

# Culture or Fluency? Unpacking Interactions Between Culture and Communication Medium

Leslie D. Setlock, Susan R. Fussell

Department of Communication, Cornell University

Ithaca, NY 14850 USA

lsetlock, sfussell@cornell.edu

## ABSTRACT

In this paper we describe two studies intended to replicate earlier work comparing American and Chinese communication in a negotiation task using several different media. In the earlier studies, the participants all spoke in English, raising the question of whether differences in fluency rather than differences in cultural background explained the results. We replicated the earlier studies using materials translated into Chinese, a native Chinese-speaking experimenter, and native Chinese participants. Counts of Chinese characters in each media show nearly the identical pattern found in the earlier studies, suggesting that cultural differences in communication styles, rather than fluency, account for the earlier findings. We describe implications of this work for tools to support intercultural communication.

## Author Keywords

Computer-mediated communication, CMC, collaborative work, intercultural collaboration, cultural differences

## ACM Classification Keywords

H5.m. Group and Organization Interface: Computer-supported cooperative work

## General Terms

Human factors; Experimentation

## INTRODUCTION

The increasing globalization of the workplace, home life, and education has led to increasing communication and collaboration among people from a variety of geographical locations around the world, usually via computer-mediated communication (CMC) technologies. Studies have shown that these interactions often face problems arising from cultural differences in communication styles, task orientation, power structures, and a host of other factors [e.g., 1, 3].

In recent years, researchers have tried to isolate the specific

ways in which culture affects CMC, both in culturally homogeneous and culturally heterogeneous groups [e.g., 7, 8, 9, 10, 11]. These studies typically use laboratory paradigms in which the task can be specified in advance and comparisons can be made across cultures in terms of efficiency, task performance, the relative emphasis on task completion vs. relational development, liking for partners, and the like. Virtually all such studies have found differences between Western cultures and other cultures, as well as interactions between culture and medium.

For example, Setlock and colleagues conducted two studies comparing American dyads, Chinese dyads, and mixed American-Chinese dyads performing a decision-making task via different media. In their first study [7], they found a significant interaction between culture and medium: Chinese participants talked significantly longer face-to-face than in Instant Messaging (IM), whereas American participants talked very little in both media options. Intercultural pairs lay intermediate to these same-culture pairs. In their second study [8], they found that mixed culture pairs talked significantly more using audio or video conferencing than did either American or Chinese same-culture pairs. In both studies, mixed culture pairs reported liking each other less than same-culture pairs.

There are numerous theories which attempt to explain cultural variation, and each has its supporters and critics. This study utilizes observed behavior to clarify one specific theoretical concern: that observed behavioral differences often attributed to culture may be caused by fluency issues. Hall [4]'s theory proposed that low-context cultures, such as that of the United States, tend to emphasize the words people use to communicate, whereas high context cultures, such as that of China, tend to consider the entire situation of communication in understanding a message. The affordances of a medium [1] may make it more or less appropriate for communicators from different cultural backgrounds. In particular, people from cultures with high context communication styles may make more use of affordances of richer media, whereas people from cultures with low context communication styles may find rich and lean media equally suitable for their needs.

In Setlock et al.'s studies, as well as many similar studies, all pairs interact in English. This was done to ensure comparability across the different conditions, and is

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

CHI 2011, May 7–12, 2011, Vancouver, BC, Canada.

Copyright 2011 ACM 978-1-4503-0267-8/11/05...\$10.00.

reasonable given that English is often used as a lingua franca in international discourse. However, it raises the question of whether the communication patterns of the Chinese participants might have been due to issues of fluency rather than culturally shaped styles of communication. This is an important issue, because it informs the design of new tools to support intercultural communication. If observed differences between groups stem from fluency, machine translation-based CMC tools [e.g., 5] alone may be sufficient to facilitate communication across nations and groups. If observed differences stem from cultural factors, however, CMC tools may also need to adapt to cultural differences in communication styles and help bridge gaps that arise in mixed-culture groups.

The purpose of the current studies is to assess fluency as an alternative explanation for the findings reported by Setlock and colleagues, by replicating the Chinese condition of both studies entirely in Chinese. All materials for both studies, including consent forms, etc., in addition to the task materials, were translated into Mandarin Chinese by a native Mandarin speaker (an instructor of Chinese at an American University). Materials were back-translated into English to ensure appropriateness. The sessions were likewise run entirely in Mandarin Chinese, by a native Mandarin speaker, from the time participants entered the lab. As will be shown, the results of these two studies closely parallel those by Setlock et al., suggesting that cultural differences in communication styles rather than fluency in a second language explain the earlier results.

