

Conversational Argumentation in Decision Making: Chinese and U.S. Participants in Face-to-Face and Instant-Messaging Interactions

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This study investigates cultural and communication medium effects on conversational argumentation in a decision-making context. Chinese and U.S. participants worked in pairs on two decision-making tasks via face-to-face (FtF) and instant messaging (IM). The analyses showed that Chinese participants tended to engage in potentially more complex argumentation, whereas U.S. participants tended to utilize proportionally more statements of claims and statements of convergence (agreements, acknowledgments, and concessions). Argumentation in IM tended to be more direct than in FtF interactions. There were no interaction effects between culture and communication medium on argumentation behavior. In addition, statements of convergence were found to be negatively related to measures of persuasion, indicating that such statements do not necessarily indicate true agreements or shifts in opinion. The results are discussed in terms of structuration theory and the socioegocentric model of communication.

Argumentation is a pervasive mode of discourse, occurring in face-to-face (FtF), mass-mediated and computer-mediated contexts, and in oral and written discourse. Various definitions of argumentation exist, depending on disciplinary and functional orientations to the study of argument (Voss & Van Dyke, 2001). Decision-making dyads and groups engage in argumentation by exchanging claims and

reasons, and expressing agreement and disagreement, in the process of arriving at decisions that are, at least ideally, mutually acceptable to the group's members. Increasingly, as organizations internationalize, collaborative decision making takes place over computer-mediated channels and across diverse cultures. However, there is little research on argumentation in decision-making directly comparing the argumentation behaviors found in computer-mediated interactions with those in FtF interactions or argumentation behaviors in collectivistic cultures with those in individualistic cultures. In this article, we analyze the argumentative discourse moves of dyads consisting either of U.S. or Chinese college students collaborating on decision-making tasks in FtF and instant-messaging (IM) interactions. In addition to investigating how culture and communication technology affect argumentation, we investigate relations between argumentation behaviors and post-discussion agreement between partners and subjective ratings of the tasks.

THEORETICAL FRAMEWORK

Structuration theory has been an influential framework for studying the role of interaction and communicative processes in group decision making. As Poole, Seibold, and McPhee (1985) stated, "Structuration refers to the process of production and reproduction of social systems via the application of generative rules and resources [i.e., structures]" (p. 76). The underlying structures that support social systems emerge through processes of interaction. Argumentation is a key aspect of human interaction in collaborative decision making. A structurational approach to argumentation insists on studying arguments within the context of the interactions in which they occur and is sensitive to the notion that argumentative structures are culturally dependent. Further, it sees argumentation and decision-making processes as interlinked—that is, how argumentation unfolds in interaction depends on the demands of the decision-making context while the unfolding of argumentation may alter the decision-making context (Seibold & Meyers, 1986).

Structuration theory places interaction and communicative processes at the center of collaborative decision making. In contrast, Hewes (1996) proposed that communicative processes do *not* influence decision making, or at least that the evidence for such influence is not yet conclusive. Instead, he argues that communication may at most mediate and at worst be irrelevant to the cognitive and social factors that are the "true" determinants of decision-making outcomes. As an alternative to models of group decision-making, such as structuration, that assume that communication is constitutive of decision-making processes, Hewes proposed what he called the "socioegocentric model" of group communication. This model posits that, because of the high cognitive load of generating thoughts and contributing to a conversation, decision-making conversations are structured by "nonsubstantive" conversational turn-taking rules and the expression of "vacuous

acknowledgements.” Conversational turn taking and vacuous acknowledgments socially organize communication and “add to the illusion of influence in idea development and persuasion” (p. 197), without necessarily directly influencing decision-making outcomes.

The following short exchanges from Hewes (1996, p. 197) illustrate socioegocentric speech in which the second speaker in each exchange expresses acknowledgment, but the contribution does not indicate that the first speaker has influenced his or her thinking in any substantive way:

- A: I really believe that educating students about the dangers of bike accidents would help to reduce them.
- B: Right! I’ve also been thinking that maybe we ought to improve bike routes as a step toward solving our problem.

[...]

- C: How about building an underpass for bikes on Sierra?
- D: I can see your point, but how about more money being put into traffic lights?

These exchanges are sensible, and the second contributions (B and D) are relevant. However, according to Hewes, the available evidence in these exchanges does not show necessarily that A or C influenced B or D’s thinking on the issue at hand, and the ultimate decision may not be greatly influenced by what transpires in these exchanges. In other words, what is significant about the exchange may be that participants are displaying their preferences and not that they are taking their partners’ perspectives into account and revising their preferences based on those exchanges. A recent study found that participants were unable to discriminate between real group interactions and computer-generated interactions designed to conform to a socioegocentric framework, showing that Hewes’ account is at least plausible (Corman & Kuhn, 2005). Further evidence from cognitive psychology suggests that discourse is egocentric in that interlocutors tend to design their utterances based on their own, rather than mutual, contextual knowledge and to assume that others have the same contextual knowledge as themselves, even if those others would not have had access to that contextual information (Barr & Keysar, 2005).

The majority of research on collaborative decision making in social psychology and communication studies is conducted in the United States and other Western cultures. Of course, researchers interested in structural perspectives on decision-making interactions can and should make other cultural perspectives more central to their research programs. Specifically, culture can be considered a structure and a system in structural theory; members of different cultures draw on different symbolic resources (structures), which are manifest in different conversa-

tional practices (systems) (e.g., see Carbaugh, 2005). Thus, we should expect that the structuration of arguments would proceed differently depending on the culture in or from which these arguments occur. Similarly, the affordances of different communication technologies, which provide different levels of context and feedback, may also support different discursive structures, which manifest themselves in different systems of communication such as impersonal or hyperpersonal communication styles (Walther, 1996).

Likewise, researchers who wish to critique more discourse- or communication-focused decision-making research from the perspective of the socioegocentric model also need to consider the roles of culture and technology. The studies that support the socioegocentric model of communication were conducted in the context of Western, U.S. culture (Barr & Keysar, 2005; Corman & Kuhn, 2005; Hewes, 1996). So, the observation that decision-making conversations tend toward a lack of perspective taking and an excess of vacuous acknowledgments may characterize U.S. or Western discourse styles, rather than human interaction in general. For the socioegocentric critique of structural or other discourse-based models of collaborative decision making to hold, its predictions should bear out in other cultural contexts. In addition, socioegocentric communication could be more pronounced in anonymous, text-based communication technology than in richer context communication technology.

