

How Did You Feel During Our Conversation? Retrospective Analysis of Intercultural and Same-Culture Instant Messaging Conversations

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ABSTRACT

Research has shown that intercultural communication can be more problematic than same-culture communication. In this study we use a technique called retrospective analysis in order to examine these problems in greater detail. American and Chinese participants discussed a crime story with either an American or a Chinese partner using Instant Messaging (IM). After the session, each participant reviewed the IM conversation in two-minute segments and rated it on several dimensions. Chinese participants reported significantly more problems than American participants, and partner culture affected all participants' feelings of annoyance. An analysis of the communication problems participants reported showed four themes: mismatched communication styles, differences in conversational focus, relationship-building issues, and problems with the IM medium. The results show how differences in communication styles can affect intercultural conversations and provide design suggestions for new tools to improve intercultural collaboration.

Author Keywords

Cross-culture communication, CMC, retrospective analysis

ACM Classification Keywords

H5.3 Group and Organization Interfaces: Computer-supported cooperative work

General Terms

Experimentation, Human Factors

INTRODUCTION

Global virtual teams (teams consisting of members in different geographical locations collaborating via computer mediated communication) have been found to offer many benefits such as a broad variety of expertise to work on a task, the ability to leverage on local knowledge and the ability to work around the clock [22]. However, global virtual teams also face communication problems such as

misunderstandings, negative impressions of members, lack of trust and mutual awareness of one another on the team, due to both the cultural differences among the team members and the dispersed, virtual nature of team communication [e.g., 32]

Previous work has shown that these communication problems can be attributed in part to cultural differences in communication styles [e.g., 12, 13]. For example, speakers who use a high-context speaking style, which relies on the situation to make meaning clear, may react negatively when interacting with a speaker who uses a more direct, low-context style. Similarly, speakers favoring a low-context, explicit style of speech may misinterpret the subtleties of more indirect high context speech. The picture is further complicated by the fact that prior studies of computer mediated intercultural communication show quite different patterns of results depending on the medium of communication [e.g. 26, 27], the type of task, and the cultural composition of the group [30].

In order to better prevent or correct the above problems in computer mediated intercultural communication, we need a better understanding of the various types of issues that may arise during the communication process of intercultural teams. While previous studies have pointed out problematic processes in intercultural communication such as grounding [e.g. 20], participants' reactions to the interaction were obtained in a single questionnaire or interview after the fact, these studies likewise can't pinpoint what is going wrong at the level of the moment-by-moment dynamics of the interaction. The goal of the current study is to provide a deeper understanding of the kinds of communication problems that arise in intercultural teams and the impact of these problems on team performance and members' liking for one another.

In the current study, we use a technique from psychology called retrospective analysis [11], in which participants review an interaction after the fact, privately, and indicate their affective and cognitive reactions to each snippet of the interaction on a moment-by-moment basis. Using this technique, we show how cultural differences in communication style can lead to more problems and annoyance in an interaction. We then use qualitative techniques to explore the nature of the reported problems.

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CSCW 2012, February 11–15, 2012, Seattle, Washington.
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In the remainder of this paper, we first review background literature on intercultural communication and outline our hypotheses. We then present a study in which American and Chinese participants first work with a partner from the same or the other culture to first solve a crime task and then retrospectively review their interaction and rate it on a variety of dimensions. After presenting our findings, we conclude with some design recommendations for tools to support intercultural communication as well as a discussion of future areas for research.

BACKGROUND

In this section we first describe some of the ways that cultures have been posited to vary in terms of their communication styles; then, we outline the specific hypotheses tested in our study.

Cultural Differences in Communication Styles

Research has shown that team members from different cultures frequently differ in their communication styles, which may then lead to collaboration problems [6, 17]. Several theories address these differences, from different approaches and foci. Hall [13] has identified two communication styles: *low context*, typically Western, communication that is verbally explicit and to the point, and *high context*, typically Eastern communication that is indirect, often ambiguous, and sensitive to the context in which it occurs (e.g., the relationship between speaker and addressee, nuances of facial expressions or tone of voice).

Both high and low context style may work well for collaboration among people who share the same style. However, in intercultural teams where members may have different styles, problem can arise [6]. For example, while low context communicators typically expect their partners to directly express their opinion, including disagreement, high context communicators tend to express disagreement indirectly though silence. In this scenario, a low context communicator may erroneously assume that his or her partner is in agreement. At the same time, a low context, direct, style of communication may be perceived by high context communicators as inconsiderate and dominating.