## STUDY 1

### Method

Pairs of participants performed a modified version of two decision-making tasks (the Desert Survival Task and the Arctic Survival Task). Participants performed one task face-to-face and the other via Instant Messaging.

*Participants.* Twelve pairs (24 participants) of native Mandarin Chinese speakers born and raised in the People's Republic of China (PRC) participated in the study (mean age 28.5; age range 22-37, 54% male). Participants were drawn from two universities in the eastern United States. They had been studying in the U.S. for fewer than two years. All were fluent in spoken and written English, to ensure comparability with Setlock et al., although English was not used at any point in the current study.

*Materials and equipment.* Materials and equipment were identical to those used by Setlock et al. [7], with the exception that we used MSN as an IM client rather than AIM because it is better suited to typing in Chinese.

Participants collaborated on two tasks, the Desert Survival Task and the Arctic Survival Task. The goal of these tasks is to rank salvaged items in order of importance for the survival of the team. Participants completed the tasks in pairs. First, they ranked the items individually, then negotiated and completed a joint ranking, and finally

completed a second individual ranking. Items included a “gallon can of maple syrup” and a “hand ax” (Arctic Survival Task) and “Book ‘Edible Plants of the Desert’” and “loaded .38 caliber pistol” (Desert Survival Task.) Items were ranked from 1 (most important item for survival in this simulation) to 6 (least important item for survival in this simulation.)

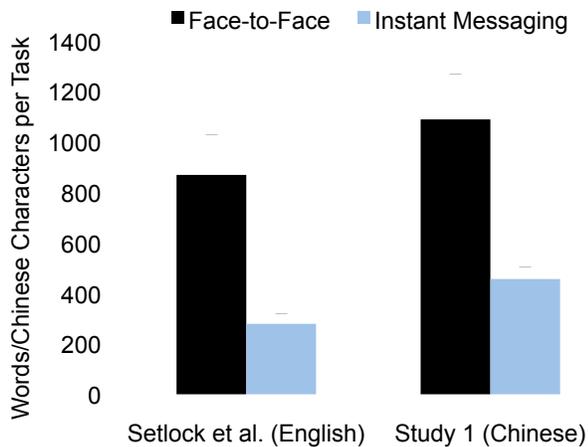
Participants also completed a post-task questionnaire following each task, which assessed their experience with the communication media and partner. The questionnaire included such items as “This method of working together was effective,” and “We disagreed often.” Items were rated from 1 (strongly disagree) to 7 (strongly agree). At the end of the study, they completed a post-experimental questionnaire which asked about their demographic characteristics (age, gender, major, country of birth, years in the United States). The post-experimental questionnaire also included the Schwartz value inventory [6].

*Procedure.* All sessions were run entirely in Mandarin Chinese, by a native Chinese speaker. Participants were brought to the laboratory and instructed about their task and the media (lapel microphones and the AIM program) used in each condition. Following the brief instructions, they were situated in the correct location for their first trial, either in the same section of the room (for the Face-to-Face condition) or separated by a divider (for the IM condition). They completed the individual item ranking, had 20 minutes in which to complete the joint ranking (a single, mutually agreed-upon ranking), and then completed the final individual ranking. Each trial was followed by a post-task questionnaire. After both trials were completed, participants completed the post experimental questionnaire. They were then debriefed and compensated.

### Results

*Conversational efficiency.* The audio recordings from the face-to-face condition were transcribed and then translated by a native Mandarin Chinese speaker. We then calculated the Chinese characters per task (roughly equivalent, though not identical, to words per task in English) as well as the translated English words per task for the two media conditions. We ran all analyses twice, once using Chinese character counts and once using the number of English words after translation. The pattern was identical, so here we report significance values using the Chinese character counts.

Figure 1 shows characters per task from the current study compared to words per task from Chinese participants in Setlock et al. [7]. As can be seen, the Chinese language results replicate the English findings. Pairs used a mean of 1088.92 (SD = 618.73) Chinese characters per task in the face-to-face condition in comparison to only 456.50 (SD = 159.38) Chinese characters per task in the IM condition. A repeated measures ANOVA using the pair as the unit of analysis showed this difference to be highly significant ( $F[1, 11] = 8.34, p < .005$ ).



**Figure 1. Results from Chinese participants speaking in English in Setlock et al. [7] (left) and Chinese participants speaking in Chinese in Study 1 (right). The measures are not exactly equivalent (words in English; characters in Chinese) but the pattern of findings is nearly identical.**

*Outcome measures.* On the whole, the participants rated the quality of their interaction with their partner highly ( $M_s = 6.22$  and  $6.08$  for the face-to-face and IM conditions, respectively). These ratings are comparable to the mean rating of  $6.5$  provided by the Chinese pairs speaking in English in Setlock et al. [7]. The data was analyzed in a 2 (trial) by 2 (media condition) Mixed Models ANOVA in which participant within pair was the random variable. No main effects or interactions were found for trial or media (all  $F < 1$ ).