The purpose of the research reported in this article is twofold: (a) to compare the argumentation systems evident in the decision-making interactions of participants working with (potentially) different discursive structures: namely, individualistic (i.e., United States) or collectivistic (i.e., Chinese) culture, and high-context (i.e., FtF) or low-context (i.e., IM) communication technologies; (b) to investigate to what extent argumentation systems evident in interaction influence the opinions of the individual participants in the interactions. A related study on the present data found that Chinese participants show nearly complete agreement with their partners post discussion, whereas U.S. participants tend to show greater post-discussion disagreement with their partners (Setlock, Fussell, & Neuwirth, 2004; there was no effect of communication medium on post-discussion agreement). In terms of conversational efficiency, Chinese pairs engaged in much longer interactions than did the U.S. pairs, although this cultural difference was mitigated when the interactions were over IM (Setlock et al., 2004). Thus, the overarching research question for this study is: Do differences in the argumentative discourse moves of these interactions explain differences in the individual opinions post discussion? Structuration theory suggests that post-discussion outcomes should be closely related to the argumentative interactions that produced those outcomes; the socioegocentric model suggests that these outcomes may have little to do with communication processes but instead with other, non-substantive aspects of the interactions (e.g., the length of the interaction). The next section reviews the research and proposes hypotheses regarding the potential effects of culture on the

structuration of conversational arguments. The following section reviews the research and proposes hypotheses regarding the potential effects of communication technology, as well as the potential for interaction effects between culture and communication technology.

CULTURE AND THE STRUCTURATION OF CONVERSATIONAL ARGUMENTATION

Cross-cultural comparisons of interpersonal communicative behavior is an increasingly important area of research. Much of this research draws on two related theoretical frameworks. First, cultures may be described as *individualistic* or *collectivistic*. The former emphasizes the independence of individuals, whereas the latter emphasizes the interconnectedness of individuals in the context of social behavior and interactions (e.g., Triandis, 1995). Western cultures, in particular the United States, tend to be more individualistic and less collectivistic than Asian cultures; these differences explain cross-cultural differences in a number of cognitive and social dimensions (Oyserman, Coon, & Kemmelmeier, 2002). Second, cultures may be described as *low context* or *high context*. In the former, associated with U.S. and other Western cultures, much of the meaning of any given verbal message is primarily encoded linguistically; whereas in the latter, associated with China and other Eastern cultures, much of the meaning is encoded in the context, such as the social roles of the interlocutors and other paralinguistic cues (Hall, 1976).

It should be noted here that although sometimes powerful ways of describing broad cultural differences in social behavior, distinctions between individualism and collectivism or high-context and low-context cultures can obscure as much as they illuminate. As Miller (2002) noted, cultural constructions of self, group, and context are quite nuanced and can vary across cultures typically lumped together under broad “global” headings (see also, Zhang, Lin, Nonaka, & Beom, 2005). We recognize, therefore, a certain amount of essentializing in our theoretical framework and literature review of cross-cultural communication research. We also highlight some of the complexity involved here showcasing the different, potentially contradictory, ways that cultural orientations may structure argumentation—specifically face management/relational constraints and conflict resolution styles—and we propose a set of competing hypotheses because there is not a single, unitary symbolic structure that determines culture-based differences in communicative systems.

Although research suggests cross-cultural differences in the comprehension and production of conversational indirectness and politeness strategies (e.g., Ambady, Koo, Lee, & Rosenthal, 1996; Holtgraves, 1997; Holtgraves & Yang, 1992), it is not clear precisely how such differences might influence argumentation

in collaborative decision making. On one hand, collectivism is associated with relational constraints such as not hurting others' feelings, avoiding negative evaluations, and minimizing imposition, whereas individualism is associated with outcome-oriented constraints such as clarity and effectiveness (Kim et al., 1996). Similarly, members of collectivistic cultures tend to show more concern for other's face, whereas those from individualistic cultures tend to show more concern for self face in conflict situations (Oetzel et al., 2001). In the context of interpersonal influence, Japanese participants tend to be more concerned with protecting both the negative and positive face of their target than are U.S. participants (Cai & Wilson, 2000). (*Face* refers both to desires to be "unimpeded" ["negative face"] and for social approval ["positive face"]; Brown & Levinson, 1987).

Although the aforementioned research suggests that members of collectivistic cultures may favor indirect, other, and mutual face-saving argumentation in collaborative decision making, research on conflict resolution suggests that more direct discourse strategies might instead be favored. Among a number of potential conflict resolution styles, integrating (which includes openly discussing information and disagreements and seeking a mutually acceptable conclusion) was the most preferred for all participants, but members of collectivistic cultures tended to prefer integrating and compromising more so than members of individualistic cultures (Cai & Fink, 2002). Chinese and Taiwanese participants report "direct appeals," along with "hinting," "setting an example," and "strategic agreement" as being common strategies in interpersonal influence (Ma & Chuang, 2001). In a study of organizational communication, East Asians favor indirect conflict strategies only when dealing with organizational superiors; otherwise, they were no more indirect than Australians (Brew & Cairns, 2004), suggesting that equal levels of conversational directness might be expected where power between participants is equal. Finally, in a study of decision-making discussions, Chinese participants self-report being more dominating and less respectful than do U.S. participants (Harris & Nibler, 1998).

