Analysis of Chinese Speakers' Responses to Survey Intention Questions

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Abstract

This research examines the linguistic behaviors of Chinese-speaking respondents and their impact on the quality of data collected in survey interview settings. This study examines whether respondents provided sufficient, relevant, or contrary-to-face value (CTFV) responses to the proposition of a survey question asking respondents their intention to participation in a future survey. It compares the responses of Chinese speakers to those of English interviewees and explores how social factors such as educational attainment and dialect preference relate to the linguistic behaviors of Chinese-speaking respondents. We found that Chinese-speaking respondents are significantly more likely to provide indirect and/or CTFV responses than respondents who speak only English at home. Education level and dialect preferences were related to Chinese-speaking respondents' linguistic behaviors. Chinese speakers who have provided an indirect and/or CTFV responses are significantly more likely to provide a true 'no' response to the target question**.** Findings from this study are significant and insightful for our understanding of the characteristics of Chinese institutional discourse in comparison with other language groups and how these characteristics impact the quality of their responses in structured survey interviews.

Key Words: Cross-Cultural, Cognitive interview, Chinese respondents, data quality

1. Introduction

The motivation for the current research grew from the need to understand the issues regarding the administration of surveys to non-English speakers (Pan 2008) at the U.S. Census Bureau. The United States Census Bureau serves as the leading source of quality data about the U.S. nation's people and economy (www.census.gov) and is one of the largest data collection agencies in the world. These demographics and economic data are collected mainly in the form of survey questionnaire. Given that the United States is a multilingual country, with over 55 million people -- about 1-in-5 U.S. residents -- age 5 and older, reported regularly speaking a language other than English at home (Shin and Kominski 2010), it is necessary for the U. S. Census Bureau to provide informational brochures and/or questionnaires in languages other than English to its survey participants. While conducting the Census and various census surveys, interviewers routinely encounter households that speak non-English languages (e.g. Spanish, Chinese, Korean, Russian, Vietnamese) at home. Of relevance to this current study, in 2007, there were over 2.5 million Chinese speakers in the United States and the Chinese language was the second most spoken non-English language spoken at home (Shin and Kominski 2010). The recent multilingual survey research conducted at the United States Census Bureau has shown that monolingual Chinese respondents have trouble filling out self-administered questionnaires (Pan 2005). In a series of cognitive pretesting interview studies on multilingual supplemental materials and surveys, researchers met other challenges and encounter problems with Chinese respondents providing responses that are irrelevant or off topic, or they simply opt out from responding to the questions (Pan, 2008). A systematic study of these communication styles of Chinese speakers may help shed light on these issues.

Prior research on the communication styles of Chinese speakers in their writing and conversations have shown that they tend to use indirect and circular styles in their interaction (Young 1994, Gunthner 1993, 1994, Scollon and Scollon 1995). Other studies on Chinese pragmatics show that Chinese speakers engage in contrary-to-face-value (CTFV) communication style in their interactions. Ma (1996) defines CTFV communication as "any communication in which what is said is the opposite of, or different from, what the speaker believes to be true or what he or she is 'logically' expected to say" (ibid.: 258). The underlying principles governing Chinese CTFV communication is interpersonal harmony. Ma asserts that within the Chinese culture, correct interpretation of the speech act depends on culture and context. The authenticity of a 'yes' or a 'no' message can usually be established through contextual and nonverbal cues.

Recent work by Pan (2008, forthcoming) examining the linguistic features of monolingual Chinese respondents in a structured cognitive interview setting revealed that Chinese interviewees show a similar style of communication when responding to interview questions. In particular, Chinese respondents were more likely to provide very limited or ambiguous responses to survey questions compared to their English speaking counterparts. Unlike a regular conversation, survey interviews consist of non-reciprocal flow of information where the survey interviewers are seeking information and the respondents are releasing them. It is often assumed that survey respondents will provide direct responses to survey questions.