Persuasion was measured by summing the absolute difference between pair members' individual rankings both pre- and post-discussion. With this measure, smaller scores indicate closer agreement between pair members' rankings. Differences between participants' pre-discussion averaged  $8.5$  ( $SD = 3.53$ ) in the face-to-face condition and  $7.17$  ( $SD = 3.66$ ) in the IM condition. Differences in post-discussion individual ranks also did not differ between media condition ( $M = 1.42$  for the face-to-face condition and  $1.50$  for the IM condition;  $F [1, 12] < 1, ns$ ). The high agreement between partners after discussion is not quite as great as found in the earlier study (where Chinese pairs speaking in English averaged  $.56$  difference between their final rankings) but is greater than American ( $M = 2.88$ ) and mixed culture pairs ( $M = 4.50$ ) in the earlier study.

### Discussion

The results from this study, in which Chinese participants communicated in their native language, closely parallel those from Setlock et al. [7], in which they communicated in English. Thus, the interaction between culture and medium reported by Setlock et al. does not appear to be due to the fact that the Chinese participants were speaking in a second language.

## STUDY 2: AUDIO VS. VIDEO CONFERENCING

### Method

The design of Study 2 replicated Setlock et al. [8]. Pairs performed two survival tasks, one via audio conferencing and one via video conferencing. Tasks and media were counterbalanced across pairs.

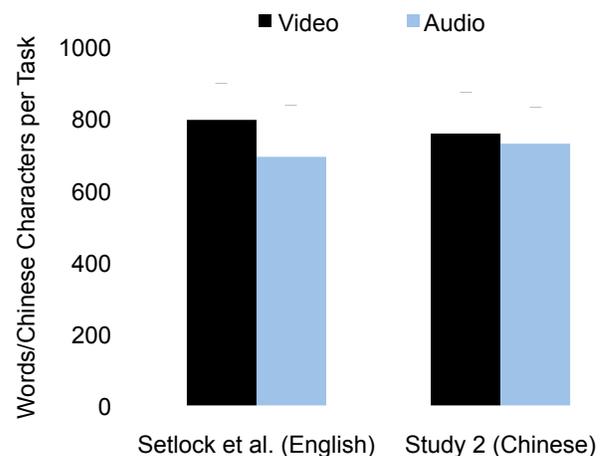
*Participants.* Twelve pairs (24 participants) of native Chinese speakers born and raised in the People's Republic of China participated in Study 2 (mean age  $29.04$ ; age range  $22-35$ ,  $54\%$  male). All had lived in the U.S. for two years or less, were studying at a local university, and spoke English as a second language.

*Materials and equipment.* The materials were identical to those used in Study 1. In the video condition, web cameras located above each participant's monitor sent a head and shoulders view of that participant to his/her partner. Video was displayed full-screen on a color 13-inch monitor located directly in front of each participant. Sony wireless microphones were used to record and transmit audio in both conditions.

*Procedure.* The procedure was identical to Study 1. The study was conducted entirely in Mandarin Chinese.

### Results

*Conversational efficiency.* Consistent with the results reported by Setlock et al. [8], there was little difference between conditions in terms of how many Chinese characters pairs used to come to their joint rankings (for audio,  $M = 729.67$ ,  $SD = 409.17$ ; for video,  $M = 757.75$ ,  $SD = 470.59$ ;  $F [1, 11] < 1, ns$ ). Means per condition are shown in Figure 2.



**Figure 2. Results from Chinese participants speaking in English in Setlock et al. [8] (left) and Chinese participants speaking in Chinese in Study 2 (right).**

*Outcome measures.* There were no effects of media condition on any of our outcome measures. Participants' ratings of the quality of their interaction were high for both conditions (for audio:  $6.24$  on a scale of  $1-7$  [ $SD = .66$ ]; for video:  $6.23$  [ $SD = .72$ ];  $F < 1, ns$ ). Persuasion, as indicated

by the difference between partners' post-task individual rankings, was 1.17 (SD = 1.99) for the audio condition and .67 (SD = 1.30) for the video condition ( $F [1, 11] < 1$ , ns). This low score indicates high agreement and is consistent with Chinese pairs' persuasion scores in previous studies.

### Discussion

The results for Chinese pairs conversing in Chinese are very similar to those for the Chinese pairs conversing in English reported by Setlock et al. [8]. In both cases, there was no evidence that adding visual cues to the auditory channel improved conversational efficiency, subjective evaluations of the success of the collaboration, persuasion, or task performance. In Setlock et al., gaze coding suggested that participants did not make use of the video channel for establishing mutual gaze. We consider the same may have happened in this study.