With respect to argumentation specifically, Warnick and Manusov (2000) found that Asians are more likely to use deductive arguments in conversation than are U.S. participants regardless of ethnic group (African, Asian, or European), which suggests a more direct argumentative strategy than might be expected (although Warnick & Manusov, 2000, suggested that this may be a function of the U.S. university setting where the study was conducted). Hample's (2005) research on interpersonal argumentation identified three frames in which people situate their argumentative activities: the first is focused on "one's primary goals," the second on "connecting with others' goals," and the third on "reflecting on the experience of arguing." The first and second of these frames can be mapped onto an individualistic-collectivistic cultural framework. Thus, we might expect members of individualistic cultures to orient to "instrumental" argument goals, which in the context of task-oriented arguments includes quickly resolving the task. On the other hand,

members of collectivistic cultures may orient to “cooperative” argument goals, which, according to Hample, involve negotiating “face” versus “substantive” concerns.

Based on the aforementioned review of the literature, we pose the following hypotheses regarding the *starting points* of argumentation—making claims and asking questions (Canary, 1992). First, because members of individualistic cultures tend to favor effectiveness and efficiency, consider our first hypothesis:

H1: U.S. participants will utilize a greater proportion of claims than Chinese participants.

Second, because members of collectivistic cultures tend to orient toward interconnectedness, consider our second hypothesis:

H2: Chinese participants will utilize a greater proportion of questions (seeking responses from their partners) than U.S. participants.

With respect to other argumentative discourse moves, we propose the following sets of competing hypotheses, depending on whether face or intersubjective goals tend to be favored by members of collectivistic cultures. If collectivistic cultural discourse structures emphasize face goals, then we might hypothesize that, in general, Chinese participants’ argumentation systems will be characterized by indirect and non-confrontational discourse moves compared to U.S. participants, resulting in the following specific predictions:

H3a: U.S. participants will utilize a higher proportion of reasons than Chinese participants.

H4a: Chinese participants will utilize a higher proportion of convergence (agreement, acknowledgment, concession) than U.S. participants.

H5a: U.S. participants will utilize a higher proportion of disagreement (objections, challenges, defenses) than Chinese participants.

However, if collectivistic cultural discourse structures favor intersubjective goals, then we might hypothesize that, in general, Chinese participants’ systems will be characterized by more direct discourse moves compared to U.S. participants, resulting in the following specific predictions:

H3b: Chinese participants will utilize a greater proportion of reasons than U.S. participants.

H4b: U.S. participants will utilize a greater proportion of convergence markers than Chinese participants (particularly if statements of convergence tend to

be “vacuous” as suggested by the socioegocentric model of communication).

H5b: Chinese participants will utilize a greater proportion of disagreement than U.S. participants.

COMMUNICATION MEDIUM AND THE STRUCTURATION OF CONVERSATIONAL ARGUMENTATION

Early research comparing interactions in FtF and computer-mediated communication (CMC) found that CMC is marked by a lack of social context and agreed-on norms, resulting in more impersonal communication (Kiesler, Siegel, & McGuire, 1984). Early research in decision-making contexts shows that computer-mediated groups are more likely to be “task-oriented” than FtF groups (Hiltz, Johnson, & Turoff, 1986) and more likely to engage in “flaming” or other negative communicative behaviors (Kiesler & Sproull, 1992; Siegel, Dubrovsky, Kiesler, & McGuire, 1986). More recent research suggests that CMC does not necessarily result in more task-oriented nor in more negative communicative behavior (e.g., Coleman, Paternite, & Sherman, 1999; Straus, 1996; Taylor & MacDonald, 2002; Walther, 1995). Walther (1992, 1996) suggests that the differences between FtF and computer-mediated groups in earlier research are not the result of the technology itself but are instead due to other situational factors, such as anonymity and whether participants anticipate future interactions. When interlocutors are not anonymous and expect to communicate with one another in the future, CMC is no more impersonal than FtF interaction. However, when interlocutors are anonymous, no future interactions are anticipated, and the goals of the interaction are not interpersonal (i.e., are task oriented), then we may expect more impersonal communication in CMC.

There is very little research directly comparing argumentation in FtF versus computer-mediated contexts, although some studies of group argumentation have been done on computer-mediated groups (Brashers, Adkins, & Meyers, 1994; Lemus, Seibold, Flanagan, & Metzger, 2004). In a study on small groups of managers performing a decision-making task on risk taking, McGuire, Kiesler, and Siegel (1987) found evidence that there may be differences in argumentation in these contexts. They found that managers’ decisions conformed to the predictions of prospect theory (i.e., the tendency to be risk averse in gain situations and to be risk seeking in loss situations) only in the FtF condition. They reasoned that because FtF discussions were longer and had proportionally fewer assertions (i.e., statements of claims) than did computer-mediated groups, FtF groups produced more complex argumentation that allowed prospect theory norms to influence these groups. However, in this study, argumentation was operationalized as the proportion of comments made that were not assertions, so there was no consider-

ation of the different kinds of discursive moves that may be made in conversational arguments. Although they did not directly compare FtF and computer-mediated groups, Lemus et al. (2004) found in their sample of computer-mediated groups differences in the frequency of several argument behaviors compared to a study of FtF arguments (Meyers, Seibold, & Brashers, 1991). Without a direct comparison between FtF and computer-mediated conditions, it is unclear whether any such differences are the result of differences in medium or differences in the sample or task.

IM is an increasingly commonly used CMC technology, in both interpersonal and organizational contexts (Shiu & Lenhart, 2004). Therefore, scholarly attention to IM use and effects is increasing as well. Some factors of IM as a communication technology that may affect argumentative discourse include that it is synchronous, precluding more carefully planned contributions that are possible (although not necessary) in asynchronous communication technology such as e-mail or discussion boards (Loewenstein, Morris, Chakravarti, Thompson, & Kopelman, 2005), it is perceived as informal in comparison to other communication technology (Cameron & Webster, 2005), and is associated with lower task satisfaction, but similar task performance, relative to other communication technology (Simon, 2006). Although these and other studies have investigated the uses and outcomes of IM in organizations, comparisons of argumentative discourse in IM and FtF interactions are less common in the literature.

Based on the aforementioned literature, we make the following predictions regarding argumentation in FtF versus IM interactions, reflecting more direct, task-oriented argumentation in IM interactions:

- H6: IM interactions will utilize a greater proportion of claims than FtF interactions.
- H7: FtF interactions will utilize a greater proportion of questions than IM interactions.
- H8: IM interactions will utilize a greater proportion of reasons than FtF interactions.
- H9: FtF interactions will utilize a greater proportion of convergence than IM interactions.
- H10: IM interactions will utilize a greater proportion of disagreement than FtF interactions.