In prior research studies involving the use of conversational or interviewing type of tools, much of the information gathered is of a qualitative nature. Such research requires painstaking detailed qualitative analyses of turn by turn conversation, and sometimes word by word analyses for each sentence, which are generally provided in the form of language transcripts (e.g. Ma 1996; Young 1994). The analyses generally compare detail discourse analyses of one case versus another, such as a Chinese speaker or writer versus a western speaker or writer. The issue with this type of analyses is that it requires a linguist specialized in the language to conduct the intensive data analyses, which would be labor intensive if survey researchers were to study such behavior over a large number of respondents. Moreover, this type of discourse analysis research is based on localized text**.** Researchers generally use text as evidence and do not examine a larger sample of respondents. The findings from these studies generally cannot be generalized beyond the study person, and, hence, the findings often lack representativeness.

The research reported in this chapter is a continuation of ongoing research initiated by Pan (forthcoming) to systematically code and analyze the quality of survey responses provided by respondents. Based on linguistic theories, Pan developed a discourse analytic tool using a theoretical framework that draws from speech act theory, discursive notion of question-answer sequences, and cross cultural pragmatics to measure the concept of indirectness in the Chinese discourse pattern. This study has three major goals. First, it aims to apply the new tool to measure this known communication style by including a larger sample of Chinese speakers. We contrast their responses to a group of respondents who speak only English at home and provide a unique comparison among these two groups of speakers. We focus our analysis on their responses to a personal opinion type question and expand the scope of Pan's study (Pan, forthcoming) with a full set of Chinese and English cognitive interview data. We aim to replicate prior linguistic studies, which generally focus on one or two case study by using a larger sample of Chinese speaking respondents. Second, we examine the meaning behind the conversation by analyzing the contextual cues provided by the respondents during the entire interview

that either support or contradict their face value response to the opinion question to examine the internal validity of the survey question. Third, we examine the social and demographic factors that associate with the communication styles of Chinese respondents.

The findings of comparative studies provide information for survey researchers about the differences in the discourse on which respondents from different language backgrounds will respond using different styles, and how the different communication styles affect the answers to the standard survey questions. This research contributes to prior studies on discourse of Chinese speakers and cross-cultural pragmatic differences between Chinese and native speakers in the United States by examining a larger study sample to enhance the external validity of our findings. It examines and controls for subgroup differences and the "true" meaning of responses (internal validity of the survey question measure) for the Chinese speakers. The findings from this research have practical implications for questionnaire development for Chinese speakers and have helped evaluate an analytic tool developed for cross cultural survey research.

2. Research Questions

This study has three specific research questions in the design:

Q1. Are Chinese-speaking respondents more likely to use indirect and contrary-to-face-value responses than respondents who speak only English at home?

Q2. Do Chinese speakers use indirect or contrary-to-face value response to hide their lack of interest in participating in a future survey?

Q3. What type of social-demographic factors relate to the linguistic behaviors among Chinese speakers?

3. Data and Method

3.1 Data

This study utilizes data collected as part of two multilingual research projects undertaken at the United States Census Bureau. The combined data set consists of 224 cognitive interviews between 2006 and 2008 conducted with five different language groups (Chinese, Korean, Spanish, Russian and English). Both projects recruited purposive samples in three metropolitan areas with high concentrations of the target language groups through newspaper and electronic advertisements, non-English language schools, and by word-of-mouth. The recruitment targeted a group of participants whose demographics mirrored those of the 2006 ACS non-English-speaking respondents in the CATI interviews to improve the representativeness of the sample. (For more details of the two research projects, please see Pan, Schoua-Glusberg, Hinsdale, and Park 2006 and Pan, Hinsdale, Schoua-Glusberg, and Park 2008.)

For the purpose of this study, we obtained cognitive interview summary data and in-language transcripts (if available) of 46 Chinese and 33 English cognitive interviews. Cognitive interviewing is a commonly used qualitative method in survey research to pretest survey questions. It is a semi-structured interview to "study the manner in which targeted audiences understand, mentally process, and respond to the materials" provided by survey researchers (Willis 2005, p3). Interviewers use think-aloud methods, cognitive probes and debriefing questions (Willis 2005) to elicit detailed and in-depth information about respondents' interpretations and mental processes when reacting to the material they are reading. It is crucial that respondents articulate their thoughts and answer the interview questions directly so that survey researchers can understand the types of

problems in the survey instruments or survey documents. Table 1 below shows the demographic characteristics of the two selected groups of language speakers.