### GENERAL DISCUSSION

The results from Experiment 1, in which Chinese participants communicated in their native language either face-to-face or via IM, parallel those Setlock et al.'s [7] similar study in which they communicated in English. The results of Experiment 2, in which Chinese participants communicated in their native language using audio or video conferencing, likewise parallel those of Setlock et al.'s second study [8]. Thus, the interaction between culture and communication medium, found in the previous experiment do not appear to be due to the fact that the Chinese participants were speaking in a second language. In addition, participants' scores on the outcomes measures (liking for each other, persuasion) were similar to the scores of Chinese pairs in the previous studies. This suggests that the main effects of culture reported in those studies are likewise not due to fluency issues. Chinese pairs enjoy working together and successfully persuade one another, regardless whether they interact in Chinese or English.

Our results are limited in that we only replicated two of the many previous studies in which native Chinese speakers were asked to communicate in English. Possibly, replications of other studies using quite different kinds of tasks [e.g., 9, 11] would show some effects of non-native language use. Similarly, our results are limited in that we could not, due to the lack of available participants, replicate the American condition in Setlock's studies using native English speakers fluent in Chinese. It would be very interesting in the future to see if Americans speaking in Chinese adopted a more high-context communication style.

One implication of these findings is that solutions to intercultural communication that rely exclusively on machine translation are unlikely to lead to successful interactions. Yamashita and colleagues have already demonstrated how small errors in translation can lead to confusion [12, 13]. Our results suggest that even if machine translation were perfected, cultural differences in communication styles will continue to create barriers that need to be overcome if we are to maximize the success of intercultural collaborations.

### ACKNOWLEDGMENTS

This material is based upon work supported by the National Science Foundation under Grants #0803482, #0325087 and #0329077. The authors thank Ying-Ying Shih for translating the materials and running the sessions.

### REFERENCES

1. Adair, W. L., & Brett, J. M. (2005). The negotiation dance: Time, culture and behavioral sequences in negotiation. *Organizational Science*, 16, 33-51.
2. Clark, H., & Brennan, S. (1999). Grounding in communication. In L. B. Resnick, J. M. Levine, & S. D. Teasley, *Perspectives On Socially Shared Cognition* (pp. 127-149). Washington D.C.: APA.
3. Cramton, C., & Hinds, P. (2007). Intercultural interaction in distributed teams: Salience of and adaptations to cultural differences. *Proc. Academy of Management Annual Meeting, Best Papers*.
4. Hall, E. 1976/1981. *Beyond Culture*. New York, NY: Doubleday/Anchor Books.
5. Ishida, T. (2006). Language Grid: An infrastructure for intercultural collaboration. IEEE/IPSJ Symposium on Applications and the Internet (SAINT-06), 96-100.
6. Schwartz, S. (1992) Universals in the content and structure of values: Theoretical advances and empirical tests in 20 Countries. In M. Zanna (Ed) *Advances in Experimental Social Psychology*, 25, 1-65.
7. Setlock, L. D., Fussell, S. R., & Neuwirth, C. (2004). Taking it out of context: Collaborating within and across cultures in face-to-face settings and via instant messaging. *Proc. CSCW 2004* (pp. 604-613).
8. Setlock, L. D., Quinones, P. A., & Fussell, S. R. (2007). Does culture interact with media richness? The effects of audio vs. video conferencing on Chinese and American dyads. *Proc. HICSS 2007*.
9. Vatrapu, R. & Suthers, D. (2009). Technological intersubjectivity in computer supported intercultural collaboration. *Proc. IWIC 2009* (pp. 155-164). NY: ACM.
10. Veinott, E., Olson, J., Olson, G. & Fu, X. (1999) Video helps remote work: Speakers who need to negotiate common ground benefit from seeing each other. In *Proc. CHI 1999* (pp. 302-309). NY: ACM.
11. Wang, H-C., Fussell, S. R. & Setlock, L. D. (2009). Cultural difference and adaptation of communication styles in computer-mediated group brainstorming. *Proc. CHI 2009* (pp. 669-678). NY: ACM.
12. Yamashita, N. & Ishida, T. (2006). Effects of machine translation on collaborative work. *Proc. CSCW 2006* (pp. 515-523). NY: ACM Press.
13. Yamashita, N., Inaba, R., Kuzuoka, H., & Ishida, T. (2009). Difficulties in establishing common ground in multiparty groups using machine translation. *Proc. CHI 2009* (pp. 679-688). NY: ACM Press.