Potential Interactions Between Culture and Medium

Both culture and communication technology can be described as high context or low context. Individualistic cultures tend to be low context, whereas collectivistic cultures tend to be high context; text-based communication technology like IM tend to be low context, whereas FtF interactions tend to be high context. Thus, in-

interactions between high- and low-context cultures and high- and low-context communication technology might be expected. For example, members of high-context cultures communicating using low-context communication technology may adopt discourse strategies and norms that are more similar to those of members of low-context cultures.

Some research on culture and group decision support systems (GSS) suggests that, although there are main effects for both culture and medium on communicative behavior, there tend not to be interactions between culture and medium in communicative behavior (e.g., Reinig & Mejias, 2002, 2004). However, other studies suggest that there are interactions between culture and communication medium effects on process in decision-making contexts. Majority influence, that is, the tendency for majorities to impose their opinions on a group as a whole, is mitigated in CMC for groups from an individualistic culture but not from a collectivistic culture (Tan, Wei, Watson, Clapper, & McLean, 1998). In terms of discourse processes, GSS leads to fewer “valid” and “novel” statements in decision-making conversations for groups from individualistic cultures, whereas GSS had less effect on these variables for groups from a collectivistic culture (El-Shinnawy & Vinze, 1997). Therefore, we pose the following research question regarding culture and medium:

RQ1: Are there interaction effects between culture and medium on the structuration of conversational arguments?

Finally, in addition to the earlier hypotheses and research question, we pose two additional research questions addressing relations among argument behaviors and relations between argument behaviors and task outcomes:

RQ2: Which argument behaviors are correlated with one another in these decision-making conversations?

RQ3: What correlations exist between argument behaviors and persuasion and participants' subjective assessments of the interactions?

RQ2 investigates what argumentation behaviors are related to other argumentation behaviors, allowing us to consider, for example, to what extent statements of convergence or of disagreement are related to more or less reasoning activity or statements of claims, suggesting more or less complex argumentation. RQ3 investigates whether there is any relation between any argumentation behaviors and persuasion as defined as shifts in opinions post discussion as well as whether any argumentation behaviors are related to positive or negative assessments of the interaction. Although prior research has compared argumentation behaviors be-

tween consensus and non-consensus groups, relations between specific behaviors and shifts in opinion have not been established in the existing research literature.

METHOD

Participants

Thirty participants were recruited from Carnegie Mellon University and the University of Pittsburgh. Sixteen were nationals of the United States and spoke English as their first language, and 14 were visiting students from the People's Republic of China and had been in the United States for fewer than 2 years and were fluent or nearly fluent in English. Among the U.S. participants, 1 self-identified their ethnicity as African American/Native American, 6 as Caucasian or White, 1 as Hispanic, 1 as Korean, 1 as Taiwanese/Asian, 6 as either "none" or no response. Participants' ages ranged from 18 to 32 years. The sample consisted of 13 women, 13 men, and 4 participants who did not indicate their gender. Although some of these participants may have met one another prior to the experiment, they did not know who their partners would be before the experiment. Participants were compensated \$15 for their time.

Procedure

Each pair completed two decision-making tasks (Human Synergistic Corporations' Desert Survival and Arctic Survival tasks), one in FtF and the other via IM, creating a total of 30 conversations. Tasks and media conditions were counterbalanced. Each scenario included six salvaged items (e.g., water purification tablets) that participants ranked in order of importance for survival. Separately, each participant was given 10 minutes to read the scenario and rank the items. Then, either FtF or in separate rooms over computers equipped with AOL Instant Messenger, each pair was instructed to "perform the same task, this time working with your partner to reach the best possible consensus. You may discuss the reasons for your rankings as you attempt to come to the best decision." Pairs were given up to 20 minutes to complete this part of the task. All of the conversations ended in agreement before the time limit expired. After coming to a consensus, each participant separately ranked the items again and was instructed that "these [rankings] may be the same as your original answers, your joint answers, or entirely different." After completing both tasks, participants completed post-experiment questionnaires, were debriefed, and compensated. The total time for the experiment was no more than 90 minutes.

Transcripts

FtF conversations were transcribed, and the IM logs were saved. These transcripts were divided into thought units, defined by Hatfield and Wieder-Hatfield (1978) as “the minimum meaningful utterance having a beginning and an end” (p. 46). Typically, a conversational turn was coded as an individual thought unit, but when a single thought or idea was expressed across multiple turns, these turns were combined to form a single thought unit (e.g., in a 3-turn sequence such as, “I chose the matches ... ” “Yeah.” “ ... first,” “I chose the matches first” would be considered a single thought unit). Also, when different ideas were expressed in the same turn, for example, by indicating that a reason is being offered for a claim (e.g., “I chose the matches, *because* we will need a fire”), these were split into separate thought units.¹

Coding

The transcripts were coded using a revised version of the Conversational Argument Coding Scheme (CACS; Canary, 1992; Canary, Brossmann, & Seibold, 1987; Meyers et al., 1991). The revised CACS coding scheme that we utilize in this study divides argumentative utterances into five broad categories: *starting points*, which includes statements of claims (“I think the water is most important!”) and questions that elicit a response from the partner (“Umm ... what do you have for number one?”); *reasoning activities*, which includes statements that provide reasons for a claim (“the reasons are 1, the water is most important in the high temp”) or hypothesize about the task (“If our speed is 6 km per hour, it is longer than 18 h”); *convergence markers*, which includes statements of agreement with the partner (“Okay, I agree with the matches”), of common ground or acknowledgment of the partner (“So we’re pretty much ... our three are the same three types of things”), and concession to the partner (“Well, I’d definitely be willing to agree with the canvas being number 4”); *disagreement-relevant intrusions*, which includes statements that object to a partner’s contribution (“I don’t think so”), challenge a partner’s argument (“the pistol is better than the flashlight in my point of view”), or defend against a partner’s objection or challenge (“22 miles isn’t that

¹One half of the transcripts were divided into thought units by Leslie D. Setlock, the other by one of the trained coders. Both used the following guidelines to parse the transcripts, based on Hatfield and Weider-Hatfield (1978): (a) Look for beginnings and ends of statements or ideas. If the syntax suggests that there is a single idea being expressed—for example, together the turns or lines express a single clause, or an independent clause and then a closely related dependent clause, then these should be combined as a single thought unit; (b) look for clear breaks in idea—things that indicate a different idea is being expressed. This might be a shift in topic, or indication of a shift from making a claim to giving a reason (e.g., because, since, etc.), or other indications of a shift (e.g., but, however, etc.).

far, so I don't think food is that important"); and *non-argument*, which includes back-channel feedback or incomplete statements.