Table 1: Demographics of Study Sample

Characteristics	*Chinese (Total N=46)*	*English (Total N=33)*
Gender		
Female	28 (61%)	20 (61%)
Male	18 (39%)	13 (39%)
Age		
LT35	4 (9%)	9 (27%)
35-54	20 (43%)	17 (52%)
55 & over	22 (49%)	7 (21%)
Education		
Less than high school	25 (54%)	5 (15%)
High school	15 (32%)	14 (43%)
College	6 (16%)	14 (43%)
Year of Entry		
Before 1990	8 (17%)	Not
1990-1999	21 (46%)	Applicable
2000 or later	17 (37%)	
Preferred Chinese Dialect		
Mandarin	30 (65%)	
Cantonese	10 (22%)	Not
Shanghainess	3 (7%)	Applicable
Fukanese	2 (4%)	
Shandonese	1 (2%)	

3.2 Discourse Analysis

In this paper, we used discourse analysis to examine interviewees' responses to a sequence of interview questions that lead up to determining their survey participation intention. "Discourse analysis focuses on knowledge about language beyond the word, clause, phrase and sentence that is needed for successful communication. It looks at patterns of language across texts and considers the relationship between language and the social and cultural contexts in which it is used. It considers the ways that the use of language presents different views of the world and different understandings." (Paltridge 2006, p2). In this paper, we consider the larger discourse context in order to understand how it affects the meaning of the responses. We coded responses provided by the respondents during all conversational turns taken relating to the one personal opinion type question administered by the interviewers, and we would applied the contextual cues to help determine the final meaning of the survey responses. In particular, we compare the overall level of consistency in these responses between Chinese and English speakers and reinterpret the true meaning of a 'yes' versus a 'no' response when the followup explanations do not match up to the answers.

3.2.1 Survey question and response types

In this study, we focused on examining one survey question, which asks respondents their intention to participate in a future household survey-like conducted by the U.S. Census Bureau. "If you were selected, would you participate in the survey?" We define and measure (in)directness of speech based on the (ir)relevancy of a participant's response to the survey question. The interview question has a proposition with a key question word, functioning to elicit an expected "Yes/No" answer that matches the semantic content to fully complete the proposition of the survey participation intention question. We coded how closely the responses completed the proposition or matched what the question was asking. When the response fully answered the question, it was coded as 'match.' A response that partly answered the question or was totally off track, or off topic, or irrelevant or there was resistance from the respondent to provide any answer was coded as 'indirect'. For more details about the coding scheme, see Pan (forthcoming). To achieve a relatively high coding reliability, two sociolinguists (one native Chinese speaker and one non-native Chinese speaker) and another native Chinese social science researcher – coded the interview question and responses independently for all 79 respondents using the coding scheme described above. The researchers then convened to review and discuss the coding to reach consensus. We obtained very high interrater agreement between the two of the researchers (233 out of 237 codes). Whenever there was disagreement, the coding of the third researcher was taken. It just so happened that the third set of coding taken for this purpose was always in agreement with the native Chinese sociolinguist.

3.2.2 Contrary-to-face-value response (CTFV)

We explore the true meaning of the initial response to the target survey participation intention question by examining other responses throughout the interview that provide contradictory evidences to their initial response. For instance, imagine the following scenario. A respondent has reported that she will probably participate in the future survey when the interviewer administered the target survey participation intention question (see excerpts from the interview below). However, after reviewing the entire transcript, the respondent has provided clues and evidences that she has provided a contrary-to-face-value response. Response from another section of the transcript shows that the respondent reiterated the mandatory requirement for participating in the study "…it is required by the US law to answer the survey…" and yet provided the hint that she believe only US citizens are required to do so. During one of the conversation turns, it became clear that the respondent, who is only temporarily staying in the US, was not a citizen; together with the fact that the letter was not addressed to her directly, she did not believe she was included in the survey. If researchers only take the respondent's face value 'Yes' response to the target question, the response may not be accurate. In this instance, the coder had a final interpretation of the meaning of the initial 'yes' response changed to a final 'no' response.