Other studies have found that members from more individualistic cultures, such as those of many Western countries, typically focus on getting work done efficiently. In contrast, members of more collectivistic cultures, such as many Asian countries, often focus on building good relationships and establishing rapport with one's partners in addition to task completion [30]. This may impact negotiation strategies [28], strategies for making requests [1], methods of interruption [25], and other communicative behaviors. Clashes in these communicative behaviors in intercultural communication may lead to communication problems.

Even though previous studies in intercultural communication have suggested that culture groups do differ in communication styles and that intercultural communication may be problematic [e.g 25], it is still not

clear what kinds of problems may arise and what aspects of the communication process may be negatively affected. A handful of studies have examined particular communicative behaviors such as conversational grounding (the interactive process of making sense of a partner's utterances) which can be problematic in intercultural communication [20, 21]. However, in these studies participants' reactions to their partners' communication were inferred from team performance or assessed by survey after the fact, rather than assessed in the moment of the communication itself.

Culture Communication Styles and CMC

There is evidence that culturally-shaped communication styles affect computer-mediated communication (CMC) as well as face-to-face conversations between cultures, and that the pattern of the effect depends on the features of the particular CMC medium. Setlock et al. [27], for example, found that American participants were relatively terse regardless of what medium they were using, in keeping with the view that Americans favor a low-context, verbally explicit conversational style, whereas Chinese participants spoke much longer face-to-face than when using CMC, in keeping with the view that Chinese favor a high-context style that relies on contextual information.

While many studies have reported differences between how members of different cultures communicate in CMC, the pattern of results across the studies is not always clear. For example, while Chinese participants were more talkative than Americans in Setlock et al.'s study, which used a negotiation task [27], Wang et al. [30] found that Chinese pairs were *less* talkative in a brainstorming task unless they worked with an American partner. This and similar contradictions in the literature suggest that we need a more nuanced understanding of how the different culturally-shaped communication styles influence the communication process of intercultural teams, whether or not they create problems in the communication process, and what kinds of problems arise.

The Current Study

The goal of the current study is to look more closely at how participants experience the communication process with a partner from a different culture versus with a partner from the same culture. Specifically, we examine whether or not participants encounter more problems working with a partner from a different culture than with one from the same culture, what aspects of the communication process were (or were not) problematic, and how that affected the outcome of collaboration. We use a technique in psychology called retrospective analysis [11] to gain in-depth, moment-by-moment understanding of problems encountered in cross-cultural IM conversations.

We focus on IM conversations between Americans and Chinese as these two groups have been shown to prefer distinct styles of communication. American speakers tend to be direct and to the point, and willing to express emotions, whereas Chinese speakers tend to be more indirect, relying on context to make their messages clear.

We examine the total problems reported after the IM conversation and two specific aspects of the communication process that may be problematic in intercultural communication: involvement and negative emotion. In addition, we explore people's open-ended descriptions of the problems they encountered. We also analyzed the outcomes of collaboration. Below, we outline the hypotheses of our study.

Communication Problems

For the reasons we have discussed, differences in high and low context communication styles between two communication partners may lead to misunderstandings. The lack of social cues in a text-based medium such as IM may further complicate communication between partners who favor different styles [24]. Therefore, we propose that:

Hypothesis 1A: Chinese participants will report more problems communicating with an American partner than with a Chinese partner.

Hypothesis 1B: American participants will report more problems communicating with a Chinese partner than with an American partner.

Involvement in Conversation

Cegala and colleagues [2] conceptualize involvement in an interaction as, "the extent to which an individual participates with another in a conversation," (pp. 229) in terms of responsiveness to the situation, perceptivity about one's own and a partner's behavior, and attentiveness to the environment. Involvement also includes receptiveness, or a willingness to listen and offer feedback, for example through backchannel responses like *uh huh* or *yeah* or nonverbal behaviors such as head nods [8, 16]. Involvement increases affiliation, expression of intimacy, regulation of interaction and conversational cohesion, thereby fostering better understanding [29].

Previous studies have found that people from different cultures may differ in the way they express and interpret involvement cues such as back channel responses [4, 21]. For example a forward lean might indicate involvement for one culture and an attempt to dominate for another culture. Moreover, in text-based IM where non-verbal cues are not supported, it may even be more difficult to express and interpret involvement cues, especially when conversational partners have different expectations. Therefore, we hypothesize that:

Hypothesis 2A: Chinese participants will report less involvement communicating with an American partner than with a Chinese partner.

Hypothesis 2B: American participants will report less involvement communicating with a Chinese partner than with an American partner.