Intercoder Reliability

Two trained coders independently coded all but two of the transcripts.² Cohen's kappas were calculated for each of the five metacategories described earlier: starting points, $k = .81$; reasoning activity, $k = .69$; convergence markers, $k = .66$; disagreement-relevant intrusions, $k = .60$; non-arguable, $k = .78$. Thus, the reliability in this study is comparable to previous versions of the CACS, which typically range from $k = .60$ to $.70$ (Meyers & Brashers, 1995). The coders met to discuss the transcripts until they reached 100% agreement. This jointly coded data is analyzed in the results section.

Dependent Variables

Persuasion was measured by the size of difference between partners' pre- and post-discussion rankings and by the degree of change between partners' pre- and post-discussion rankings. Post-discussion *agreement* was computed by summing the absolute values of the differences in ranking for each item after the pairs' discussion, with lower scores indicating more agreement (e.g., if one partner ranked an item first, and the other ranked the same item third, the absolute value of the difference is 2). Post-discussion *change* is a measure of each pair's change from their initial to final rankings, with higher scores indicating that a pair experienced more change from their initial rankings to their final rankings (indicating that the pair's members changed their minds after discussion, even if they do not completely agree with one another). The range of possible values for both variables was 0 (*complete agreement/no change*) to 18 (*complete disagreement/complete change*).

In addition, after each task, participants completed a 12-item questionnaire in which they assessed their experiences completing the task. This questionnaire consisted of items such as "This method of working together was effective" and "We disagreed often," which participants rated on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). These responses were subjected to factor analysis with Varimax rotation. Three factors were evident, corresponding to ratings of quality of *collaboration* (e.g., "my partner was responsive to my ideas," "my partner treated me fairly"), of *task performance* (e.g., "we wasted time on this task," "we agreed on our final answers"), and of *frustration* (e.g., "the task was frustrating"). These factors were collapsed into single measures by averaging par-

²The data for one pair was recovered after all of the other transcripts had been coded. Thus, both the face-to-face and instant-messaging transcripts for this pair were coded by only one of the trained coders.

ticipants' responses on the questions corresponding to each factor. These factors accounted for 30%, 27%, and 13% of the variance, respectively.

Statistical Analysis

Hypotheses concerning the effects of culture and communication medium on use of CACS categories were tested using mixed-models analyses of variance (ANOVAs) using *participant within pair* as a random factor, *media condition* (FtF or IM) as a within-subjects fixed variable, and *culture* (United States or Chinese) as a between-subject fixed variable. Mixed-models ANOVA, unlike traditional repeated measures ANOVA, allows us to account for the fact that dyad members' communicative behaviors may not be independent of one another. Because trial and task (arctic vs. desert) showed no effects on any of the dependent measures in our preliminary analyses, we do not include them in the final analyses reported later.

RESULTS AND DISCUSSION

We discuss the results in three parts: First, we describe the results of mixed-models ANOVAs analyzing the effects of culture and medium on the use of CACS categories. Then, we present correlations among the different argument behaviors and between argument behaviors and outcome measures.

Cultural Effects on Argumentation

H1: Claims. H1 predicted that U.S. participants would use proportionally more claims than Chinese participants. This hypothesis was supported, $F(1, 28) = 14.56, p = .001, \eta^2 = .34$. This finding suggests that more of the U.S. participants' argumentation was devoted to simply stating their claims, precluding other kinds of argumentative discourse.

H2: Questions. H2 predicted that Chinese participants would use proportionally more questions than Chinese participants. This hypothesis was not supported, $F(1, 28) < 1, ns$. Both U.S. and Chinese participants asked questions in roughly the same proportions.

H3: Reasons. Chinese participants used proportionally more reasoning activity than did U.S. participants, $F(1, 28) = 6.16, p < .02, \eta^2 = .18$, as predicted by H3b. This finding is consistent with the overall prediction that Chinese participants would orient toward intersubjective argumentation goals, resulting in a greater proportion of their discourse moves being devoted to offering reasons for their claims.

H4: Convergence. U.S. participants used proportionally more convergence markers than Chinese participants, $F(1, 28) = 18.37, p < .001, \eta^2 = .40$, as predicted by H4b. This finding is also consistent with the overall prediction that Chinese participants would orient toward intersubjective argument goals, devoting less of their interactions toward expressions of agreement and acknowledgment and more toward other kinds of argumentative discourse moves, enabling greater intersubjective understanding of the task.

H5: Disagreement. Chinese participants utilized proportionally more disagreement-relevant intrusions than did U.S. participants, $F(1, 28) = 15.92, p < .001, \eta^2 = .36$, as predicted by H5b. Thus, this last cultural comparison is also consistent with the overall predictions regarding Chinese participants orienting toward intersubjective argument goals, making clear where they disagreed and working through those disagreements.

Discussion of cross-cultural comparisons. Overall, these differences support the idea that the structuration of conversational argumentation differs by culture. Specifically, Chinese participants oriented toward collectivistic, cooperative goals in their arguments, whereas U.S. participants oriented toward individualistic, instrumental goals. On average, 32% of the U.S. participants' thought units expressed convergence, compared with 18% for Chinese participants; and 18.4% stated claims, compared with 11.5% for Chinese participants. In other words, one half of the thought units in the U.S. participants interactions were devoted to stating claims and convergence, leaving little room for complex argumentation. On the other hand, Chinese participants were twice as likely as U.S. participants (6.9% vs. 3.5%) to engage in disagreements with their partners and 1½ times as likely (15.5% vs. 9.4%) to engage in reasoning activity, suggesting more complex argumentation and a greater orientation to substantive, intersubjective discourse goals rather than face-oriented goals in their argumentation (cf. Hample, 2005).