> Q: **If you received this letter at your household, what would you do next? Why?**
>
> R: "***I will do according to what is being asked in the brochure. It says that it is required by the US law to answer the survey***. … ***If you are an American citizen****, you have the duty to do this thing…"*
>
> Q: "How about those who are here legally, such as green card holders, student visa or work visa holders?"

R: "*I don't know for sure, but **I feel I'm not included. I just stay here**. If the letter has my name on it, I would think it is for me. If it doesn't address me specifically, I don't feel it is for me…"*

Q: "So for those who live here for a few years, it is not for them."

R: *"Yes, when you handed me this letter, I first looked at the address box of the envelope to see if it is for me, if it addresses me in the address. If it doesn't have my name, but just my address, I will think it's junk mail and will throw it to trash."*

4. Findings

In this section, we report our findings on the linguistic behaviors of Chinese speakers when they are responding to the survey participation intention question and compare them to those of English speakers. We report the relationship between these communication styles and Chinese respondents' true intention for participating in the future survey and examine social factors that may be related to the communication style of Chinese speakers.

4.1 Question One (Q1): Are Chinese-speaking respondents more likely to use indirect and contrary-to-face-value responses than respondents who speak only English at home?

In section 4.1, we address our first research question by reporting the prevalence of the two linguistics behaviors (indirectness and contrary-to-face value response style) and comparing these behaviors between Chinese-speaking and native English survey respondents.

4.1.1 Indirectness of Response by Language Groups

Our results show that the 39 percent of Chinese interviewees provided indirect responses while only 3 percent of English interviewees did so. The observed difference is statistically significant (chi-square=13.7, p<.001; the same result is obtained using the Fisher Exact test, p<.001.) Table 2 gives summary statistics for the estimated prevalence and the 99 percent confidence interval (between .20 to .59 for Chinese-speakers and 0 to 0.11 for English speakers) for the use of indirect responses among the two language groups.

Table 2: Confidence Interval for Estimated Prevalence of Indirect Communication Style by Language Groups.

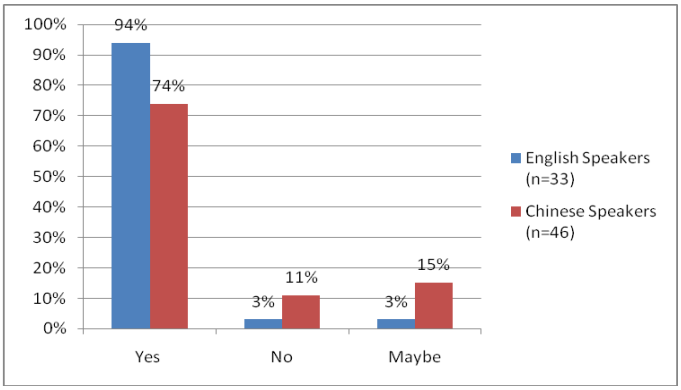
Language group	Mean (Std dev.)	99% C.I. (low, high)	N
Chinese	0.39 (0.49)	0.20, 0.59	46
English	0.03 (0.17)	-0.05, 0.11	33

4.1.2 Initial face value responses and contrary-to-face-value (CTFV) evidence

In this section, we first present the initial face value responses provided to the survey participation intention question by the Chinese and English speakers in our study. Chart 1

summarizes the face value responses of the two language groups. The chi-square statistical test shows that the difference in the willingness to participate in future survey between the English (94%) and Chinese speakers (74%) is significant (Chi-sq=5.9, p<.05). The English speakers in our study were significantly more likely to agree to participate in the future survey than the Chinese speakers.

