constructs in this study. Low item loadings required that one or two items be dropped from each scale. As Chin [15] noted, low loadings can reflect some unknown concept or indicate that the item is unreliable, and this can require that an item be removed from analysis.[11] Four individual loadings were slightly less than the heuristic cutoff of 0.707. These items were left in the analysis because they were very close to the heuristic cutoff and because Chin [15] indicated that the cutoff should not be treated as perfectly rigid.[12] Aside from the aforementioned four item loadings, all item loadings were high—that is, greater than 0.707. In addition, all items loaded on constructs as theoretically predicted and all item loadings were larger than their related cross-loadings.

The constructs produced by the item loadings are analyzed in Panel B of Table 1. As shown, internal consistency reliability for each construct was greater than 0.70, each construct's AVE was greater than 50 percent (greater than 0.707), and the square root of AVE for each construct was greater than the correlation between that construct and other constructs. In addition, correlations between this study's variable pairs were all well below a 90 percent threshold value, indicating that the model variables are distinct [6]. Overall, the psychometric properties of our study's scale-based latent variables supported model testing.

Results

Manipulation and Other Checks

SUBORDINATES WERE ASKED TO CONFIRM the budget amount immediately after the negotiation and before the postnegotiation performance trial. Supervisors were asked to confirm the budget amount immediately after the negotiation and before they completed the perception indices. Three participants misreported the budget (all three missed it by five). Supervisor knowledge of the average subordinate performance that they were told (i.e., the congruent/incongruent prenegotiation expectations manipulation) was checked immediately after the budget was negotiated. Three supervisor participants

Table 1. Construct Validity of Latent Variables

Panel A: Measurement Model Factor Structure Loadings and Cross-Loadings

Scale items*	Task conflict	Relational conflict	Process satisfaction	Budget satisfaction
Disagree over alternatives	**0.799**	0.355	0.126	0.296
Conflict in negotiation	**0.800**	0.061	0.015	0.095
Debates over alternatives	**0.704**	0.353	0.038	0.102
Disagreements over alternatives	**0.850**	0.345	0.100	0.228
Negotiation-related conflict	**0.808**	0.117	0.052	0.136
Conflict was experienced	**0.803**	0.390	0.294	0.322
Acknowledge conflict	**0.717**	0.193	0.038	0.107
Different points of view (dropped)				
Remarks made about me	0.181	**0.827**	0.039	0.141
Conflict personality based	0.147	**0.784**	0.108	0.092
I was ridiculed	0.180	**0.860**	0.069	0.090
Conflicts personal	0.330	**0.690**	0.259	0.300
Conflict targeted at me	0.491	**0.712**	0.173	0.387
Personal issue conflict (dropped)				
Process was efficient	0.047	0.228	**0.654**	0.226
Process was coordinated	0.119	0.039	**0.768**	0.204
Process was fair	0.309	0.027	**0.772**	0.282
Process was confusing (dropped)				
Process was satisfying (dropped)				
Satisfied with budget	0.302	0.458	0.212	**0.769**
Budget reflected inputs	0.114	0.111	0.152	**0.765**
Confident in budget correctness	0.100	0.052	0.367	**0.670**
Committed to budget (dropped)				
Accountable for budget (dropped)				

Panel B: Internal Consistency Reliability (ICR), AVE, and Correlations

Study variables	IRC	(1)	(2)	(3)	(4)
(1) Task conflict	0.918	**0.785**			
(2) Relational conflict	0.883	0.330	**0.777**		
(3) Process satisfaction	0.776	–0.110	–0.098	**0.733**	
(4) Budget satisfaction	0.779	–0.238	–0.248	0.323	**0.736**

Notes: In Panel A, factor loadings shown in boldface type identify theorized constructs. In Panel B, diagonal elements, shown in boldface type, are the square root of the AVE by latent constructs from their indicators, and the off-diagonal elements are correlations; * conflict scale is based on [51]; satisfaction scale is based on [36].

misreported the subordinate average that they were told. Eliminating these participants did not change the direction or significance of our statistical results; they were therefore left in the sample.

