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THE IMPACT OF COMMUNICATION MEDIA ON NEGOTIATION OUTCOMES

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Our need to understand the impact of communication media on negotiation is growing as technological advances offer negotiators more communication options. As access to technologies such as computer chat and videoconferencing increases, negotiators are choosing to use or to avoid these media without knowing the impact of their choices on negotiations. This research assesses objective and subjective negotiation outcomes, such as profit and outcome satisfaction, across four communication media with varying levels of media richness (face-to-face, videoconference, telephone, and computer-mediated communication). A conceptual framework is offered to illustrate how media richness impacts objective and subjective outcomes. Results suggest that media richness affects required bargaining time, outcome satisfaction and the desire for future negotiation interaction. Thus, the communication media for negotiations should be chosen with care.

Negotiation is a common form of social interaction in which two or more people attempt to make a joint decision about one or more issues in which they are interested. The ability of negotiators to communicate effectively is critical for negotiation success (Thompson, 1998, p. 12). Research indicates that communication media can have a significant impact on negotiations (Poole, Shannon, & DeSanctis, 1992). Communication media set the context for communication, influence communication patterns and affect managerial effectiveness (Yates & Orlikowski, 1992). In addition, communication media determine how much access

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negotiators have to perceptual and communication cues, and they influence the semantics, syntax and style of negotiators (Fulk, Schmitz, & Steinfield, 1990).

Our need to understand the impact of communication media on negotiation is growing as technological advances offer negotiators more communication options. For example, the number of organizations and individuals with access to media such as computer-mediated communication (CMC) is growing rapidly (Hunt, 1999; Kiesler, Siegel, & McGuire, 1984). As the use of new technologies such as computer chat and videoconferencing increases,[1] negotiators are choosing to use or to avoid various technologies without knowing the impact of their choices. Some negotiators may choose to use a new communication technology because it is readily available or relatively inexpensive without considering the impact the technology may have on the quality of communication. Other negotiators may summarily reject new technologies on the assumption that face-to-face interactions offer richer communication and result in better outcomes. As more organizations and individuals face a choice between these technologies, additional research is needed to investigate their impact on negotiation processes and outcomes.

Some authors have suggested that negotiation research more closely mirrors real bargaining when it incorporates bargaining problems with significant integrative potential (Pruitt, 1981) and when negotiators have the expectation of ongoing relationships (Barley, 1991). The goal of this research is to assist negotiators in making informed choices about communication media in such a bargaining context. We address this timely problem by comparing the outcomes of negotiations across four important and commonly used communication methods with varying levels of media richness, namely face-to-face, videoconference, telephone, and computer-mediated communication. While some research has examined negotiation via telephone (e.g., Lewis & Fry, 1977; Williams, 1977) and via videoconference (Drolet & Morris, 1995), a broader understanding is needed of the relationship between communication media and negotiation. Toward this end, this paper (though practically motivated) provides a conceptual framework that links media richness to objective and subjective outcomes. We then report an experimental investigation to test the proposed framework and its theoretical predictions.

Model and Hypotheses

Conceptual Model

This study examines the impact of media richness on both objective and subjective negotiation outcomes. Our hypotheses are specific to bargaining contexts where continuing interaction is anticipated and where integrative potential exists such that both negotiators can achieve their objectives. While we do not attempt to

[1]Substantial empirical evidence supports this assertion. Numerous firms have set up chat rooms on the Internet to conduct bargaining sessions with distant partners (Oberndorf, 1998; Oldham, 1998). Internet companies offering secure sites for online negotiations are experiencing exponential growth in demand (Tedeschi, 1999). In Washington state, government officials are increasingly conducting meetings via videoconference to reduce travel expense (Hunt, 1999).

propose a comprehensive causal model, our conceptual framework (see Figure 1) illustrates the theoretical basis and causal sequence of our hypotheses. This proposed model depicts the impact of media richness on economic and affective outcomes and also attempts to identify a set of possible mediating relationships.

In this conceptual model (Figure 1), media richness directly impacts the bargaining process and two objective outcomes: profit and the time required to complete the negotiation. The impact of media richness on satisfaction is mediated by the negotiation process through the bargaining approach adopted and by objective outcomes. We specifically hypothesize that subjects bargaining through richer media will achieve better objective outcomes (higher profit in less time), will be more satisfied with those outcomes, and will be more motivated to negotiate again with the same partner. We believe that these improved outcomes will be achieved in part because richer media will facilitate the use of a more collaborative and less competitive bargaining approach. Successful collaboration can generate integrative solutions and establish the foundation for mutually satisfying long-term relationships.

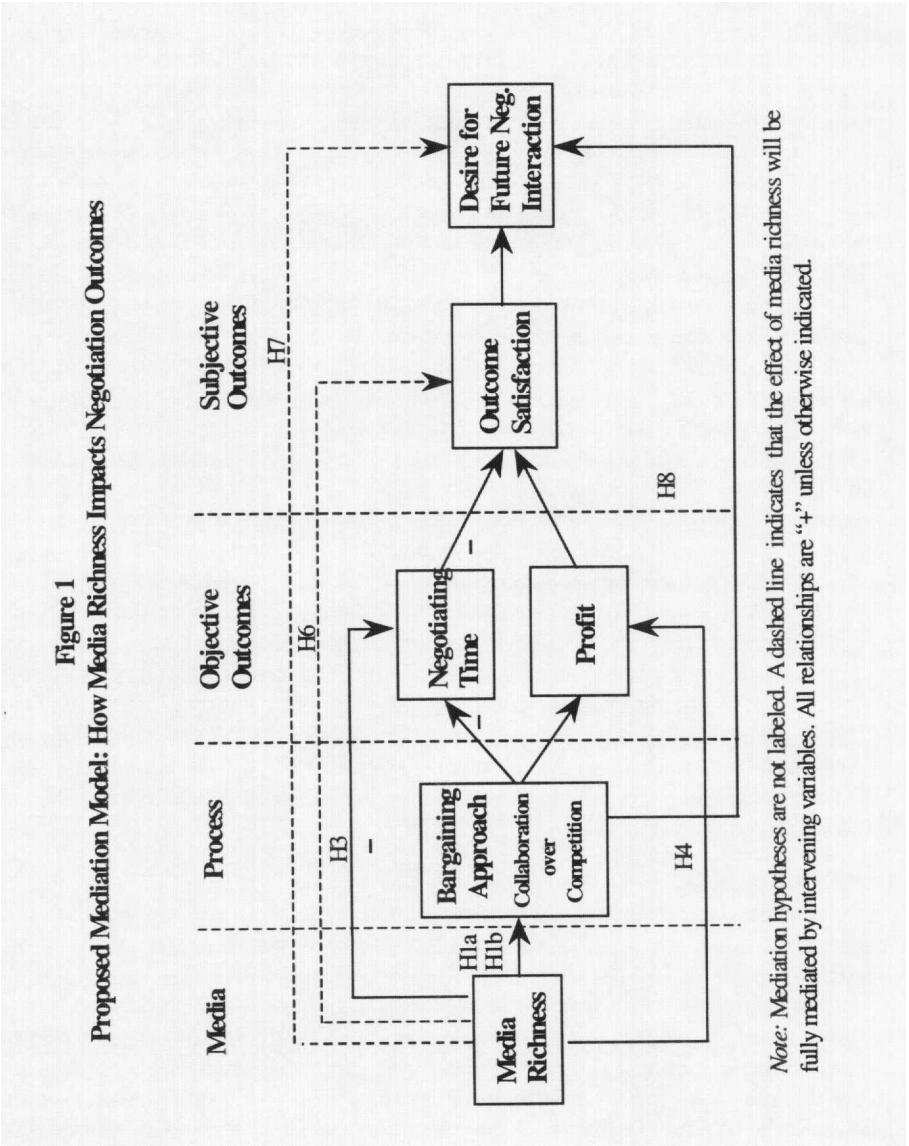
We begin with a brief discussion of the differences among the four communication methods in terms of their media richness. We then provide specific predictions as to why we anticipate differences in process and outcome measures due to the choice of communication methods. The specific theoretical rationale for each hypothesis is discussed.