Chart 1: Face Value Responses to the Survey Question by Language Groups



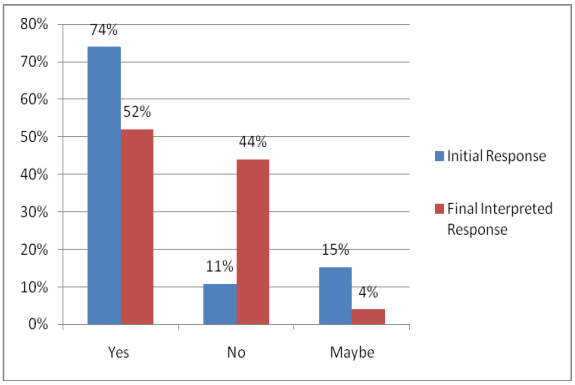
After the coders determine the (in)directness of responses to the survey particiaption intention question, the coders examine other responses in the interview that provided CTFV evidences to respondents' initial responses. The coders then make a final interpretation of the respondents' true intention to the future survey participation. Our results show that none of the English speakers provided contradictory evidence whereas 19 out of 46 (41%) of the initial responses provided by the Chinese speakers were contrary to face value. Among the 19 respondents who have provided CTFV responses, all but one of them have provided a 'maybe' or a 'yes' initial responses and all of these 18 responses were reinterpreted as a 'no' response. The remaining respondent (1/19) had initially provided a 'no' response but was reinterpreted as a 'yes' response. Table 3 below provides the summary statistics for the estimated prevalence and the 99 percent confidence intervals (between .22 to .61 for Chinese-speakers and 0 for English speakers) of the CTFV behavior of our sample.

Table 3: Confidence Interval for Estimated Proportion of CTFV Communication Style

Language group	Mean (Std. dev.)	99% C.I. (low, high)	N
Chinese	0.41 (0.50)	0.22, 0.61	46
English	0 (0)	NA	33

Chart 2 shows both the initial face value and the final interpreted responses for the Chinese Speakers in our study. The percentage of Chinese speakers who is willing to participate in the future survey drops from 74 percent to 52 percent while the percentage of those who have no intention to do so increased from 11 percent to 44 percent. This reinterpretation further increased the difference between the English (94%) and Chinese speakers (52%) in their willingness to participate in the future survey.

Chart 2: Percentage of Initial and Final Interpreted Responses to the Survey Participation Intention Question Among Chinese Speakers



4.2 Question Two (Q2): Do Chinese speakers use indirect or contrary-to-face value response to hide their lack of interest in participating in a future survey?

Next, we examine how Chinese respondents' communication style is related to their true intention to participate in a future survey. Given that the normative style of Chinese communication is harmony-oriented, we expect Chinese respondents who do not wish to participate in the future survey to be more likely to provide indirect and/ or contrary-to-face-value responses than those who are willing to do so. Chart 3 shows the proportion of indirect and/or contrary to face value responses that were provided by the Chinese respondents, based on their initial face value response. The first bar on the left shows the distribution of the linguistic behaviors of Chinese respondents who have provided an initial 'yes' response to the target question. About 68 percent of them (23/34) provided the 'yes' response in a direct manner where their answers matched the proposition of the survey question. Another 15 percent of them (5/34) provided the 'yes' response indirectly, and 18 percent of them (6/34) used both indirect and CTFV response styles. The middle bar shows that all Chinese speakers who have provided a 'maybe' answer used both indirect and contrary-to-face-value response styles. The last bar shows that the majority of respondents (80% or 4 out of 5) who have responded 'no' initially did so indirectly. The remaining 20 percent represents the one respondent who provided both an indirect and contrary-to-face-value 'no' response for a true 'yes' answer.