We tested the values of subordinates' third practice trial to ensure its accuracy in gauging subordinate performance. We found that there was a significant mean difference between practice trials one and two (118.72 versus 125.71). However, we found no significant mean difference between trials two and three (125.71 versus 127.52). Further, subordinates were required to indicate their estimated capability, and these estimates were almost identical to their third practice trial. It appears that, by trial two, decoding performance was level, and our participants believed that it was level.

Dependent variables were tested across sessions to ensure that outcome differences did not emanate from the experimental session and no session-related differences were found. Also, to ensure that there were not systematic differences in negotiation style, all participants completed a ROCI. No systematic conflict-handling differences were found between negotiation modality treatments, congruent and incongruent prenegotiation expectation treatments, or between supervisors and subordinates. A priori, there was a concern that difference between treatments could be driven by the complexity of the system upon which the NSS treatments were negotiating. Based on participant responses to a system ease-of-use index adapted from Davis [23], it was determined that NSS dyads did not perceive the experimental application as more difficult than did participants in face-to-face dyads. The postnegotiation questions contained indices where positive answers were at both ends of the Likert scale. In addition, the ordering of both index placement and index items was altered. No order effects were found.

Finally, all participants were asked to rate how well they knew their negotiation partner on a scale of one to seven with one representing "did not know at all" and seven representing "best friends." Because friends have been shown to negotiate differently than nonfriends [62, 68], 18 dyads were eliminated when a response to the friends query by at least one member of the dyad was four or above.[13] Our initial sample of 174 participants produced 87 dyads, of which four were lost to subject or system error, and 18 were lost to preexperimental relationships. Therefore, our testable sample consisted of 130 participants paired in 65 dyads.

Negotiation Mode and Impasse

The congruence/incongruence of prenegotiation expectations was hypothesized to moderate the effect of negotiation modality on negotiation impasse. Table 2 presents a descriptive analysis of negotiation impasse broken down by modality and prenegotiation expectations. As shown, impasse rates for the congruent expectations treatment did not differ significantly between dyads that negotiated face-to-face and those that negotiated on the NSS. However, impasse rates for the incongruent expectations treatment were significantly higher for dyads that negotiated face-to-face as compared to those that negotiated on the NSS. These results indicate that when participants in a budget

Table 2. Incidence of Negotiation Impasse

Congruent expectations			
Modality	Consensus	Impasse	Total
NSS	11	8	19
Face-to-face	9	7	16
Total	20	15	35
	Statistic	*p*-value	
Chi-square	0.010	0.461	
Fisher exact test		0.266	
Incongruent expectations			
Modality	Consensus	Impasse	Total
NSS	11	5	16
Face-to-face	4	10	14
Total	15	15	30
	Statistic	*p*-value	
Chi-square	4.821	0.014	
Fisher exact test		0.028	

negotiation started with divergent expectations, face-to-face negotiations were more likely to end in impasse than were NSS negotiations.

Whereas descriptive statistics indicated a relationship between modality and impasse, moderated by expectation congruency, our model of negotiation impasse specified impasse as a function of both negotiation modality and the magnitude of initial negotiation differences. H1 focused on initial negotiation differences and stated that larger initial differences would lead to higher rates of impasse. Tests of the relationship between initial negotiation differences and impasse are shown in Table 3. When negotiations began with incongruent expectations, we found that larger initial bid/counteroffer differences did have a statistically significant relationship with impasse ($p = 0.007$). In addition, when negotiations began with congruent expectations, we found that larger initial bid/counteroffer differences significantly increased the likelihood of impasse ($p = 0.042$). Taken together, these results provide support for H1.