Media Richness

Media richness refers to the amount of information that can be conveyed through a communication medium (Poole, Shannon, & DeSanctis, 1992). The richness of a communication medium is dependent upon its ability to handle multiple information cues simultaneously, to facilitate feedback and to enable communicators to establish personal presence beyond the raw content of the message (Poole et al., 1992). The richness of a communication medium may have a significant impact upon the outcomes of negotiation for several reasons. First, up to ninety-three percent of the meaning of a message is contained in facial and vocal cues rather than in text (Mehrabian, 1971). Negotiators using leaner media may lack sufficient commonality of meaning to negotiate effectively. Second, the lack of information in leaner media can cause feelings of depersonalization and a sense of anonymity (Straus & McGrath, 1994), potentially affecting negotiation rapport (Drolet & Morris, 1995) and rates of impasse (Moore, Kurtzberg, Thompson, & Morris, 1999). Finally, communication media may affect perceptions of influence (Hollingshead, 1996), a fundamental component of negotiation. Below are brief descriptions of the media used in this study in descending order of media richness.

Face-to-face communication occurs when negotiators interact in physical proximity to each other. Face-to-face communication is the richest communication medium (Daft, Lengel, & Trevino, 1987), offering negotiators access to a wide range of aural, visual and nonverbal communication cues. Visual cues may include gestures, facial expressions, eye contact, body movement, and the physical appearance of the other negotiator. Aural cues may include the quality, pitch and volume of the voice, the speed at which a speaker talks, and the use of pauses. Additional

Figure 1
Proposed Mediation Model: How Media Richness Impacts Negotiation Outcomes



aural information comes from paralanguage, which includes filler words and non-language vocal sounds such as laughter (Baird & Wieting, 1979).

Videoconferencing, in which negotiators interact in real time with televised images of each other, is ranked closely behind face-to-face communication in terms of its media richness. Videoconferencing simulates face-to-face interaction but has some limitations that prevent negotiators from having full access to the available communication cues. For example, videoconferencing usually transmits a visual picture of a negotiator's head and shoulders, but conveys less information than face-to-face communication because gestures and posture are not fully visible (Drolet & Morris, 1995). Negotiators are confined to a relatively small space if they wish to remain within sight and sound of the other party. In addition, current limitations in technology make it difficult to have true eye-to-eye contact (Rose & Clark, 1995). Finally, subtle aspects of aural communication may be lost due to technical limitations such as transmission quality.

The telephone is a widely used substitute for face-to-face interaction when negotiators are not in close physical proximity. Telephone communication is significantly lower in media richness than the preceding media because it denies negotiators access to visual information cues such as facial expressions, movement and body language. Nonverbal cues such as the proximity of the negotiators are absent as well. The telephone does offer a fairly complete array of aural cues, including verbal and nonverbal vocal sounds.

Computer-mediated communication (CMC) refers to electronic communication by which senders write text messages on their computers that are relayed to receivers' computers and are viewable on a screen. While the term CMC encompasses many types of computer communication (Walther, 1992), in this research we focus on computer chat, which allows negotiators to communicate in real time so that messages are received and read immediately. Computer chat offers relatively few communication cues because it relies solely upon textual messages. Aural cues are non-existent and visual cues are limited to those that can be conveyed via printed text.

Bargaining Approach

Because the number of communication cues available to negotiators is dependent upon the richness of the communication medium, we anticipate that media richness will impact the bargaining process by influencing negotiators' bargaining approaches and how accurately bargaining approaches are perceived. A study of verbal and visual forms of communication suggests that at least one element of media richness, namely visual communication, impacts bargaining style behaviors and perceptions (Sheffield, 1995). Sheffield found that visual communication reduced equivocality about the bargaining orientation of negotiators.

We expect media richness to have two impacts on bargaining approach in the negotiation context we are studying, namely, when integrative bargaining potential exists and ongoing interactions with the other party are expected. In contexts where there are expectations of future cooperative interaction with the other party and when no obvious compromise solution is present, Ben-Yoav and Pruitt (1984) have suggested that negotiators will be encouraged to employ problem-solving strate-

gies. Specifically, richer communication media lead to better information exchange (Drolet & Morris, 1995) and thus make it easier for negotiators to engage in the behavioral activities associated with collaboration, such as uncovering underlying interests and building trust. Consequently, we anticipate that negotiators are more likely to be collaborative when they are using richer communication media.

In addition, richer communication media also make it easier to interpret those messages (Daft & Lengel, 1984) and thereby allow negotiators to more accurately perceive the bargaining approach being used by the other party. Greater access to communication cues improves the chances of accurate perceptions through the stages of the negotiation process (Douglas, 1962). Rich media allow negotiators to develop personal relationships and improve communication clarity, thereby facilitating the identification of mutual interests. For example, face-to-face interaction has been found to communicate personal interest, caring and trust (Lengel & Daft, 1988). Poorer communication media provide a greater sense of anonymity, which in turn might result in less concern for the other, a classic driver of contending tactics (Pruitt & Rubin, 1986). Additionally, less rich media make it easier for negotiators to mask the use of distributive bargaining tactics, thereby possibly encouraging competitive or contentious behavior.

Hypothesis 1a: Negotiators using richer communication media are more likely to use a collaborative bargaining approach than negotiators using less rich media.