Chart 3: Chinese Speakers' Linguistic Behaviors by Initial Face Value Responses

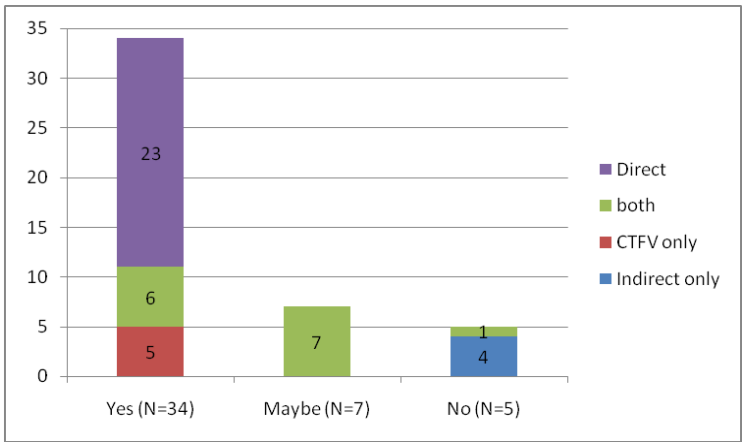
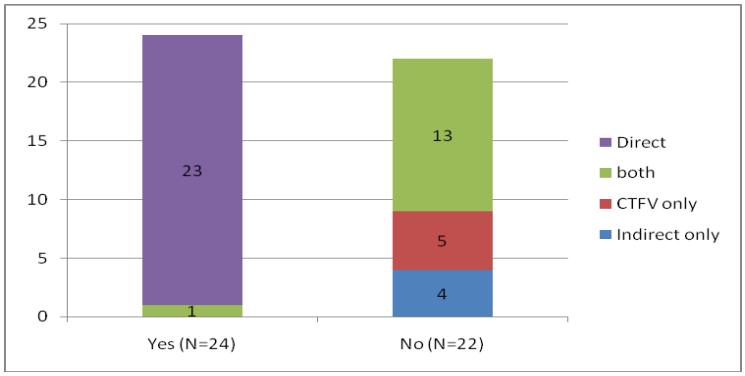


Chart 4 shows the final interpreted responses of the Chinese speakers. The key message from Chart 4 is that none of the true 'no' responses was provided in a direct manner; they were either provided indirectly and/or were CTFV responses. In contrast, the majority (23 out of 34 or 96%) of 'yes' responses were provided directly; no reinterpretation was required for genuine 'yes' responses.

Chart 4: Chinese Speakers' Linguistic Behaviors and Final Interpreted Responses to Participate in Future Survey.



4.2.1 Linguistic behavior and its predictive value of responses to survey question

We used a logistic regression model to predict the final 'no' response as a function of the two observed linguistic behaviors. The logistic regression model used is:

$$\text{logit}\left(p_i\right) = \beta_0 + \beta_1 x_{1i} + \beta_1 x_{1i} + \ldots + \beta_8 x_{8i}$$

Both linguistic behaviors were significant in predicting a true 'no' response. Table 4 shows that Chinese respondents who have provided indirect responses ($p<.01$) or those who have used CTFV responses ($p<.01$) were significantly more likely to have a final interpreted 'no' response to the survey intention question than those who did not use either one of these communication styles. The identification of such linguistic behaviors may help identify problematic survey question and help interpret the true meaning of an initial response for the survey question.

Table 4: Logistic Regression Results Predicting the Probability of a "No" Response as a Function of Communication Styles.

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-1.3013	0.7741	2.8257	0.0928
CTFV	1	2.2911	0.7363	9.6817	0.0019
Indirect	1	2.1491	0.7475	8.2667	0.0040

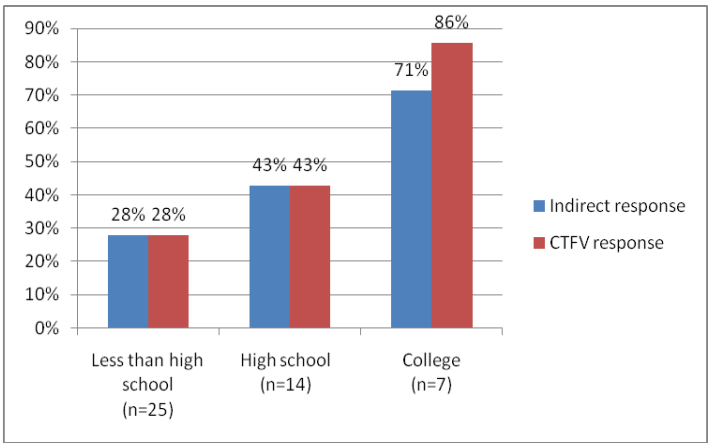
4.3 Question Three (Q3): What type of social-demographic factors relate to the linguistic behaviors among Chinese speakers?