H2a and H2b dealt with the relationship between negotiation modality and initial negotiation differences. We hypothesized under H2a that negotiation modality would not affect the magnitude of initial negotiation differences when prenegotiation expectations were incongruent. However, when expectations were congruent, we hypothesized under H2b that face-to-face negotiations would have larger initial negotiation differences than NSS negotiations. For the incongruent expectations treatment, we found average face-to-face and NSS initial bid/counteroffer differences were 57.57

Table 3. Analysis of Modality, Negotiation Impasse, and Initial Differences

Dependent variable	Independent variable(s)	Beta	Standard error	*t*-value Wald	*p*-value
		Incongruent expectations			
Initial difference	Modality	–7.991	15.199	0.526	0.603
	Model *F*-value	0.276			
	p-value	0.603			
	Adjusted R^2	0.026			
Impasse	Modality	–1.705	0.801	4.534	0.033
	Chi-square	4.963			
	p-value	0.026			
	Nagelkerke R^2	0.203			
Impasse	Initial difference	–0.053	0.020	7.336	0.007
	Modality	–3.330	1.353	6.054	0.014
	Chi-square	19.217			
	p-value	0.000			
	Nagelkerke R^2	0.631			
		Congruent expectations			
Initial difference	Modality	21.375	10.343	2.067	0.047
	Model *F*-statistic	4.271			
	p-value	0.047			
	Adjusted R^2	0.088			
Impasse	Modality	–0.067	0.685	0.010	0.922
	Chi-square	0.010			
	p-value	0.922			
	Nagelkerke R^2	0.000			
Impasse	Initial difference	–0.029	0.014	4.134	0.042
	Modality	0.543	0.795	0.466	0.495
	Chi-square	5.127			
	p-value	0.077			
	Nagelkerke R^2	0.183			

Consensus/impasse = 1/0; face-to-face/NSS = 1/0.

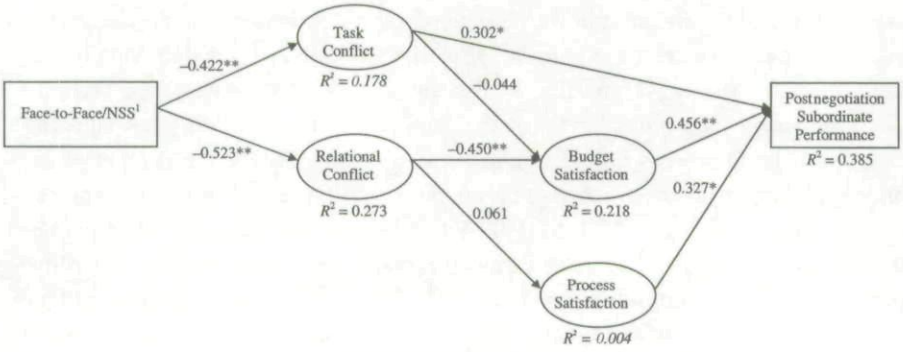
and 65.56 ($t = 0.526$; $p = 0.603$), respectively. Thus, modality had no effect on initial negotiation difference when expectations were incongruent, and, as expected, we failed to reject H2a. Under congruent expectations, average face-to-face and NSS initial bid/counteroffer differences were 61.37 and 40.00 ($t = 2.067$; $p = 0.047$), respectively. In support of H2b, we found that initial bid/counteroffer differences were significantly higher in face-to-face negotiations than in NSS negotiations when prenegotiation expectations were congruent.

Our final impasse-related hypotheses, H3a and H3b, put forward expectations on the relationship between modality and impasse. H3a predicted that, under incongruent prenegotiation expectations, face-to-face negotiations would experience more impasse than NSS negotiations controlling for the effect of initial negotiation differences. Whereas, H3b indicated that, under congruent prenegotiation expectations, negotiation modality would have no effect on impasse controlling for the effect of initial negotiation differences. As shown in Table 3, we found that face-to-face negotiations that started with incongruent expectations were more likely to reach an impasse regardless of initial bid/counteroffer differences, supporting H3a. On the other hand, we did not find a significant relationship between modality and an impasse when prenegotiation expectations were congruent, and, as expected, we were not able to reject H3b.