Hypothesis 1b: Negotiators using richer communication media are less likely to use a competitive bargaining approach than negotiators using less rich media.

Hypothesis 2: When a collaborative bargaining approach is being employed by the other party, negotiators using richer communication media will perceive it more accurately.

Objective Outcomes

Negotiating Time. Technologies such as CMC and videoconferencing are often considered efficient because they allow synchronous communication between people in different places. However, these technologies are often inefficient in terms of the amount of information communicated per unit of time. Text-based chat is slow and tends to have long pauses between each conversant's contribution (Heid, 1997). Negotiators using computer-mediated communication tend to use fewer words to communicate, yet require more time to do so because they are using a text-based system rather than an aural-based system of communication (Sheffield, 1995). Although negotiators adapt their communications to fit the medium (typing/reading versus speaking/listening), some evidence suggests that text-based communication media result in longer negotiations regardless of the negotiators' efficiency at inputting and reading text messages. Sheffield (1995) found that more time was needed to understand the structure of a negotiation task when negotiators used text-based communication rather than audio communication. In addition, the informal tone, lack of formal structure, and slower speed of typewritten computer

communication (Adkins & Brashers, 1995) may impede communication between negotiators.

Some newer technologies such as videoconferencing allow users to have simultaneous access to aural and textual cues. While these media may be similar to face-to-face communication in the number of cues offered, we anticipate that the technological interface will affect the way people communicate and receive information, necessitating additional time for interpretation of the information.

Hypothesis 3: Negotiators using richer communication media will require less time to reach agreements than negotiators using less rich media.

While we expect communication media to directly affect negotiating time, a negotiator's bargaining style may partially mediate this effect. In the context of this study, we expect bargainers who are more collaborative and less competitive to forge an acceptable agreement more quickly. The key reason is that a competitive approach may be lengthy and unproductive if parties are reluctant to exchange information or if they resort to bargaining tactics that delay the search for integrative solutions. Admittedly, a collaborative approach can be extremely time-consuming, particularly when the bargaining problem is complex and achieving an acceptable solution requires extensive information sharing. However, many integrative bargaining problems are simple and require only modest information sharing (Lewicki, Saunders, & Minton, 1999). Pruitt (1981) makes a distinction between two types of integrative bargaining activities: logrolling and inventing "bridging" solutions. The latter attempts to create new options that bridge the interests of the parties. Bridging may be time-consuming because it requires extensive information exchange and the invention of new options. In contrast, logrolling simply requires that the parties make mutually beneficial trade-offs involving attributes already on the bargaining agenda (Lewicki, Saunders, & Minton, 1999). By sharing enough information to recognize that they value key attributes differently, the negotiators can quickly converge on an integrative solution. Thus, bargaining time should be reduced when negotiators approach a logrolling problem collaboratively (willing to share information about their priorities) rather than competitively (reluctant to share information). Since the bargaining problem used in this research presents a straightforward logrolling opportunity, we expect a more collaborative approach to reduce bargaining time.

Hypothesis 3M: Bargaining approach will partially mediate the effect of media richness on negotiation time.

Profit. Many negotiations are integrative in nature. Integrative negotiations are those in which mutually beneficial agreements can be created whereby it is possible for both sides to achieve their objectives (Walton & McKersie, 1965). In such negotiations, success is often measured by how integrative the agreement is; that is, to what degree the negotiators have discovered solutions that provide them with maximum joint benefits (e.g., Carnevale & Isen, 1986; Mannix, Tinsley, & Bazerman, 1995). The role of communication in the discovery of integrative solutions has been considered in much prior research (see Chatman, Putnam, & Sondak, 1991).

A positive relationship between media richness and integrativeness is supported by numerous empirical studies. Morley and Stephenson (1977) found that subjects who communicate face-to-face, rather than by a microphone/ headphone apparatus, are more generous. Williams (1977) found that face-to-face negotiators were less aggressively competitive than those who negotiated via telephone. More recently, Drolet and Morris (1995) considered the effects of videoconference negotiations on negotiation rapport and trust. They found that subjects experienced greater rapport, trust and cooperation in the face-to-face condition (the condition with the greatest media richness). Further, computer-mediated negotiators were less accurate in judging the interests of the opponent, obtained lower outcomes, and distributed resources more unequally than face-to-face negotiators (Arunachalam & Dilla, 1995; Eliashberg, Rangaswamy, & Balakrishnan, 1987). There are few social context cues (such as gender and status) available in CMC to enhance the meaning of the message (Rice & Love, 1987; Sproul & Kiesler, 1986). Finally, the social anonymity of CMC tends to elicit stronger, more uninhibited communication from users (Kiesler et al., 1984) that may be damaging to negotiations. For example, insults and threats can be quickly transmitted without careful consideration, escalating hostility (Wheeler, 1995). A few studies have suggested that negotiators who were denied visual access to their negotiation partners achieved more integrative results (Carnevale & Isen, 1986; Carnevale, Pruitt, & Seilheimer, 1981). However, a greater preponderance of research supports the notion that media richness is positively related to integrative outcomes such as joint profit.

Hypothesis 4: Negotiators using richer communication media will achieve higher (joint) profits than negotiators using less rich media.

Richer communication media are likely to improve integrativeness in bargaining because they allow more information to be exchanged. However, we offer an additional explanation based on our earlier arguments linking media richness with bargaining approach. Above, we predicted greater use of collaborative strategies in richer media. Such collaborative, problem solving strategies are typically used to discover integrative outcomes when coupled with the adoption of ambitious but realistic goals (Pruitt & Carnevale, 1993). Consequently, we anticipate that negotiators using richer communication media are more likely to obtain high joint benefit agreements.

Hypothesis 4M: Bargaining approach will partially mediate the effect of media richness on profit.

Profit Inequity. Integrativeness generally measures the joint gains achieved by both negotiators; however, these joint gains are not always equally distributed among negotiators. Following the above arguments, media richness may influence not only the integrativeness of the negotiators' solution, but also how equitably outcomes are distributed between negotiators. Studies of face-to-face versus computer-mediated negotiation have found that CMC negotiations resulted not only in lower outcomes, but also in a less equal distribution of benefits (Arunachalam & Dilla, 1995; Eliashberg et al., 1987).

The lack of anonymity in richer media may motivate negotiators to avoid "dividing the pie" to their advantage, since they would risk social disapproval by

the other. Social disapproval is particularly relevant in contexts where the parties expect ongoing relations and thus retaliation may occur in subsequent encounters (Kiesler, Kiesler, & Pallak, 1967). Further, the collaborative bargaining approach we anticipate in richer media conditions may create expectations of future collaboration. When dyads expect cooperative future interactions, they may focus more on equal distribution of rewards (Shapiro, 1975). Consequently, we anticipate that rich communication media will result in a greater likelihood that negotiators will distribute profits more equally.