Negative emotions in communication

Moods and emotions have influences on team interaction and performance and effective team communication involves attention to members' affective states, emotions

and feelings [18]. Although there has not been much research focused on finding the cause of negative emotions in intercultural interactions, studies within a single culture find that negative emotions result from different team processes. Cegala [3] suggested that low involvement in interaction was highly related to negative affect, especially anxiety, tension and low self-esteem. Cramton [6] observed that when mutual knowledge and understanding were not established in geographically dispersed teams, feelings of anxiety and tension developed. Thus, we hypothesized:

Hypothesis 3A: Chinese participants will report more negative emotions communicating with an American partner than with a Chinese partner.

Hypothesis 3B: American participants will report more negative emotions communicating with a Chinese partner than with an American partner.

Outcomes of Intercultural Collaboration

As discussed above, the communication problems, level of involvement and negative emotions experienced during an interaction can influence how each participant feels about the team's performance. When the task involves information exchange, differences in communication styles can lead to inefficient grounding and lower perceived performance [20]. Moods and emotions also affect team interaction and performance [18]. Previous studies suggested that high understanding, high involvement and low negative emotions would lead to better subjective team performance. Based on Hypotheses 1-3 above, we hypothesize:

Hypothesis 4A: Chinese participants will report lower subjective performance collaborating with an American partner than with a Chinese partner.

Hypothesis 4B: American participants will report lower subjective performance collaborating with a Chinese partner than with an American partner.

It is still unclear from the literature how problems of understanding, involvement and negative emotions during a conversation may affect the objective final outcomes of intercultural collaboration. While Li [20] found that better grounding led to better performance, other studies did not find objective performance differences despite differences in communication styles [e.g., 27, 30]. Based on our previous hypotheses we suggest that:

Hypothesis 5A: Chinese participants will achieve lower objective performance collaborating with an American partner than with a Chinese partner.

Hypothesis 5B: American participants will achieve lower objective performance collaborating with a Chinese partner than with an American partner.

METHOD

In order to understand how cultural differences in communication styles affect intercultural interaction, we

used a retrospective analysis technique developed in psychology [11]. Same-culture and cross-culture pairs first discussed and solved a crime case using a text-based IM program. Afterwards, they individually reviewed a recording of their interaction. At preset intervals, the recording was stopped and participants provided their feedback on the segment.

Participants

Participants consisted of 60 students (53% undergraduate, 65% female) studying at a large American university. Of these, 30 students were native Chinese speakers who had been born in the People's Republic of China (29) or Taiwan (1), and had spent less than 5 years in the United States or Canada. The Chinese participants spoke fluent or near-fluent English. The other 30 American participants were all born and raised in the United States or Canada and spoke English as their native language. Twenty-eight American were Caucasian and two were Asian.

Each participant was paired randomly with a partner from the same culture or from a different culture, resulting in three combinations: 10 Chinese-Chinese (CC) pairs, 10 American-American (AA) pairs, and 10 American-Chinese (AC) pairs. To control for age differences we paired graduate students with other graduate students and undergraduates with other undergraduates. Participants in a pair did not know each other prior to the experiment.

Materials

Task. The task consisted of discussing a crime story and identifying the culprit of the crime. The crime story, developed by the first author, involved a break in and a murder attempt on a victim named Alex. Alex is the leader of a rock band of four people. The other three members of the band were the three prime suspects, one of whom was the actual culprit.

Two different versions of the crime story were prepared, based on the reports of two witnesses. Each version contained 10 pieces of information important to solving the case. The two versions shared common information about the victim, crime location, and attack on the victim. They also included details complementing each other that needed to be combined to fully understand what happened, such as the time and location of each of the suspects before and after the crime. The two versions also contained three contradictory details about the crime: (a) the time of the attack, (b) the body builds of the culprit and (c) the color of the shirt the culprit was wearing as they were reported from the different perspectives of the two witnesses. These had to be resolved through discussion to identify the culprit. The details were presented on a single sheet of paper (622 words for version A; 644 words for version B).

Memory quiz. A paper and pencil *memory quiz* was created to test participants' understanding of the materials prior to discussion with their partner. The quiz consisted of 10 multiple choice questions on the key details of the crime (e.g., time, suspects).

Culprit identification form. Since every pair had to provide a common answer to the case, we created a shared Google document between the two participants in a pair, with two questions on it: one for indicating the culprit(s) of the crime, and another for the pairs' reasoning behind their identification of this culprit. Both participants in each pair were able to edit this shared document at the same time. At the end of the discussion they saved this document.