Divergent prenegotiation expectations were expected to exacerbate initial negotiation differences regardless of negotiation modality and, in face-to-face treatments, divergent expectations were expected to promote forcing behavior. As such, there were two potential determinants of impasse that emanated from incongruent prenegotiation expectations: magnitude of initial negotiation difference and negotiation modality. The severity of initial bid/counteroffer differences did increase negotiation impasse, as shown in H1. However, initial bid/counteroffer differences did not mediate the effect of negotiation modality on negotiation impasse when incongruent prenegotiation expectations existed [8]. Modality had a separate effect on impasse independent of initial negotiation differences under incongruent prenegotiation expectations. Our results indicated, apart from the distance of initial position, that face-to-face negotiators were less likely to reach consensus than were NSS negotiators when a shared understanding of subordinate production capability did not exist. This finding indicates that concession was difficult for face-to-face negotiators absent a shared understanding, regardless of the size of the needed concession. The inability to concede indicates the failure of face-to-face negotiators to break their prenegotiation anchor, which appears to have produced a perception of forcing behavior that, when reciprocated, resulted in negotiation impasse [28, 67].

Postnegotiation Subordinate Performance

Testing of our model of postnegotiation subordinate performance was performed with PLS. As previously noted, PLS is a robust procedure that places minimal demands on sample size and assumed distributional form. Also, by minimizing the variance of all dependent indicators, PLS is particularly effective for predictive purposes [15]. Given the pragmatic nature of budget negotiation and our sample size, the robustness of PLS and its predictive orientation made it appropriate for this research. Since PLS does not generate model goodness-of-fit statistics, predictive validity was assessed by examining the R^2s and the structural paths [15, 66, 81]. To obtain standard errors for t-tests of path coefficients, we used a bootstrapping procedure with 500 resamples [15, 81].



PLS Path to Postnegotiation

Variable(s)	Excluded[2]	Included[2]	Effect size
Face-to-face/NSS	0.385	0.394	0.015
Relational conflict	0.385	0.403	0.029
Both of the above included	0.385	0.404	0.031
Task conflict	0.298	0.385	0.142
Budget satisfaction	0.190	0.385	0.317
Process satisfaction	0.283	0.385	0.166

Figure 4. PLS Test of Proposed Model—Postnegotiation Subordinate Performance.
Notes: [1] face-to-face/NSS = 1/0; [2] variance explained (R^2); * $p < 0.05$; ** $p < 0.01$.

Figure 4 summarizes the results from the PLS data analyses. Supporting H4a, we found that subordinates negotiating on an NSS perceived more task conflict than did subordinates negotiating face-to-face. Supporting H4b, we found that face-to-face subordinates perceived less relational conflict than did NSS subordinates. The model explained moderate amounts of variance in task conflict ($R^2 = 0.178$) and relational conflict ($R^2 = 0.273$). Supporting H5a, relational conflict had a significant negative effect on budget satisfaction. However, no significant relationship was found between task conflict and budget satisfaction as predicted in H6a. Also, relational conflict did not have a significant relationship with process satisfaction, and, therefore, we found no support for H5b. The model explained a moderate amount of variance in budget satisfaction ($R^2 = 0.218$) but explained little variance in process satisfaction ($R^2 = 0.004$). Supporting hypothesis H6b, task conflict had a significant positive effect on postnegotiation subordinate performance. Supporting H7a and H7b, budget and outcome satisfaction, respectively, had significant positive effects on postnegotiation subordinate performance. Our model explained a medium amount of variance in postnegotiation subordinate performance ($R^2 = 0.385$).

To confirm the mediational roles and relative effect sizes of the relationships hypothesized in our model of postnegotiation subordinate performance, a series of alternative model tests were performed using PLS. Results are presented at the bottom of Figure 4. Our first tests involved creating direct links from modality and relational conflict to postnegotiation subordinate performance. None of the paths were statistically

significant, and the increase in the amount of variance explained in postnegotiation subordinate performance was extremely small. Our final analyses individually withheld the paths from task conflict, budget satisfaction, and process satisfaction to postnegotiation subordinate performance. We found that withholding the paths from task conflict and process satisfaction had a significant effect on the amount of variance explained in postnegotiation subordinate performance, indicating moderate levels of effect size (0.142 and 0.166) [19]. Withholding the budget satisfaction path had the largest effect on the amount of variance explained in postnegotiation subordinate performance, indicating an effect size (0.317) that Cohen [19] classifies as large. These analyses provide additional support for the notion that task conflict, process satisfaction, and budget satisfaction have a significant effect on postnegotiation subordinate performance.