Hypothesis 5: Negotiators using richer communication media will achieve a more equal distribution of profits than negotiators using less rich media.

Subjective Outcomes

Outcome Satisfaction. We expect two objective outcomes, profit and negotiating time, to directly impact outcome satisfaction (Figure 1). While profit is clearly an economic benefit, time may be viewed as a cost of negotiating and a proxy for effort. From a cost/benefit perspective, bargainers should be more satisfied with a given profit if it can be achieved in less time. Raiffa (1982) argues that while time is valuable and can be traded off with profit, "many unskillful negotiators place a dysfunctional premium on speed." In the United States "faster" is often viewed as better, because it suggests greater efficiency (Lewicki, Saunders, & Minton, 1999). Since media richness is expected to reduce negotiation time and increase profit, it should also increase outcome satisfaction.

Hypothesis 6: Negotiators using richer communication media will be more satisfied with the negotiation outcome than negotiators using less rich media.

Hypothesis 6M: Bargaining time and profit will fully mediate the impact of media richness on outcome satisfaction.

Desire for Future Negotiation Interaction (DFN). As Heidi and Miner (1992) note, expectations of future interaction are of considerable interest to managers and researchers of inter-organizational relationships. Given a context in which continuing interactions are anticipated, we propose that media richness will be positively related to a negotiator's desire for future negotiation with the same partner.

Negotiators who perceive that they have not received an equitable outcome are likely to evaluate the other party unfavorably (Balakrishnan, Patton & Lewis, 1993). In addition, Oliver, Balakrishnan, and Barry (1994) suggest that a negotiator's affective response to negotiation influences the choice of subsequent negotiation partners, either through interpersonal trust or greater confidence in the partner following favorable outcomes. Thus, satisfaction with the negotiation outcome is positively related to the willingness to negotiate with the same partner again (Oliver et al., 1994). As we anticipate media richness to be positively related to outcomes and satisfaction, we expect a parallel relationship between media richness and negotiators' desire to negotiate again with the same representative of the other party.

Hypothesis 7: Negotiators using richer communication media will be more likely to desire future negotiation with the same partners than negotiators using less rich media.

Hypothesis 7M: Outcome satisfaction will fully mediate the impact of bargaining time and profit on the desire for future negotiation.

Additionally, media richness may promote desire for future negotiation interaction (DFN) through a second mechanism. We hypothesized earlier that richer media will promote greater collaboration (H1a) and less competition (H1b). Negotiators who experience a collaborative interaction may be more motivated to continue the relationship, because they have established trust and a sense that they can work effectively together. Thompson (1990) argues that information sharing can strengthen a relationship, because negotiators working collaboratively may make positive attributions about one another.

In contrast, negotiators who engage in a competitive, contentious interaction may create resentment (Pruitt, 1981) and undermine trust (Lewicki, Saunders, & Minton, 1999). Greenhalgh and Chapman (1998) argue that the use of coercive tactics stimulates negative affect. More importantly, they demonstrate a strong inverse relationship between the use of coercive tactics and relationship continuity. Consistent with this research, the perception that the other party's bargaining approach was more collaborative than competitive should directly increase the desire for future interaction.

Hypothesis 8: A collaborative bargaining approach will directly and positively impact desire for future negotiation.

Method

Subjects

Subjects were 150 undergraduate students enrolled in business administration classes at two campuses of a western U.S. university. Participants averaged 9.8 years of work experience, but none were professional negotiators. The sample was 56% female with a mean age of 30 years. No subjects had any prior experience with negotiating via videoconference or computer-mediated communication, although all subjects had experience communicating by e-mail. All subjects were unpaid volunteers who participated in a negotiation exercise outside of class.

Media Conditions

Subjects were randomly assigned to one of four media conditions: face-to-face, videoconference, telephone or computer talk. Face-to-face negotiations were conducted in campus facilities. Videoconference, telephone and computer negotiations were conducted via a link between two campuses that are geographically separated by 50 miles. In the videoconference condition each negotiator was seated at a desk with a microphone and viewed their counterpart on a 25" monitor. Video cameras were placed on or near the monitor to improve eye contact between negotiators. Computer negotiations were conducted using computer chat software that

allowed both negotiators to write unlimited length messages, transmit them instantly, and view both negotiators' texts simultaneously.

The Task

Each subject was assigned to the role of retail store manager (buyer) or manufacturer's representative (seller) and charged with negotiating the sale of a men's clothing line. Instructions specifically primed subjects to anticipate a continuing relationship: "Important: Your relationship with [the other negotiator] is ongoing. You expect to have frequent interaction with [the other negotiator]."

The bargaining problem, which presented considerable integrative potential (see Appendix) required that participants agree on three attributes: retail profit margin, advertising support, and credit terms. This was a straightforward "logrolling" problem, since one attribute was more important to the seller (margin) while another was more important to the buyer (credit terms). The profits to be made by an individual party ranged from a minimum of $0 to a maximum of $80 million. Negotiators who bargained integratively could achieve a maximum payoff of $52 million each by selecting options A, E, and I. Negotiators who bargained distributively or by strict compromise would achieve a payoff of $40 million each (options E, E, and E). Subjects were given their role assignments and payoff tables thirty minutes prior to negotiating to allow them time to read and prepare. Subjects were instructed not to show their roles or payoff tables to their negotiation partners. No time constraint was imposed on the negotiation.

Dependent Measures

After completing the negotiation, subjects responded to a post-negotiation questionnaire. They recorded three objective outcomes: settlement terms, the profit they had obtained and the time spent negotiating. Subjective outcomes were measured on seven-point semantic differential scales. Subjects reported their level of satisfaction with the outcome and their desire for future negotiation (DFN) with the same party.

Finally, subjects reported which bargaining styles they had used in the negotiation. Because our research is practically motivated, we did not attempt to influence our subjects' choice of style. We also relied on subjects' self-reports rather than objective coding of bargaining style because our emphasis is on subjects' perceptions. Subjects were presented with brief descriptions of the five bargaining styles that characterize the Dual Concerns Model (Pruitt & Rubin, 1986; Thomas & Kilmann, 1974): avoiding, competing, accommodating, compromising, and collaborating. Subjects indicated which of the styles they attempted to use and which styles they believed their opponents used. For example, to indicate that they competed, subjects would respond affirmatively to this statement: "I tried to maximize my profit by winning concessions from my counterpart." To indicate collaboration, they responded affirmatively to this statement: "I tried to find a solution that would give us both large, but not maximum profits." These measures allowed us to examine the impact of communication media on both bargaining style and ability to perceive the other party's intent. If a subject believed that his opponent had col-

laborated and the opponent confirmed an attempt to collaborate, we scored this as a correct perception of collaborative intent.