Post task survey. Participants completed an online survey asking about their reactions to the task and partner, their communication styles, and their basic demographic information. Task-related questions consisted of four 7-point scales adapted from the NASA TLX workload scale [15] to measure mental effort, temporal effort, overall effort, and frustration during the task, and two 7-point scales to measure participants' subjective evaluation of their team and individual performance on the task.

Partner-related questions consisted of four 7-point scale items measuring the participant's liking of his/her partner, the partner's liking of the participant, the participant's enjoyment and comfort in working with their partners.

We also included an exploratory measure to examine participants' perceptions of their communication strategies. Questions about communicative styles include a subset of 13 items from Gudykunst et al.'s [12] high and low context culture scale, selected from the three factors that have the highest loadings in this study: ability to infer meaning, interpersonal sensitivity and use of indirect communication.

Retrospective analysis survey. The online *retrospective analysis survey* consisted of 7 rating questions and an additional open response question that participants completed after each 2-minute video clip. The first three questions asked each participant to rate on 5-point Likert scales their level of tension (very tense-very relaxed), annoyance (very annoyed-not annoyed at all) and interest (not interested at all-very interested) in the conversation. The next two questions asked participants to rate how much their partners understood them and how much they understood their partners, respectively (1 = not understanding at all; 7 = very understanding). The remaining two questions asked the participants to rate how much their partners and they themselves felt involved with the conversation (1 = not involved at all; 7 = very involved). The final question asked whether the participant had noticed any problem with their interaction at the point of time shown in the video clip. If the answer was yes, we asked them to provide details about what went wrong and what they would have done to prevent/remedy the problem.

Equipment and Recording Processing

Participants in all pairs used identical Dell workstations running the same version of Gtalk for Window XP. We disabled the use of audio call in Gtalk. The Gtalk chat window of the two participants in each pair were recorded, synchronized and combined into a split screen video during their discussion using CamStudio 2.5 desktop capturing

software and ShowMyPC 3011 remote desktop sharing software. The split screen video consisted of two frames, one for each participant's Gtalk chat window. During retrospective analysis, each participant was shown only the frame with his or her own chat window.

Two Dell workstations with Dell Ultrasharp 19 inch monitors (1140 x 900 resolution) were used to present the video clips during the retrospective analysis. The 20-minute video of the discussion was divided into 10 sequential clips of 2 minute each to be played one by one in chronological order to both participants using Quicktime Player.

Procedure

The experiment consisted of two phases: a discussion phase and a retrospective analysis phase. In the *Discussion Phase*, pairs of participants were brought into a room and assigned seats at two separated workstations with a divider in between. They signed consent forms and received task instructions. Each participant received one of the two versions of the crime story. They were given 10 minutes to read the story and learn the details of the crime, after which the hard copies were taken away and they were given the memory test. The experimenter then corrected the quiz and left the corrected quiz with the participants for the rest of the experiment. Participants were then instructed how to use the Gtalk text chat client.

Each pair then discussed the story via Gtalk for 20 minutes (Figure 1). In order to solve the crime, the pairs needed to gather all the information from both versions of the story, resolve conflicting details, and identify the culprit. At the end of their interaction, each pair submitted their conclusion about the culprit and the reasoning behind their decision in the culprit identification form. Each participant in the pair then separately filled out the post-task survey.

In the *Retrospective Analysis Phase*, the two participants were seated as in the previous phase. They were shown a series of 10 two-minute video clips of their conversation in Phase 1. After each clip, participants filled out the retrospective analysis survey. After the last clip, participants were debriefed, paid and dismissed.



Figure 1. Setting of the discussion phase.

Measures

The dependent variables were number of problems, levels of understanding, involvement and negative emotions, subjective outcomes and performance.

Problems. We collected a binary measure for whether or not problems were reported every two-minute segment of the 20-minute long interaction.

Involvement. Participants' ratings, on a 7-point scale, of how much they felt involved in the conversation (self's involvement) during each minute of their interaction were negatively skewed and recoded into three groups, representing the bottom, middle and top third of the responses (1 to 5=1 "low", 6=2 "middle", and 7=3 "high").

Interest. Participants indicated, on a 5-point scale, how much interest they felt in the conversation. This measure was also negatively skewed and recoded into three groups, representing the bottom, middle and top third of the responses (1 to 3 =1 "low", 4=2 "middle", and 5=3 "high").

Negative emotions. Participants' ratings on a 5-point scale of how tense and how annoyed they felt in the conversation were negatively skewed and recoded into three groups, representing the bottom, middle and top third of the responses (1=1 "low", 2 to 3=2 "middle", and 4 to 5=3 "high").