We examine the relationship between social demographic factors and communication style among Chinese speakers. Associations were found between educational attainment and dialect preferences with communication style while no statistically significant association were found between gender and age. The next two sections will describe the significant findings.

4.3.1 Educational attainment

Education is a formal way of socializing and reinforcing cultural norms, which are expected behaviors within a society or group and indicate the approved and established norms of the ways of doing things, of dress, of speech and of appearance (Scollon and Scollon 1995). We expect Chinese respondents with higher educational attainment to demonstrate more culturally appropriate or prescribed behavior from their counterparts with less education. Our findings support this hypothesis. Chart 5 shows that 71 percent of Chinese respondents with college education used indirect response style while 43 percent of those with high school and 28 percent of those with less than high school educational attainment provided indirect responses. Similarly, Chinese respondents with college education had the highest percentage of using CTFV response style compared to high school (43%) and those with less than high school education (28%).

Chart 5: Percentages of Indirect and Contrary-To-Face-Value (CTFV) Responses by Educational Attainment

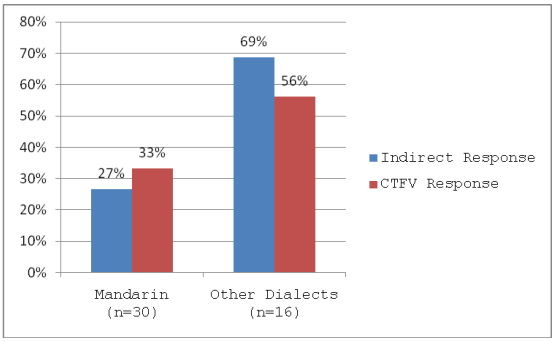


Due to the small number of Chinese respondents with college degree, we combine the two groups of Chinese respondents with higher level of educational attainment into one group – at least high school education. The chi-square result shows that educational attainment is related to the use of indirect responses (chi-sq=2.8, $p<0.1$) and CTFV responses (chi-sq=4.0, $p<0.05$). We used logistic regression analysis to examine whether the same binary education variable (at least high school versus less than high school) is predictive of Chinese respondents' communication style. The odds ratio estimates show that the Chinese speakers with at least a high school education are 2.8 times more likely than the other Chinese speakers to use indirect responses ($p<.10$) and 12 times more likely to use CTFV responses ($p<.05$).

4.3.2 Dialect preference

Among the Chinese speakers in this study, about 65 percent of them (see Table 1) spoke Mandarin or prefer to speak Mandarin, while the remaining spoke or preferred to speak a Chinese dialect (such as Cantonese, Shanghainese) other than Mandarin. Chart 6 shows that 69 percent of Chinese respondents in this study whose preferred dialect is not Mandarin, used indirect response style while 23 percent of those who spoke or preferred to speak Mandarin did so. The difference is statistically significant (chi-sq=9.0; p<.01). The percentages of CTFV responses usage show similar pattern for the two dialect groups - 56 percent versus 33 percent respectively. However, the chi-square test result was not statistically significant.

Chart 6: Percentages of Indirect Responses by the Dialect Preferences Among Chinese Speakers



4.4 Summary

To summarize, the Chinese-speaking respondents were significantly more likely to provide indirect responses that do not directly match the proposition to the survey questions than their English-speaking counterparts. More than two out of five Chinese respondents demonstrated contrary-to-face-value communication style, while none of the English respondents use this communication style. These findings addressed our first research question and showed that the use of indirect and CTFV response behaviors is more prevalent among Chinese-speaking survey respondents compared to their counterparts who speak only English at home. Our second research question, which hypothesized that Chinese speakers tend to use indirect or CTFV communication style to hide their lack of interest in participating in a future survey was supported by our study results. The use of these linguistic behaviors of our Chinese respondents is found to be highly associated with a true 'no' response. All but one of the respondents who had used either or both communication style had meant to say 'no' to the survey question. Our third research question explores factors that may explain subgroup differences among the Chinese speakers. We found that educational attainment and dialect preferences are related to the use of indirect and CTFV response among the Chinese speakers. Compared with respondents who have less than college education, respondents who have completed high school are more likely to use indirect response style and CTFV responses than their counterparts who have less than high school educational attainment, while respondents with college-level education are more likely to use an indirect response style, compared with their high school counterparts. Respondents who spoke or preferred to speak a dialect other than Mandarin also were more likely to use indirect response style than their counterparts Mandarin-speaking. The difference in the percentages of CTFV responses between the two dialect groups was not statistically significant. It is possible that the