To parsimoniously represent bargaining style in our mediation model, we use a single composite variable, perceived collaboration, which measures the perception that a negotiator's opponent was more collaborative than competitive on a scale ranging from −100 (to indicate pure competition) to +100 (to indicate pure collaboration). Of the five bargaining styles in the dual concern model, we focus on the two that reflect a high self-concern, competing and collaborating; because all participants were instructed to demonstrate a high concern for their own outcomes. While competing suggests a concern solely for one's own interests, collaborating requires both self-concern and a concern for the other party. To capture this distinction, perceived collaboration measures the extent to which participants were perceived to rely more on collaboration than competition.

The Mediation Model

We hypothesize that media influence subjective bargaining outcomes through intervening variables (Figure 1). To demonstrate a mediated relationship, we use the regression procedure described by Baron and Kenny (1986). We estimate three regression models. First, we establish that the independent variable affects the proposed mediator variable by regressing the mediator on the independent variable. Second, we demonstrate that the independent variable affects the dependent variable by regressing the dependent variable on the independent variable. Finally, we regress the dependent variable on both the independent variable and the mediator. If the coefficient of the mediator is significant, while the coefficient of the independent variable becomes insignificant, we conclude that the impact of the independent variable is fully mediated. If the mediator is significant, while the independent variable becomes *less* significant, we conclude that the impact of the independent variable is partially mediated.

Results

The results of our mediation tests are presented in Table 1 and Figure 2, while correlations among the variables in our model are presented in Table 2. As we discuss our findings, we will refer to these exhibits and briefly describe the mediating variables through which media richness appears to impact bargaining outcomes. Each row of Table 1 presents a unique regression model. Consider an example: our model (Figure 1) suggests that both profit and time influence the desire for future negotiation (DFN) by increasing outcome satisfaction. To test the mediating role of satisfaction, we examine three regression models (Table 1: Models 9, 13, &14). First, Model 9 demonstrates that profit is positively related to satisfaction, the mediator, while time is negatively related to satisfaction. Second, Model 13 demonstrates that profit and time are both significantly related to DFN, the dependent variable. Thus, the two independent variables are correlated with both the proposed mediator and the dependent variable. But does outcome satisfaction actually mediate the impact of profit and time on DFN? Model 14 regresses the dependent variable (DFN) on the two independent variables (profit and time) as well as on the

mediator (satisfaction). Since profit and time both become insignificant, while satisfaction is highly significant, we conclude that satisfaction fully mediates the impact of profit and time on DFN.

Table 1
Mediation Model: Standardized Regression Coefficients

		Independent and Mediator Variables					
Model	Dependent variable	Media richness[1]	Perceived collab.[2]	Time	Profit	Satis-faction	R^2
1	Perceived collaboration	signif**					.09**
2	Time	signif****					.45****
3	Time	signif****	–.14*				.48****
4	Profit	*ns*					.01
5	Profit	*ns*	.26**				.07*
6	Satisfaction	signif**					.08**
7	Satisfaction	signif*	.26***				.14***
8	Satisfaction	*ns*	.20**	–.51****			.28****
9	Satisfaction	*ns*	.11	–.45****	.37****		.41****
10	DFN	signif*					.07*
11	DFN	*ns*	.36****				.18****
12	DFN	*ns*	.31****	–.35****			.25****
13	DFN	*ns*	.26****	–.30**	.22**		.29****
14	DFN	*ns*	.20**	–.07	.04	.47****	.39****

Note: [1]Since media richness is a categorical variable, coefficients are not reported. [2]Perception that opponent was more collaborative than competitive.
*$p < .05$. ** $p < .01$. ***$p < .001$. ****$p < .0001$.

Table 2
Correlations Between Model Variables

	Mean	*SD*	1	2	3	4
1. Perceived collaboration	4.6	54.4				
2. Bargaining time	25.1	18.7	–.29***			
3. Profit	41.9	11.1	.25**	–.17*		
4. Outcome satisfaction	5.0	1.3	.31***	–.47***	.45***	
5. Desire for future neg.	5.6	1.6	.39***	–.39***	.34***	.59***

*$p < .05$. **$p < .01$. ***$p < .001$.