Subjective performance. The two questions measuring participants' subjective evaluation of team performance and individual performance were averaged to create a composite score (Cronbach's alpha = .54).

Liking of partner. The four questions measuring participants' liking and comfort while working with their partner were average to create a composite score about their emotional experience on the task (Cronbach's alpha = .81).

Perceptions of communication strategy. Responses to the 13 items were averaged (after inverting the low context items) to create a measure of self-reported high context communication style (Cronbach's alpha = .51). Since scale reliability was relatively low and a preliminary screening showed no differences between cultures ($F[1, 56] < 1$, n.s), we do not discuss this measure further.

Objective performance. Pairs' answers to the crime task consisted of two parts: the name of the culprit(s) and an explanation for the solution. The identity of the culprit was scored 1 for correct or 0 for incorrect. The explanations were scored in terms of the presence of three key clues needed to prove the culprit guilty. Two research assistants blind to the conditions of the experiment coded responses for the presence of these clues ($\kappa = 90\%$).

RESULTS

We report the results in three parts: retrospective analysis, performance on the task. We follow these results with our qualitative analysis of the problems participants reported.

Retrospective Analysis of Pair Interaction

To test Hypotheses 1 to 4, we conducted mixed model

Analyses of Variance with self’s culture, partner’s culture and the interaction of these two as the fixed effects, and pairs, individual within pairs, and time within individual as random effects. Note that in mixed models, when tests of fixed effects involve a linear combination of variances at different levels of the model (e.g., group and individual), it is standard to estimate the degree of freedoms associated with the denominators by using Satterthwaite’s approximation. Therefore, non-integer degree of freedoms may occur [23]. Because our hypotheses concern the fixed effects of culture, we present only these fixed effects below.

Problems in Collaboration. Hypotheses 1A and 1B predicted that participants would report more problems when working with a partner from another culture than when working with a partner from their own culture. To test these hypotheses, we conducted a mixed model analysis of the form outlined above, using the number of problems reported during the retrospective analysis as our dependent measure. We found a significant main effect of participants’ culture (Figure 2). Chinese participants reported more problems than Americans, regardless of their partners' culture (for Chinese, $M = .397$, $SEM = 0.05$; for American, $M = .167$, $SEM = 0.05$; $F[1, 51.9] = 13.46$, $p < 0.01$). However, contrary to our hypotheses there were no effects of partner’s culture and no interaction between participant and partner culture (both $F < 1$, n.s.).

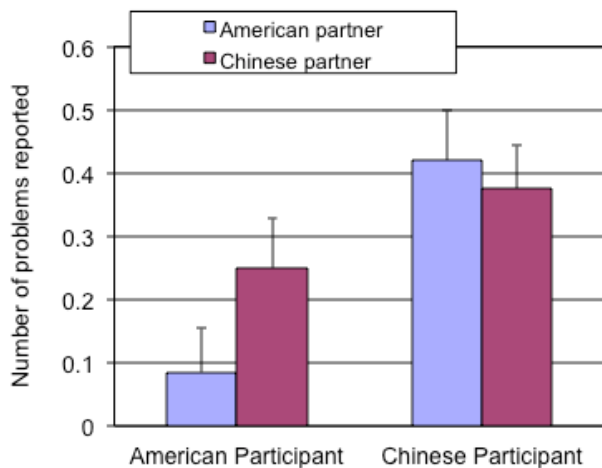


Figure 2. Mean number of problems reported per two-minute interval by participant culture and partner culture.

Involvement. Hypotheses 2A and 2B predicted that participants would report lower involvement when working with a partner from a different culture than when working with a partner of the same culture. Mixed model ANOVAS on the level of involvement and interest reported during the retrospective analysis showed no support for these hypotheses (all $F_s < 1$, n.s.).

Negative emotions. Hypotheses 3A and 3B predicted that participants would report more negative emotions when working with a partner from a different culture than when

working with a partner from the same culture. A mixed model ANOVA on the level of annoyance reported during the retrospective analysis showed a significant main effect of partner culture ($F [1, 59.1] = 7.7$, $p = .007$) (Figure 3). Both Chinese and American participants reported more annoyance working with a Chinese partner than with an American partner (for Chinese partner, $M = 1.84$, $SEM = .14$; for American partner, $M = 1.47$, $SEM = .14$). This contradicts Hypothesis 3A, while supporting Hypothesis 3B.