Discussion and Conclusion

Discussion of Findings

A KEY QUESTION ADDRESSED IN THIS STUDY was whether employing an NSS could mitigate the impasse observed in face-to-face budget negotiations. In answer to that question, we found impasse more common in face-to-face settings than in NSS settings when incongruent prenegotiation expectations existed. Moreover, our results indicated that impasse under incongruent prenegotiation expectations had two determinants: magnitude of initial negotiation differences and negotiation modality. The size of initial negotiation differences had a positive and significant effect on impasse regardless of prenegotiation expectations—as the size of the concession to be made increased, so did the incidence of an impasse. Independent of the effect of initial differences, face-to-face negotiations were more likely to experience an impasse under incongruent prenegotiation expectations than were NSS negotiations. Our results indicated that concessions of any size were difficult to make in face-to-face negotiations that did not start with a shared understanding of subordinate capability. The unwillingness to concede suggests that when face-to-face negotiators anchored on their prenegotiation expectations, it resulted in reciprocated forcing behavior and prevented an integrative phase of the negotiation, thereby resulting in an impasse.

The second analysis in our study involved the ability of negotiation modality to work through perceptions of the negotiation and affect postnegotiation behavior. Budget negotiations represent a unique opportunity to study postnegotiation behavior because the negotiation does not represent an endpoint. After the negotiation, the subordinate has to perform, and this performance is measured against the negotiated budget. As such, perceptions of the negotiation and the resulting budget have the ability to affect postnegotiation performance. We hypothesized that negotiation modality would differentially affect negotiation-borne perceptions, which, in turn, would affect postnegotiation subordinate performance.

Subordinates using an NSS perceived more task conflict than did subordinates negotiating face-to-face. Task conflict is issue-based and has been found to enhance

performance when the issue at hand is straightforward, and we found that task conflict positively affected postnegotiation subordinate performance [41, 42, 43]. This result indicates that NSS subordinates were more likely to focus on budget issues during the course of the negotiation and that this focus had a positive effect on postnegotiation performance. On the other hand, subordinates negotiating face-to-face perceived less relational conflict than did subordinates using an NSS. Relational conflict is interpersonal and has a significant history of negatively affecting satisfaction [25]. We found that relational conflict reduced budget satisfaction, and we found budget satisfaction had a strong positive effect on postnegotiation performance. This result suggests that face-to-face subordinates in our budget negotiations benefited from face-to-face communication norms that have been credited with enhancing the perception of politeness and reducing relational conflict [12, 13].

Two hypothesized model paths were not statistically significant. While we found that task conflict reduced budget satisfaction, the relationship failed to achieve statistical significance.[14] This finding is in line with the conflict literature, which indicates that relational conflict is more powerful than task conflict in its effect on satisfaction [25]. Moreover, we were not able to explain the variance in process satisfaction. Counter to our hypothesis, process satisfaction was unaffected by differences in perceived relational conflict. A potential reason for this is the fundamental nature of a single-issue distributive negotiation. With one issue to negotiate, the budget was the key focus and key outcome of the entire process. Validating this point, our results indicated that budget satisfaction had approximately double the effect size of process satisfaction on postnegotiation subordinate performance.

Limitations

Our task was not as rich as real-world budget negotiations, and our budgeting task was a one-period game that prevented learning across periods. Further, the actual negotiation was limited to four rounds, as in the Fisher et al. [29, 30] studies. In our defense, participants were tutored and tested on the rules of the compensation contracts, and the negotiation itself involved one simple issue. Limiting the negotiations to four rounds gave scope to our experimental setting and reduced maturity effects. Pilot test debriefings indicated that participants considered four rounds sufficient time for the negotiation.