Compare, for example, the following extracts. The first is from a Chinese pair and represents the beginning of a 142-turn IM conversation; the second is from a U.S. pair and comprises an entire IM conversation:

Chinese Pair (IM transcript):

- (1) A: hi, partner
- (2) B: which is most important one you think
- (3) A: i pick up syrup as first
- (4) B: my is the water tablets
- (5) B: why syrup
- (6) B: i think they will need water most
- (7) A: since food is first=

- (8) A: =when they have water around
- (9) B: but syrup is not very good food
- (10) B: but those water are sea water
- (11) A: right... but at least [fish] can be eaten
- (12) B: if they are hungry than can catch sea fishes to eat
- (13) B: so they will need matches
- (14) A: if they are not used to live near rivers, how can they catch fish??

U.S. Pair (IM transcript):

- (15) C: I was thinking that water would be the most valuable item, what do you think?
- (16) D: Yes, I agree
- (17) D: I'm not exactly sure what to put for #2 though.
- (18) D: I know it gets cold at night in the desert, but is a jacket vital?
- (19) C: I do not think so in august.
- (20) C: how about the book?
- (21) D: Yes, the book should be right after water then, I think
- (22) C: after that i'm a bit hazy.. how about you?
- (23) D: Yes, I feel the same way.
- (24) D: I thought maybe a mirror would be useful for cooking or something
- (25) D: The flashlight seemed kind of useless unless there was something important to see at night.
- (26) C: indeed. The mirror, then?
- (27) D: okay
- (28) D: Hmm. The rest don't really come into play.
- (29) D: how would you rank the last three?
- (30) C: I thought, flashlight, gun (in case of wolves), then jacket
- (31) D: Okay
- (32) D: sounds good to me
- (33) C: great.

As lines 1 through 14 illustrate, the Chinese argument systems tended toward reason giving (A's contributions in lines 7 and 8) and expression of disagreement (B's contributions in lines 5, 6, 9, and 10) where applicable. Indeed, A even seems to offer a disagreement with himself (lines 11 and 14). The orientation toward intersubjectivity is neatly illustrated here, even if it can seem contentious. Conversely, as lines 15 through 33 illustrate, U.S. argument systems to some extent resist what we might think of as argumentation supporting or rejecting positions. However, in this short conversation, the U.S. participants express a great deal of agreement or common ground with one another, as shown in lines 16, 22, 23, 26, 27, 31, 32, and 33.

Medium Effects on Argumentation

H6: Claims. H6 predicted that IM would result in proportionally more statements of claims than FtF. This prediction was supported, $F(1, 28) = 9.50, p < .01, \eta^2 = .25$. Participants interacting over IM devoted proportionally more of their argumentation to statements of claims than did participants interacting FtF.

H7: Questions. H7 predicted that IM would result in proportionally fewer questions than in FtF. This hypothesis was not supported, $F(1, 28) < 1, ns$. Participants interacting FtF or over IM utilized roughly the same proportion of questions in their interactions.

H8: Reasons. H8 predicted that IM would result in proportionally more statements of reasoning activity. This hypothesis was supported, $F(1, 28) = 5.84, p < .05, \eta^2 = .17$. Participants interacting over IM devoted a greater proportion of their argumentation to stating their reasons than did participants interacting FtF.

H9: Convergence. H9 predicted that IM would result in proportionally fewer statements of convergence. This hypothesis was not supported, $F(1, 28) = 2.75, p = .11$. Participants interacting FtF or over IM utilized roughly the same proportions of convergence markers.

H10: Disagreement. H10 predicted that IM would result in proportionally more statements of disagreement-relevant intrusions. This hypothesis was supported, $F(1, 28) = 6.93, p < .02, \eta^2 = .20$. Participants interacting over IM utilized a greater proportion of their argumentation expressing where they disagreed than did participants interacting FtF.

Discussion of medium comparisons. These findings are consistent with the idea that the structuration of conversational arguments varies by medium. Specifically, these findings fit with Walther's (1996) account for when more impersonal communication will occur in computer-mediated contexts. On average, more disagreement (6.3% vs. 3.9%), more claims (17.7% vs. 12.7%), and more reasoning activity (13.9% versus 10.5%) were expressed in IM than in FtF discussion. These results suggest that text-based CMC that is (semi)anonymous, task-oriented, and one-time only tends to be impersonal, which is consistent with greater statements of claims, reasons, and open expressions of disagreement in IM compared to FtF.

TABLE 1
Mean Proportion of Argument Behaviors by Cultural Group
and Media Condition

Behavior	Overall	Culture		Medium	
		Chinese	United States	FtF	IM
Claims	.15 (.08)	.11 (.05)	.18 (.09)***	.13 (.08)	.18 (.07)**
Questions	.12 (.08)	.13 (.07)	.11 (.09)	.11 (.08)	.13 (.09)
Reasoning	.12 (.08)	.15 (.06)	.09 (.09)*	.10 (.08)	.14 (.09)*
Convergence	.26 (.13)	.18 (.07)	.32 (.13)***	.24 (.11)	.27 (.14)
Disagreement	.05 (.04)	.07 (.04)	.04 (.03)***	.04 (.03)	.06 (.04)*
Non-arguing	.30 (.15)	.35 (.14)	.25 (.15)	.38 (.14)	.22 (.13)

Note. $N = 60$. Significant comparisons by culture and medium; no interactions between condition and medium were significant; standard deviations are in parentheses. FtF = face-to-face interactions; IM = instant messaging interactions.

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

Interaction Effects

RQ1 asked whether there are any Culture \times Medium interactions in argumentation. There were no significant interactions. The mean proportions and standard deviations for each earlier comparison are presented in Table 1.