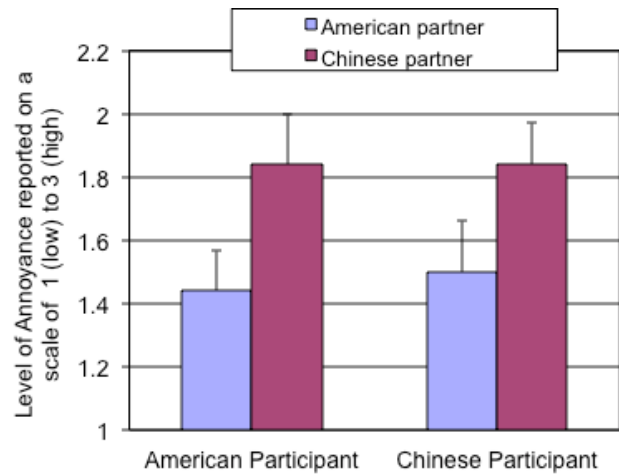


Figure 3. Mean level of annoyance reported per two-minute interval by participant culture and partner culture.

Outcome Measures

Subjective Outcomes. Hypotheses 4A and 4B predicted that participants would report lower subjective performance working with a partner from a different culture than when working with a partner from the same culture. These hypotheses were not confirmed. Two-way ANOVAs (self culture by partner culture) showed no effects of either factor on perceived performance ($F[1,56] < 1$, n.s.).

Performance. Hypotheses 5A and 5B predicted that participants would perform worse on the task when working with a partner from a different culture than when working with a partner from the same culture. These hypotheses were also not confirmed. A one-way ANOVA using culture combination (AA, AC, CC) as a between-pairs factor showed no significant effects for either the binary rating of the answers given by the pairs and or the total number of clues given in the explanations ($F [1,56] < 1$, n.s.).

Types of problems faced in collaboration

In the first part of the results, we found that participants encountered problems with intercultural communication and reported annoyance with their partners. In this part, we examine the kinds of problems participants faced, and some of the reasons why they were annoyed with their partners. We analyzed the comments participants gave for each problem they reported using a grounded theory approach [10]. Two coders, blind to experimental conditions, independently reviewed all the comments and came up with their own categorizations. They then discussed their

schemes and identified four major categories of problems: mismatched communication styles, disagreement about the focus of the conversation, relationship-building issues, and problems with the use of IM.

Mismatched Communication Styles

Communication problems were related to aspects of the communication process between the two partners in a pair, such as understanding or involvement. For both American and Chinese participants, these comprised a large proportion of the total number of problems reported (over 25%). Participants noted problems understanding their partners, or making their partners understand them. Some participants attributed these problems to differences in communication styles.

"I guess it was more or less about the style of communication. I prefer direct communication but my partner seems to be more reserved, thinking through the things himself first. So I feel that in this period of the communication, he was involved in his own thinking instead of really getting the meaning of my message. And I was a bit annoyed that he did not really talk up. So I was not sure whether he understood me or not. To do it better, maybe he should talk more and I should have more patience to wait for his info." (Chinese in CC pair)

"I would expect my partner to give me feedback if she understood my explanation about why the two observers reported different colors of the t-shirt and the height later on. I remember I totally explained that for three times, as this was a key point, I need to know if she understood or not, agree or not. I became a little bit annoyed." (Chinese in CC pair)

We notice two conflicts in communication style. First, as illustrated in the comment above, some participants (both Chinese and American) preferred to communicate directly, even in potential disagreements, while their partners were more indirect and used silence to indicate disagreement or confusion. Second, there was a conflict in the speed of conversation. Some participants preferred a fast, back and forth conversation while their partner preferred to think through their response.

"Maybe I should have done it better, listening to him more carefully instead of always expressing my views all the time. But still, I personally prefer a faster conversation." (Chinese in CC pair)

They were also uncomfortable if their partners did not pay enough attention during the conversation, or diverged from the topic.

"I remember being very annoyed at this point, because we were finally comparing information, but then we were side-tracked." (American in AC pairs)

"I wanted to focus on the task 100%, but my partner talked about something irrelevant which did not help my

understanding of his information. I believe we should have 100% focused on the task instead." (Chinese in CC pair)

Participants were also frustrated when their partner was not sufficiently responsive to them.

"I was slightly annoyed at this point because I had specifically asked about information regarding the suspect, Dave, and my partner seemed to ignore the question." (American in AC pair)

Some complained about how their partner were not talking enough, or responding fast enough and how they did not feel like having a back and forth conversation.