Our participants, who were students, negotiated and performed for a real monetary payoff, and we found no reason to believe that they did not attempt to maximize their wealth. While the use of student participants may appear to be a limitation, in experimental economics tasks such as the one employed in our study, Friedman and Sunder [34] indicate that graduate-level business students are appropriate participants primarily because they can learn quickly and can be motivated for relatively small amounts of money. The use of business professionals as participants in experimental economic settings can be problematic because professionals cannot be motivated by the amounts typically paid in such experiments. Further, there is evidence of parallelism between student behavior in experimental economic conditions and actual manager/profes-

sional behavior [46, 65]. A strong argument can be made that the economic principles that motivated the graduate business students in our experiment are the same that motivate real-world managers and subordinates [17].

Implications for Practice and Future Research

Budget negotiations are an important type of negotiation that we found can benefit from computer-mediated modality, and this finding informs practice. In budget negotiations that are geographically separated, our results indicate no process loss for negotiating through an NSS, and for budget negotiations characterized by incongruent expectations, an NSS appears to have the potential to reduce impasse. Similarly, for negotiation participants not geographically separated, our findings indicate that supervisors have reason to choose the lean media of an NSS should they perceive distance between their beliefs about subordinates' performance capabilities and subordinates' beliefs or knowledge of their own capabilities.

As to future research, an important issue that has not received attention in the literature is the choice of a negotiation medium when negotiators are offered such a choice. Most research has found that perceptions gleaned from negotiations favor the richness of face-to-face meetings. Is the apparent allure of human contact the key element in choosing the communication modality of a negotiation? Given the choice of performing a budget negotiation either with an NSS or face-to-face, it is not clear how supervisors would behave. Further, it is not clear what factors underlie such a decision. Can supervisors learn when a particular medium represents an optimal environment? Do specific individual differences drive negotiation modality choices as opposed to rational self-interest? Another avenue for future research is to investigate the use of an NSS for asynchronous negotiations, where bids and counteroffers are temporally separated and negotiating parties have a "cooling-off" period. How well does a "cooling-off" period curtail negotiation impasse, or does it at all? Do recency effects determine perceptions of asynchronous negotiations, or do negotiators have long memories in such negotiations? The topic of negotiation is rich, and the modality choices with which a negotiation can be performed have become more numerous and more accessible, indicating that this remains a fertile area for future research.

Conclusions

While one empirical study cannot set or validate theory, our results suggest that, in a single-issue distributive negotiation, the communication element of an NSS can benefit a negotiation. These findings call into question the Bazerman et al. [9] prescription that text-based computer modality should be used only in low-conflict, low-value negotiations. Our results indicated that an NSS can reduce budget negotiation impasse when supervisors and subordinates lack a shared understanding of the production function. Assuming that an impasse in negotiations is behaviorally and economically costly for organizations, our findings have monetary implications for business. We also found that negotiation modality differentially affected postnegotiation

subordinate performance in line with theories of communication and conflict. In our supervisor–subordinate negotiation setting, NSS subordinates reacted positively to a more issue-based discourse, whereas face-to-face subordinates reacted positively to the communication norms that enhance satisfaction in interpersonal discourse. This result adds to the literature by clarifying the roles that communication mode plays in a negotiation and a negotiation's aftermath. To conclude, in a single-issue distributive negotiation where negotiators come to the table with divergent positions, CMC appears a superior means of conducting the negotiation. Aside from budget negotiations, CMC also appears to benefit other single-issue distributional negotiations, as evidenced by the proliferation of online negotiations at sites such as eBay and Yahoo! auctions.

Acknowledgments: The authors thank the anonymous reviewers, Tina Loraas, Michelle Diaz, and Regan Green for their assistance. This paper has benefited from the comments of Ed O'Donnell, Sean Peffer, and workshop participants at Texas A&M University. An earlier version of this paper was presented at the American Accounting Association Information Systems Section meeting in San Diego, CA, January 2003, where it received the "Best Paper" award.