Correlations Among Argument Behaviors

RQ2 asked what correlations exist among argument behaviors. As shown in Table 2, higher proportions of both claims and convergence markers are negatively related to reasoning activity ($p < .01$). Disagreement is positively related to reasoning activity ($p < .05$). Disagreement is negatively correlated with convergence markers ($p < .05$) and with claims ($p < .05$). Consistent with the earlier comparisons, these correlations show that arguers who use proportionally more claims or convergence are less likely use reasoning activity in their conversations, but that those who express more disagreement were more likely to use reasoning activity. Moreover, those who express proportionally more disagreement also tend to state proportionally fewer claims, as well as fewer convergence markers.

Correlations Between Argument Behaviors and Outcome Measures

RQ3 asked what relations exist between argument behavior and measures of persuasion and subjective assessments of the interactions. As shown in Table 3, convergence markers were positively correlated with the distance between final individuals

TABLE 2
Correlation Matrix for Argument Behaviors

<i>Behavior</i>	<i>Claims</i>	<i>Questions</i>	<i>Reasoning</i>	<i>Convergence</i>	<i>Disagreement</i>
Claims					
Questions	-.046				
Reasoning	-.347**	-.054			
Convergence	.210	-.127	-.368**		
Disagreement	-.330*	.148	.289*	-.285*	

Note. $N = 60$.

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

TABLE 3
Correlations Between Argument Behaviors and Outcome Variables

<i>Behavior</i>	<i>Agreement</i>	<i>Change</i>	<i>Collaboration</i>	<i>Task</i>	<i>Frustration</i>
Claims	.119	-.107	-.046	.207	.182
Questions	-.193	.179	.019	.171	.094
Reasoning	-.078	.113	.251	-.267*	-.014
Convergence	.307*	-.518**	-.243	-.108	-.094
Disagreement	.033	.186	-.045	-.045	.175

Note. $N = 60$. Higher numbers for agreement indicate greater difference between partners' post discussion.

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

rankings ($p < .05$) and negatively correlated with change from first rankings to final rankings ($p < .01$), showing that more statements of convergence tended to be associated with less agreement at the end of the discussion and less change from initial rankings.³ These correlations suggest that convergence markers can indeed be vacuous, as suggested by the socioegocentric model of communication. These relations between convergence and our measures of persuasion may explain why these utterances were favored by individualistic, U.S. participants rather than collectivistic, Chinese participants. Reasoning activity was negatively correlated with task rating ($p < .05$), showing that participants who used more reasoning activity tended to rate the task less highly. Otherwise, none of the argument behaviors that were coded for in this study were significantly correlated with either persuasion or subjective evaluations of the interaction post discussion. These correlations, or lack thereof, suggest that the relation between argumentation and decision-making outcomes, both in

³These correlations are with individual participants as the unit of analysis. With dyads as the unit of analysis, the correlations are essentially the same: $r = .339$ ($p < .07$) for agreement and $r = -.581$ ($p < .01$) for change ($N = 30$).

terms of persuasion and subjective ratings of the task, still needs to be established, consistent with Hewes's (1996) critique.

GENERAL DISCUSSION

As shown in a related study on this data (Setlock et al., 2004), Chinese participants' post-discussion rankings tended to be very similar to their partners' post-discussion rankings ($M = .56$), whereas U.S. participants tended to show greater difference ($M = 2.88$), although the average pre-discussion disagreement for Chinese participants somewhat higher than the average for U.S. participants. In the analysis reported in this article, we investigated whether the argument behaviors of these groups differ. The results of this study suggest that both culture and communication medium provide for different argumentative structures that are evident in statistically significant differences in observed argumentation systems. In sum, Chinese participants tend to express proportionally fewer claims, engage in more reasoning activity, less convergence, and more disagreement relative to their U.S. counterparts; FtF interactions tend to feature proportionally fewer claims, less reasoning activity, and less disagreement relative to IM interactions.

These differences may help to explain the cultural differences in post-discussion agreement. The argument behavior that U.S. participants tended to favor most strikingly over Chinese participants was convergence markers; this behavior, in turn, is associated with less agreement between partners' post-discussion rankings and less change in rankings from pre- to post discussion. Further, both convergence markers and claims are negatively associated with reasoning activity; whereas disagreement, which tended to be utilized more frequently by Chinese participants, is positively associated with reasoning activity and negatively associated with claims, creating potential for more complex argumentation for the Chinese participants (i.e., arguments with fewer simple statements of claims and more reason giving).

Overall, these results are consistent with structuration theory; however, some of the data support Hewes's (1996) characterization of socioegocentric speech and his critique of the assumption that discourse is constitutive of decision making. In terms of structuration theory, these results demonstrate different systems of argumentation between Chinese and U.S. participants to achieve the goal of reaching the best possible consensus. In the introduction, we suggested that individualistic or collectivistic cultures might provide different discursive structures for argument and that the socioegocentric model might be a discursive structure characteristic of individualistic cultures (or, at least U.S. culture), but not of collectivistic cultures. These results are consistent with the prediction that different cultural backgrounds provide for different discursive structures that are evident in different argumentative systems. Further, these results suggest that socioegocentric communication,

particularly in terms of vacuous acknowledgments, is a system of a U.S. discursive structure.

The cross-cultural differences suggest that Chinese interlocutors, when collaborating with U.S. interlocutors, may find that convergence markers are used with more frequency than they might expect and that these argument behaviors do not necessarily correspond with true agreement or shifts in beliefs. On the other hand, U.S. interlocutors may find that Chinese interlocutors engage in more reason giving and engage in argumentation for the purpose of reaching true consensus rather than simply completing a task. Consider the following extract, drawn from a transcript of a U.S. (A) and a Chinese participant (C) working together on the Artic Task:

- (34) C: So I put the tarp [first],
- (35) C: it's 24 foot by 24 foot and you can take the snow and actually spell out like a word on the tarp like if you need to
- (36) C: snow is actually a really good insulator itself=
- (37) A: Oh yeah—
- (38) C: =if you could pack it on like the igloos.
- (39) A: Yeah I didn't notice that so what kind of [unintelligible] or could you use the [unintelligible] so this one would be the first one?
- (40) C: Yeah, the tarp I put as number one.
- (41) A: You are so clever. But, uh, but if we used this container as the water container so where could we put the, put the wood matches?