"Yes, we could have done it better if my partner could talk about things more quickly and directly. I was the one who did most of the talking which was not enough for me to understand what he thought." (Chinese in CC pair)

Disagreement about Conversational Focus

Additional problems pertained to the process the pairs went through to carry out the discussion task. For example, participants reported conflicts in the approach and process they and their partner used to discuss the task, for example, what to talk about first and last.

"I preferred to share our different information before analyzing it, but my partner was insistent on speculation without getting all the facts first." (American in AA pair)

Because of the difficulties they experienced exchanging information verbally, some participants felt they should have documented their information in a systematic and orderly fashion

"I think we should have actually created a table on the Google doc to share and combine information more quickly." (American in AA pair)

Others felt they should have focused their conversations differently. They were frustrated when their partners told them details they didn't expect and didn't know how make sense of such differences to come to a common conclusion.

"We didn't do right to convert our evidences together. We should consider why there are such a big difference in the words of those two witnesses and what makes the differences." (Chinese in AC pair)

"We should have talked about the evidence more. I think I was too quick to implicate Brian and she was not giving up the opposing information she had." (American in AC pair)

Relationship Building Issues

Consistent with previous research [e.g., 25] we found that Chinese participants mentioned problems with relationship building in addition to task-related conversation. These kinds of problems were never mentioned by American participants.

"I should have sent greeting sentence before directly entering the topic. It would be better for building good cooperation." (Chinese in AC pair)

"I should have expressed my appreciation for partner's agreeing on my opinion." (Chinese in AC pair)

Some participants complained about the dominating and judgmental manner of their partner during the conversation.

"I am a bit conservative. She is a bit judgmental." (Chinese in CC pair)

Trouble with the IM Communication Medium

Finally, having the conversation in a text-based instant messaging system created problems for some participants. Participants felt that the lack of visuals and the need to type out their opinions prevented them from fully and quickly expressing themselves.

"We felt that only chatting was not enough. We need to talk about the scenes mano a mano." (Chinese in CC pair)

"It just seems like a slow way to communicate, I would have put info together better had it been visual- which I did on my paper." (American in AA pair)

Moreover, since instant messaging allows two people to type simultaneously, a double-threaded conversation might happen that could be confusing

"We kind of had two conversations going on at the same time which probably made it hard for her to understand me, I probably should have written more complete sentences." (American in AA pair)

Chinese participants were particularly concerned about their written English in the chat medium. They were afraid that typos and unfamiliarity with chat language use on their part would confuse their partner. These problems however were not related to the level of fluency of English and in fact, no Chinese participant voiced any concern about their fluency of using English in a written chat environment.

"Another big problem for both of us, is we type in the whole spelling of the words all the time, we're not too familiar with the short forms of words used in online chatting by native speakers." (Chinese in CC pairs)

In some cases, this language barrier led to lack of trust in the partner.

"There seemed to be a language barrier, so I didn't fully trust what my partner was saying about the story." (American in AC pair)

DISCUSSION

This study aimed to examine the problems encountered in intercultural collaboration and their impact on people's affective responses and task performance. We found that Chinese participants reported more problems than Americans participants, regardless of the culture of their partners. Curiously, we found that participants, regardless of their own cultures, reported higher annoyance working with a Chinese partner. However, these communication problems and momentary annoyances had no long-term

effect on task performance, nor did they affect how involved people felt in the conversations.

We had hypothesized that participants would report more problems working with a partner from a different culture than from the same culture. As shown in Figure 2, the means per condition were in the direction we predicted (Americans reported more problems with Chinese partners; Chinese reported more problems with American partners), but the differences were not statistically significant. Possibly, a future study with a larger sample would detect significant interactions between one's own and a partner's culture.

It is puzzling that participants of both cultures reported higher annoyance working with a Chinese partner. One explanation may be that the Chinese participants were speaking in a non-native language, leading to miscommunication. However our qualitative coding of the problems people reported also points to another factor: incompatibilities in communication styles among the Chinese participants. Some Chinese participants favored a direct low context style and, like American participants, had trouble communicating with Chinese who favored an indirect high context style. This variability in Chinese communication styles is consistent with other research showing that high context communicators (or those raised in that tradition) can adjust flexibly to match the styles of low context communicators [30], a process likely to occur when people are studying in the U.S. for an extended period of time. This too may explain the lack of significant differences between populations on the Gudykunst low vs. high context communication scales.