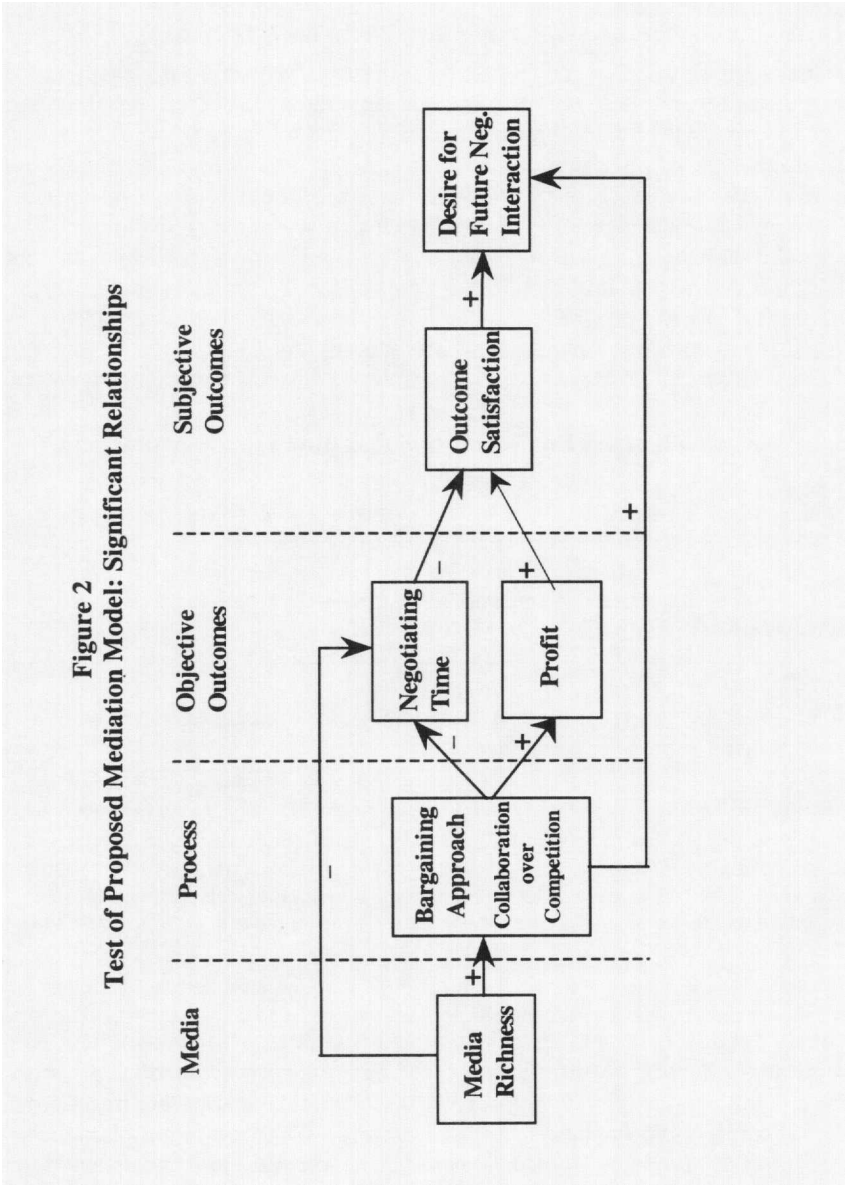


Figure 2
Test of Proposed Mediation Model: Significant Relationships

The Process: Collaborative vs. Competitive Bargaining Approach

Theory suggests that a collaborative approach to bargaining is most likely to generate integrative solutions and satisfied negotiators. However, collaboration requires a complex process of information sharing and a persistent effort to understand the other party's needs and perceptions. A rich media environment should facilitate collaborative bargaining, while a sparse media environment might frustrate a complex exchange of information and discourage collaboration. We hypothesized that negotiators using richer media would be more inclined to attempt collaboration (H1a) and less inclined to compete (H1b) than negotiators using sparser media. In addition, their collaborative efforts should be more readily perceived (H2). Results are summarized in Table 3 and Figure 3.

Table 3
Bargaining Styles Employed: Collaborating vs. Competing

	Experimental conditions: Communication media				
Dependent variables	Face to face ($n = 42$)	Video-conference ($n = 32$)	Telephone ($n = 42$)	Computer chat ($n = 34$)	χ^2 (3, $N = 150$)
% Collaborating[1]	$76\%_a$	$70\%_{a,c}$	$49\%_b$	$56\%_{b,c}$	7.64
% Competing	$12\%_a$	$47\%_b$	$29\%_b$	$44\%_b$	12.88**
% Collaboration correctly perceived[2]	$67\%_a$	$32\%_b$	35%	$42\%_b$	7.81*

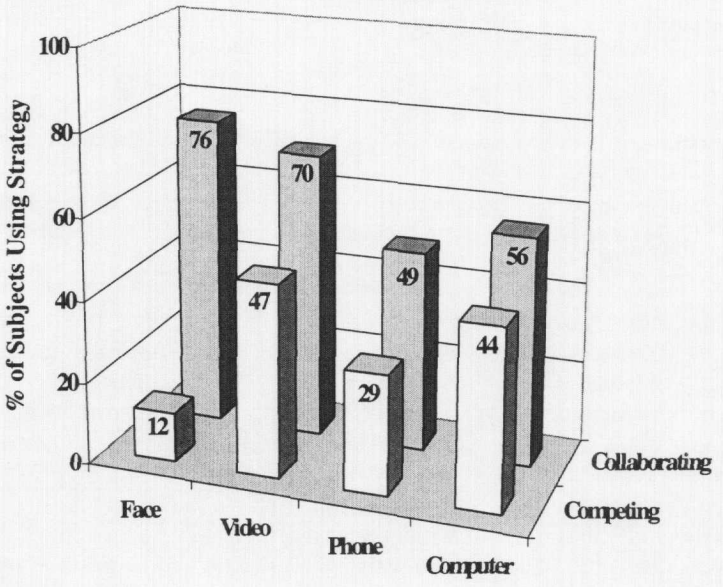
Note: [1]Percent of negotiators who report that they attempted to collaborate. [2]Percent of collaboration attempts that were correctly perceived by opponent. Proportions in the same row that do not share subscripts differ at $p < .05$ based on one-tail tests. Chi-square tests for the interdependence of media and bargaining style are significant at $*p < .05$, $**p < .01$.

Hypothesis 1a and b were supported. Generally, face-to-face subjects were more likely to collaborate and less likely to compete than subjects using less rich communication media. Most face-to-face and videoconference negotiators attempted to collaborate ($P = 76\%$ and 70%, respectively). Face-to-face negotiators were significantly more inclined to collaborate ($P = 76\%$) than either phone ($P = 49\%$, $p < .01$) or computer ($P = 56\%$, $p < .05$) negotiators. In a consistent vein, face-to-face negotiators were much less likely to compete (H1b) than negotiators in the three sparser media conditions, χ^2 (3, $N = 150$) = 12.88, $p < .01$.

Not only were face-to-face subjects more likely to collaborate; but, consistent with Hypothesis 2, their collaborative efforts were more likely to be correctly perceived by the other party. While 67 percent of collaborative attempts were correctly perceived in the face-to-face condition, only 32 percent, 35 percent, and 42

percent of attempts were correctly perceived in the video, phone and computer conditions, respectively, χ^2 (3, N = 150) = 7.81, $p < .05$. A rich media environment may facilitate the complex information exchange that collaboration requires.

Figure 3
Bargaining Styles Employed: Collaborating vs. Competing



Objective Outcomes

Negotiating Time. The time required to complete the negotiation differed dramatically across conditions (Table 4) with the face-to-face condition being most efficient (M = 14.5 minutes) and the computer chat condition being least efficient (M = 47.4), F (3, 71) = 19.65, $p < .001$. This result supports Hypothesis 3. As expected, computer chat required more time than the three richer media, which permit communication by spoken word rather than by typing.

Interestingly, face-to-face bargaining was significantly more efficient than videoconferencing (M = 14.5 vs. 24.4 minutes, $p < .05$). Face-to-face communication provides richer cues than current videoconferencing technology: better audio quality, greater ease of eye-to-eye contact, and a fuller range of visual cues. These relative deficiencies of videoconferencing may impede efficient communication. This result may also reflect subjects' inexperience with videoconferencing. While subjects appeared comfortable with the technology, videoconferencing was the only media with which they lacked previous experience.

Table 4
Objective Outcomes: Means for 75 Dyads

Dependent variables	Experimental conditions: Communication media				
	Face to face (n = 21)	Video-conference (n = 16)	Telephone chat (n = 42)	Computer (n = 17)	F-ratio
Joint profit ($000)	84.0_a	87.1_a	83.2_a	81.4_a	.46
Profit inequity ($000)	6.0_a	14.1_b	15.9_b	15.4_b	3.45*
Time (minutes)	14.5_a	24.4_b	$18.0_{a,b}$	47.4_c	19.65***

Note: Means in the same row that do not share subscripts differ at $p < .05$ based on one-tail tests. F (3, 71) tests for the main effect of media are significant at $*p < .05$, $**p < .01$, $***p < .001$.