Here, C has offered a claim (line 34) and two reasons in support of this claim (lines 35, 36, and 38). Nevertheless, A requires clarification of C's claims (line 39), which C restates in line 40. A's response in line 41 begins with a convergence marker, acknowledging C's point ("You are so clever"), but proceeds to an unrelated argument regarding the wood matches. Later in this interaction, C reiterates his claim that the canvas is the most important item and expands on the reasoning, concedes to placing the matches first, only to be rewarded with the following response from A to the suggestion that the canvas then be ranked second:

- (42) A: The canvas? So, so, um I'm not quite clear about the use of the canvas.

In sum, this intercultural collaborative interaction illustrates the cross-cultural differences in argumentation reported earlier; the Chinese participant (C) provides extended support for a claim, whereas the U.S. participant (A) apparently fails to take this argumentation into consideration, despite apparently acknowledging the value of C's contributions.

The comparisons between FtF and IM argumentation also support the notion that different communication technologies provide different argument structures,

as evident in the different argument systems for FtF and IM interactions. In addition, the differences in argument structuration is consistent with predictions based on the high- or low-context nature of the medium. Specifically, text-based CMC that is (semi)anonymous, task-oriented, and one-time only tends to be impersonal, which is consistent with greater statements of claims, reasons, and open expressions of disagreement in IM compared to FtF. At least some of these differences are attributable to the affordances of the technology itself, which allow for quick comparisons of rankings in the task. Consider the following examples from an IM interaction:

- (43) A: What are your six choices?
 (44) B: i choose water first
 (45) B: then the book
 (46) A: 1) water 2) book 3) pistol 4)flashlight 5)jackets 6)mirror
 (47) B: do you agree?
 (48) A: yep
 (49) B: k...so to [sic] down
 (50) B: I choose 3)flashlight, 4)mirror and 5) pistol and 6) jacket

Because IM enables participants to list their claims, and to have record of that to compare their claims, negotiation on the task can proceed by listing alternate claims, which can then be challenged and supported by reasons if necessary. It should be noted, however, that the differences in argumentation behavior based on communication medium tend to be smaller than those for culture, and there were no differences in persuasion or subjective ratings of the task based on medium (Setlock et al., 2004).

It is important to note that there were no statistical interactions between *culture* and *communication medium* on argument behaviors. Interactions might have been expected, given that members of high-context, collectivistic cultures tend to value feedback and social cues that are often not present in low-context, text-based CMC such as IM (Hall, 1976). Thus, for instance, cultural effects on argumentation may have been attenuated in IM compared to FtF, as members of high-context cultures adapt to a low-context communication technology. However, these findings are consistent with studies of cultural differences in GSS that have similarly found main effects of culture and medium but no interaction effects (e.g., Reinig & Mejias, 2003, 2004; Watson, Ho, & Raman, 1994).

In sum, the correlations reported in Table 3 support some of the suppositions of Hewes's (1996) socioegocentric model of communication—the relatively strong and negative relationships between convergence markers and post-discussion agreement and change suggest that convergence statements can tend to be “vacuous” rather than indicating true agreement or shifts in beliefs that might be relevant for decision making. However, it is inconclusive with respect to making claims

about other relations between argumentation variables and decision-making outcomes. Because there were few reliable relations between the argument behaviors that we coded for and decision-making outcomes, it is certainly possible that other, perhaps non-substantive discourse variables, were more significant in affecting agreement or shifts in position. For example, the number of turns per interaction were significantly correlated with our persuasion measures (agreement: $r = -.338$, $p < .02$; change: $r = .392$, $p < .01$), suggesting that more turns per conversation are related to more agreement and more change from initial rankings. Consistent with the socioegocentric model, these relations, along with the negative relation between convergence markers, may account for cultural differences in persuasive outcomes more so that the differences in the structuration of conversational arguments, especially in light of the fact that Chinese pairs tended to engage in twice as many turns as U.S. pairs on average (Setlock et al., 2004).

Some limitations of this study include its small sample size, which reduces the statistical power of the analysis. This, of course, increases the chance of failing to reject a false null hypothesis. On the other hand, cross-cultural studies may result in significantly significant mean differences between groups, which may reflect small effect sizes and elide important within-group variation. Similarly, research on communicative behavior and decision-making outcomes can sometimes imply more direct effects of communication on outcomes than is warranted by statistically significant but small effects. Therefore, given the goals and questions of this study, we take a cautious approach to power, accepting that a larger effect size is required to reject a null hypothesis in this study. That said, we have sufficient power to detect differences in the structuration of arguments based on our culture and medium variables. A larger sample size would likely have resulted in at least some of the other correlations between argument behaviors and outcomes being statistically significant. However, the observed non-significant correlations were relatively small and, even if statistically significant, would be weak evidence for meaningful relations between argumentation and decision-making outcomes.

Another potential limitation is that the Chinese participants were studying in the U.S. and were not using their native language; although this fact may limit the representativeness of this data (Warnick & Manusov, 2000), there is evidence that discourse in a second language still adheres to the communication styles and social norms of the speakers' native culture (Ralston, Cunniff, & Gustafson, 1995). Another study finds that Chinese participants working on a decision-making task utilize about the same number of turns in Chinese as in English and that the results for decision-making outcomes were replicated in Chinese as well (Setlock, Fussell, & Shih, 2006).

This study expands on previous research by utilizing an open-ended decision task allowing us to measure persuasion as a continuous variable rather than a dichotomous outcome of consensus–nonconsensus or acceptance–rejection of a proposal. This task also enables us to investigate whether argument behaviors are related to

continuous measures of persuasion, both in terms of post-discussion agreement between partners and in terms of change in the partners' differences from pre- to post discussion. Future research should apply this method to investigate decision making in groups larger than dyads, as well as in intercultural groups. In addition, future work should investigate, both quantitatively and qualitatively, what communication problems arise in collaborative situations in which participants' cultural expectations for appropriate argumentative behavior are discrepant.

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