Notes

1. Distributive justice affects attitudes and behaviors based upon the concrete gains of an expected outcome [37, 73].

2. We make no hypotheses with respect to the level of shared understanding (i.e., the congruency of prenegotiation expectations) on perceptions of task and relational conflict because we expect that communication modality will dictate the availability and norms of negotiation communication strategy.

3. Giving the supervisor the *exact* performance of the subordinate as an "average" performance would be deemed too coincidental because subordinates were aware that supervisors were being given average performance information. The constants five and 20, which were designed to produce divergent negotiator positions at the onset of the negotiation, were determined via two paid pilot tests. Pilot debriefings indicated that adding the constant five generated initial convergent expectations between the negotiators and adding the constant 20 produced divergent initial negotiator expectations. (On the first pilot test, 15 was used and found to be ineffective in producing initial divergent negotiator expectations. On the second pilot test, we increased the constant to 20 and found it effective.)

4. Social pressure and disutility from lying make subordinates prefer budgets greater than zero [18, 72].

5. Supervisors earning a negative compensation were not required to pay it. Also, total individual pay was capped at $12.00 to prevent incentives for a zero budget, high subordinate performance, and payoff splitting.

6. Prior research has established that "ingroup" negotiators, where individuals can relate to one another well, behave differently from "outgroup" negotiators, where individuals have no interrelationship [52]. Our use of ingroup participants mirrors real-world settings where negotiators are likely to be part of an ingroup.

7. In addition to the acquaintance list, we also asked students to indicate how well they knew their negotiation partner. Manipulation and other checks are discussed later in the results section.

8. NSS negotiations in our study were conducted nonanonymously to mirror real-world business settings in which supervisor–subordinate negotiations would rarely (if ever) be conducted anonymously.

9. We followed the experimental literature on budget negotiations in restricting our negotiation to four rounds [29, 30]. The purpose of this restriction is to outline the boundaries for

the negotiation process and prevent maturity effects. In addition, in pilot test debriefings, experimental participants indicated that four rounds were sufficient.

10. Participants in the face-to-face treatment, who were situated in a behavioral lab, worked on laptop computers. There were no significant task performance differences between face-to-face participants using laptops and NSS participants using desktop computers in either the practice trials or the performance runs. Pilot tests also indicated no differences.

11. In the case of an unreliable item, Chin [15] indicates that it can be left in the analysis, and it will have the effect of reducing error variance, if other reliable items exist and the poor loading is only noise. Since we cannot know the underlying cause of the poor loadings, they were removed from the study.

12. The cutoff heuristic implies that each item shares more variance with its component score than with error variance—that is, $\sqrt{50}$ percent = 0.707. When a single scale item slightly violates this heuristic and is combined with other stronger items for comparison, it has the effect of increasing model predictiveness [15].

13. This ensured consistency with our preexperimental requirement of not allowing friends to negotiate. The elimination of these dyads did not change the significance or direction of impasse rate differences.

14. With the smaller effect size of task conflict, as compared to relational conflict, our sample size may not have afforded the power to produce a statistically significant relationship. Although not hypothesized, we tested the link between task conflict and process satisfaction and, as expected, did not find statistical significance.

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The following Statement of Ownership, Management, and Circulation is provided in accordance with the requirements contained in 39 USC 3685. *Journal of Management Information Systems* (Publication no.0742-1222) appears quarterly and the annual subscription price is $780.00. It is owned, managed, and published by M.E. Sharpe, Inc., which is located at 80 Business Park Drive, Armonk, Westchester County, NY 10504–1715. The Publisher is M.E. Sharpe, at the same address. The Editor is Vladimir Zwass, c/o M.E. Sharpe, Inc. 80 Business Park Drive, Armonk, NY, 10504. During the preceding twelve months the average number of copies printed for each issue was 1,238; the average paid circulation (by mail subscription) was 863; the average free distribution, 53; the average number of copies distributed, 916. Corresponding figures for the issue published nearest to the filing date: total number of copies printed, 1,200; total paid circulation (by mail subscription), 747; total free distribution, 56; total distribution, 803. Filed by Vincent Fuentes, Senior Vice President.