The mediation model (Table 1, Models 1, 2, & 3) suggests that media richness affects negotiation time by two routes. First and most powerfully, media richness directly impacts negotiation time, probably by facilitating an efficient exchange of information. Second, bargaining approach (as measured by perceived collaboration) plays a weak mediating role between media richness and time. Media richness enhances collaboration, which in turn reduces required bargaining time. Given the clear logrolling potential of this problem, collaboration may be the most direct and efficient route to a mutually acceptable settlement. This mediated effect is weak compared to the very strong direct impact of media richness on time. Hence, Hypothesis 3M is weakly supported.

Profit. Contrary to Hypothesis 4, subjects negotiating through richer communication media did not achieve significantly higher joint profits (Table 4). Mean joint profit across all media conditions exceeded the $80,000, which could be achieved by simple compromise; but subjects in all conditions fell far short of achieving the full integrative potential ($104,000). Since all subjects were bargaining with their partners for the first time and were told that the relationship would be ongoing, they may have been focused more on relationship building than on identifying integrative potential.

Hypothesis 4M suggests that bargaining approach mediates the impact of media richness on profit. Since media did not impact profit, Hypothesis 4M is not supported. However, note that profit is positively related to perceived collaboration (Table 1, Model 5, $p < .01$).

Profit Inequity. Richer communication media did reduce inequity in the distribution of profits (Table 4), supporting Hypothesis 5. Face-to-face subjects achieved a more equal distribution of profit (mean inequity = $6,000) than did subjects negotiating by video (M = $14,100, $p < .05$), phone (M = $15,900, $p < .05$), or computer (M = $15,400, $p < .05$). Since inequity is strictly a dyadic level

variable, it is not included in our mediation model, which examines individual level outcomes.

Subjective Outcomes

Subjects reported their satisfaction with the outcome and their willingness to negotiate again with the same partner (see Table 5).

Table 5
Subjective Outcomes

	Experimental conditions: Communication media				
Dependent Variable	Face to face ($n = 42$)	Video-conference ($n = 32$)	Telephone ($n = 42$)	Computer chat ($n = 34$)	F-ratio
Outcome satisfaction	5.45_a	$5.09_{a,b}$	4.90_b	4.40_c	4.22**
Desire for future negotiation	6.05_a	5.80_a	5.59_a	4.97_b	3.31*

Note: Means in the same row that do not share subscripts differ at $p < .05$ based on one-tail tests. F (3, 146) tests for the main effect of media are significant at $*p < .05$, $**p < .01$.

Outcome Satisfaction. Negotiators using richer communication media expressed greater outcome satisfaction than negotiators using sparser media, F (3, 146) = 4.22, $p < .01$. Specifically, face-to-face subjects ($M = 5.45$) were more satisfied than both telephone ($M = 4.90$, $p < .05$) and computer chat subjects ($M = 4.40$, $p < .05$). In addition, both videoconferencing and telephone subjects were more satisfied than computer chat subjects ($ps < .05$). These results strongly support Hypothesis 6.

As the mediation model suggests, satisfaction was positively related to profit and negatively related to negotiating time (Table 1: Model 9), which together explain 41 percent ($p < .0001$) of the variation in satisfaction. However, Hypothesis 6M, which suggests that time and profit together will fully mediate the impact of media richness on satisfaction, is only partially supported. Since profit is not impacted by media richness, it does not play a mediating role. However, time does mediate the impact of media richness on satisfaction (Table 1: Models 2, 6, & 8). In this case, media richness influences satisfaction largely by reducing negotiating time. Time and profit do fully mediate the impact of bargaining approach on satisfaction (Table 1: Models 3, 5, 7, & 9).

Desire for Future Negotiation. Negotiators should be more willing to negotiate with a partner again, if they are satisfied with the negotiation outcome (Oliver et. al., 1994). Willingness to negotiate further was positively related to media richness (Table 5), F (3, 146) = 3.32, $p < .05$. However, the only significant differences were between the three richest media ($Ms = 6.05, 5.80, 5.59$) and the computer chat condition ($M = 4.97$). This result supports Hypothesis 7.

Media richness impacts DFN through two routes. First, participants using richer media completed the task in less time. The resulting favorable profit/time trade-off created greater outcome satisfaction and, consequently, a greater desire to negotiate further with the same partner. As expected (Hypothesis 7M), the impact of time and profit on DFN was fully mediated by outcome satisfaction (Table 1, Models 9, 13, & 14).

Second, participants using richer media were more inclined to collaborate rather than compete. Consistent with Hypothesis 8, this more collaborative experience directly increased DFN (Table 1, Model 14). Perhaps, a collaborative exchange can build the necessary rapport for a mutually satisfying long-term relationship. Negotiators who feel that they clearly communicated their interests and were heard may be more satisfied with the process, regardless of outcome, and more inclined to bargain further with their counterpart.

Summary of Results

Results generally support our simple mediation model. Table 6 summarizes our hypothesis tests, while Figure 2 captures the direct relationships confirmed by our tests. Our most important findings are briefly summarized below.

Bargaining Approach. Face-to-face participants were more likely to collaborate and less likely to compete than participants using less rich media. In addition, their collaborative efforts were more likely to be correctly perceived. This ability to effectively collaborate did not generate higher joint profits, but it may help to explain why face-to-face subjects expressed greater desire for future negotiation interaction. It may also help to explain the efficiency with which face-to-face subjects reached agreement, since the tendency to collaborate modestly reduced negotiating time.

Objective Outcomes. Media richness directly reduced bargaining time, but did not affect profits. Participants using richer media achieved more favorable outcomes by generating equal profit in less time than participants using less rich media.

Subjective Outcomes. Media richness does not directly impact subjective bargaining outcomes, but rather impacts them indirectly by influencing the bargaining process and objective outcomes. Media richness impacts satisfaction primarily by reducing the time required to achieve a given profit.

Media richness increased DFN through two paths. First, participants using richer media achieved a more favorable profit/time trade-off, which created greater outcome satisfaction. Satisfaction directly impacted the desire for future negotiation. Second, participants using richer media were more inclined to collaborate rather than compete. This more cooperative bargaining approach directly impacted the desire for future negotiation.

Face-to-Face vs. Videoconferencing. While profit and outcome satisfaction were similar across the two richest media, face-to-face and videoconferencing, a pattern of notable differences was observed. First, subjects negotiating by videoconference were more likely to compete (47% vs. 12%, $p < .05$). Second, in the video condition collaborative efforts were less likely to be correctly perceived by the other party (32% vs. 67%, $p < .05$). The relative ease of perceiving verbal and

visual cues in face-to-face negotiations may contribute to greater success in communicating collaborative intent as well as greater speed in reaching agreement (14.5 vs. 24.5 minutes, $p < .05$). Given current interest in videoconferencing as an alternative to face-to-face negotiation, these differences should be more rigorously explored in future research. As video technologies are refined to provide a richer array of cues, these differences may diminish.