Our coding of the communication problems participants reported showed that a large proportion of them were related to communication styles, including a partner's "failure" to directly express his or her opinions, or a failure to engage in relationship-building behavior. It is also worth noting that in a written chat environment, our Chinese participants did not voice any concern over their English fluency. This is consistent with previous results that these environments were generally preferred by non-native English speakers to express themselves clearly [e.g. 24]. However, chatting also entails the use of some special English chat lingo that global team members may not be familiar with and should avoid in intercultural interactions.

The communication problems we discovered did not, in this study, have any impact on performance but it remains to be seen whether chronic patterns of misunderstandings and annoyance would affect team collaboration and team in real world global teams. It is also worth noting that participants in this experiment regarded the task of solving a crime story in 20 minutes a nontrivial task that required effort and time commitment, as evidenced by means on the NASA workload scale. Differences in involvement based on a partner's cultural background might arise when teams are engaged in tasks that demand less cognitive effort.

The different communication styles, and a lack of common ground were the often mentioned as reasons for a partner's "inappropriate" communicative behaviors. This echoed previous studies of how negative emotions may be linked to the communication process [3] and thus can provide a hint to how we could design technology to intervene the communication process to prevent negative emotions in intercultural interaction.

Design Implications

Our findings indirectly suggest some strategies for designing new tools to support intercultural communication. First, feedback displays and other interventions might improve intercultural teamwork by either making cultural differences more apparent to team members [e.g. 7] or by intervening automatically in problematic conversations [e.g. 31]. For example, participants reported that a lack of response from their partners made them frustrated and annoyed. To prevent this, a system might display feedback about each participant's contributions to the conversation, similar to the GroupMeter system [e.g. 19], making it obvious when one partner is providing less feedback than the other. In addition, Chinese participants reported negative emotions when the team did not pay attention to relationship building. A system might display feedback about the amount of social exchanges, such as greetings, to motivate intercultural teams to engage in team building activities.

Second, some of our participants mentioned that mere verbal exchange of information was insufficient for intercultural teams and that they needed other modalities, such as images or diagrams, to document their team activities in a more comprehensible way to all team members. This suggests that a combination of communication channels should be provided for efficient and effective intercultural team collaboration.

Third, our results indicate that negative emotions may be an important issue in intercultural collaboration. Therefore, tools might incorporate strategies to minimize the negative emotions that result when communication problems are encountered. We believe this is especially important given evidence that negative emotions can be contagious in CMC [14]. Significant progress has been made identifying emotions from CMC [e.g., 9], which could in turn drive interventions to increase positive mood (e.g. via pictures of positive events, color, music).

Limitations and Future Directions

There are several important limitations to the current study. First, we examined dyads, not larger groups of cross-culture members, which may be more typical of global teamwork. We also focused only on two out of the many cultures of the world. Furthermore, our Chinese participants were studying or working in the U.S and do not represent the larger population of Chinese people with whom Americans might collaborate. In the future, we plan to replicate the study using a more culturally diverse set of participants. We also did not control for participants' experience working in

multicultural settings, which may have affected the experience of participants during the experiment.

Our next steps include a more detailed coding of the transcripts to further understand the dynamics of the dialogues at the time at which participants report a problem. We also plan to explore how our various measures of the communication process change over time during the interaction. With the findings from these analyses, we hope we can uncover the mechanism by which the communication process could lead to communication problems in intercultural collaboration. This in turn will help us characterize these problems at a deeper level, which hopefully will provide insights into how intercultural collaboration can be improved.

CONCLUSION

In this study we explored the problems that arise in intercultural communication in text-based Instant Messaging. We used retrospective analysis to examine three aspects of the communication process: number of problems, involvement and negative emotions, in 30 pairs of American and Chinese participants. We found that a person's own culture affected the number of problems reported whereas the partner's culture affected levels of annoyance during the interaction. However, we did not find an interaction between one's own culture and a partner's culture. We observed several themes in the kinds of problems participants reported facing during their interactions, including mismatching in conversational styles, task focus, emphasis on relationship-building, and use of the IM tool. Our findings help clarify when cultural can lead to problems in interactions and inform the design of new tools for intercultural communication.

ACKNOWLEDGMENTS

This work was funded in part by NSF grants #0803482 and #0942658. We thank Dan Cosley and Hao Chuan Wang for their thoughtful feedback on the experimental design, Stephanie Sanders, Kathryn Duerr, and Jin Liu for running participants and preparing data for analysis. We also thank Leslie Setlock and the anonymous reviewers for their feedback on past revisions of the paper. This material is based in part on work supported by the National Science Foundation, while Susan Fussell was working at the Foundation. Any opinion, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

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