Table 6
Summary of Hypotheses and Findings

Hypothesis	Brief Statement	Finding Supported
1a	Media richness increases collaborative bargaining.	yes
1b	Media richness reduces competitive bargaining.	yes
2	Media richness increases accurate perception of collaborative efforts.	yes
3	Media richness reduces bargaining time.	yes
3M	Bargaining approach (collaboration vs. competition) partially mediates the impact of media richness on bargaining time.	yes
4	Media richness increases bargaining profits.	no
4M	Bargaining approach (collaboration vs. competition) partially mediates the impact of media richness on bargaining profits.	no
5	Media richness results in a more equal distribution of profits.	yes
6	Media richness increases outcome satisfaction.	yes
6M	Bargaining time and profit fully mediate the impact of media richness on outcome satisfaction.	yes[1]
7	Richer media increase the desire for future negotiation.	yes
7M	Outcome satisfaction mediates the impact of bargaining time and profit on desire for future negotiation.	yes
8	A collaborative bargaining approach directly increases the desire for future negotiation.	yes

[1]Time, not profit, mediates the impact of media on satisfaction. Media richness did not impact profit.

Discussion

Our results suggest that rich communication media are more likely to encourage collaborative behavior than poorer media are. This research supports earlier findings by Sheffield (1995), which found that richer communication media are positively associated with integrativeness when negotiators attempt to collaborate. However, our results go a step further by suggesting that richer media can encourage negotiators to collaborate, when they face an integrative problem in the context of an ongoing relationship.

An important finding of this research is that the face-to-face and videoconference conditions generated similar joint profits and satisfaction levels. Previous research had suggested that videoconferencing is less useful for negotiating than for other types of information exchange (Short, Williams, & Christie, 1976; Fulk & Dutton, 1984). Our findings suggest that videoconferencing may be a reasonable substitute for face-to-face negotiation. However, face-to-face bargaining was more time-efficient than videoconferencing, and it better facilitated the communication of collaborative intent.

One explanation for the similarities between face-to-face and videoconferencing negotiation is that there are insignificant differences between these communication media in terms of media richness. However, we hesitate to state equivocally that there are no differences between negotiating in person and via videoconference.

An alternate explanation for the lack of differences with regard to joint profit is that negotiators subconsciously compensate for a lack of media richness. Users often substitute new cues or compensate for the reduction or loss of conventional nonverbal and paralinguistic cues when new media are introduced (Hart, Svenning, & Ruchinskas, 1995). When the new media is similar in media richness to a familiar medium, as in the case of videoconferencing and face-to-face communication, users may learn to compensate very quickly. Although our subjects lacked experience in videoconferencing, their mere awareness of the technology may have allowed them to compensate successfully for reduced media richness without prior experience. Novice users may not compensate as easily when using media with significantly reduced media richness, such as computer-mediated communication. Prior research indicates that for groups using computer-mediated communication to complete a task, experience with technology had a greater impact on task performance than did the type of task being performed (Hollingshead, McGrath, & O'Connor, 1993). Compensating for significantly reduced media richness may require more complex communication behaviors, such as the emoticons used in computer mediated communication to convey tones of humor or sarcasm. As negotiators gain experience with such communication media they may perceive them more positively. People with electronic mail experience have a more positive perception of the richness of electronic mail as a communication medium than those without that experience (Fulk et al., 1990).

While videoconferencing was nearly identical with face-to-face negotiation in terms of joint gains, negotiators should be aware of the potential for the inequitable distribution of these gains. It appears that these two media are equally suitable for

negotiators while they are creating value (joint gains) but unequal when negotiators are claiming value (i.e., distributing gains between the negotiators).

Limitations of this research include the relative simplicity of the negotiation task and cultural biases related to perceptions of time. Our finding that a collaborative style slightly reduced bargaining time may not be supported in all negotiation situations. The negotiation task used in this research required negotiation of three issues and it provided quantitative payoff tables for subjects. In addition, integrative solutions to the task could be found by logrolling, eliminating the need for more complex bridge solutions that may require more time to create. In addition, the finding that bargaining time is inversely related to satisfaction may be more prevalent in Western cultures, particularly in the U.S.

This research extends earlier findings about the impact of communication media on negotiation outcomes by offering a more comprehensive scope and greater external validity. The present study examined four different media using real world technology identical to that commonly employed in business settings. In particular we focused upon two newer media (videoconferencing and CMC) that are rapidly growing in usage. Our contributions also extend beyond basic economic outcomes to include social-psychological outcomes (satisfaction, desire for future negotiation) that have an impact on real world negotiations.

Future research on communication media and negotiations should extend beyond outcomes into processes. Of particular interest is the process in the computer chat condition. Negotiators using computer chat took significantly longer to negotiate, and fewer dyads reached integrative agreements. In addition, negotiators in this condition were significantly less satisfied with their outcomes. Process research may reveal that negotiators using computer-mediated communication frame negotiations differently or employ different negotiation strategies. As the bandwidth of the Internet grows, we can expect to see the development of hybrid communication media such as online videoconferencing combined with computer chat. Future research should investigate how negotiators learn to use multiple communication media, and how the dynamics of such mixed-media interactions impact the quality of the negotiation. Another important area for investigation is whether media richness has a greater impact on cross-cultural negotiations, which are often more complex (Graham, Ki Kim, Lin, & Robinson, 1988). Finally, research should examine how having multiple team members representing each party impacts the relative viability of the different communication media.

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Appendix

A. Buyer's Payoff Table

(profits listed in millions)

	Retailer Margin		Advertising Support		Credit Terms	
	Option	Profit	Option	Profit	Option	Profit
A	10%	0	10%	0	15 days	0
B	15%	2	20%	3	30 days	5
C	20%	4	30%	6	45 days	10
D	25%	6	40%	9	60 days	15
E	30%	8	50%	12	75 days	20
F	35%	10	60%	15	90 days	25
G	40%	12	70%	18	105 days	30
H	45%	14	80%	21	120 days	35
I	50%	16	90%	24	135 days	40

B. Seller's Payoff Table
(profits listed in millions)

	Retailer Margin		Advertising Support		Credit Terms	
	Option	Profit	Option	Profit	Option	Profit
A	10%	40	10%	24	15 days	16
B	15%	35	20%	21	30 days	14
C	20%	30	30%	18	45 days	12
D	25%	25	40%	15	60 days	10
E	30%	20	50%	12	75 days	8
F	35%	15	60%	9	90 days	6
G	40%	10	70%	6	105 days	4
H	45%	5	80%	3	120 days	2
I	50%	0	90%	0	135 days	0

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