subgroups of Chinese speakers communicate differently when they are speaking with other language subgroups, i.e. dialect speakers, because of the notion of insider and outsider.

5. Discussion

Based on the analysis of responses to the target question and comparison between the two language groups, several themes emerged from our findings. First, the new coding system draws from speech act theory, discursive notion of question-answer sequences, and cross-cultural pragmatics to measure the level of indirectness in the Chinese discourse patterns, shows great promise and allows the researchers in this study to analyze and quantify such behavior among a large group of respondents.

Second, the indirect communication style exists in every culture; we found that both Chinese and English speakers in our study demonstrated this kind of communication style. However, it is more prevalent among our Chinese respondents, and a much higher proportion of our Chinese sample provided indirect responses compared to our English-speaking sample.

Third, the relatively high proportion of Chinese speakers who have provided CTFV responses, compared to that of the English speakers (none), has significant implications for the quality of data collected from Chinese-speaking survey respondents. This finding is intriguing to us because it shows that a large portion of the CTFV responses were related to 'no' responses. It suggests that the survey question, which was administered in Chinese and should be clearly understood by the Chinese respondents, may not be a valid tool of measurement if a large proportion of Chinese speakers who meant to provide a true 'no' answer used CTFV responses. Hence, it is important to design interview questions for Chinese speakers so that the questionnaire can collect the type of data that the research is seeking to generate. Moreover, it is necessary to analyze responses of Chinese speakers throughout the entire interview to look for cues and contextual information that are contradictory to the face value response.

Fourth**,** our findings demonstrated that the use of quantitative data analysis methods is of great value to researchers who need to draw meaningful results from a large body of qualitative data. First, the quantitative approaches allow us to estimate the prevalence of the indirect communication behavior identified by prior qualitative research with a group of Chinese speakers. It helps pinpoint problematic survey question for Chinese respondents, and allows survey researchers to evaluate the data quality of a particular survey question. Second, the summary results provided in numerical terms can be given with a specified degree of confidence, such that the estimated prevalence of behavior can be given with more than 99 percent confidence that a certain percentage of Chinese speakers used indirect communication style in an interview. Similarly, any observed differences between two language groups can be accompanied by a statement giving the chance (probability) of error (say p=.01), that is, the chance that the conclusion in incorrect. The lower the chance of error suggests the more confidence we have that the observed difference is statistically significant. Thus the use of quantitatively procedures in analysing qualitative information can lend greater credibility to the research findings. It provides the means to quantify the degree of confidence in the research results. Finally, the main beneficial aspect of quantitative analytical approaches is that it provides the means to separate out the large number of confounding factors that often obscure the

main qualitative findings such as in this study, which examines the role of language (a measure of culture) on communication style.

6. Conclusion

Careful examination through the lens of discourse analysis of how Chinese respondents respond to interview questions can identify problematic survey questions, especially those that elicit a high proportion of indirect and CTFV responses from participants. By combining discourse analysis with quantitative statistical methods to examine the question-answer sequence in context, this study evaluated and demonstrated the utility of the newly developed method of measuring linguistic features of survey respondents in a cross-cultural manner. Our findings are consistent with earlier qualitative research, and our study identifies the same differences in communication style with a larger sample of Chinese speakers. The comparisons between two language groups provide strong evidence of the differences between the groups. However, not all Chinese are implicit, indirect, or vague in their answers when responding to the survey participation question. The examination of demographic characteristics and sociocultural factors highlight the importance of within group differences and variations of communication style among Chinese speakers. Our study suggests why it is important to pay attention to the characteristics of the survey participants and how these characteristics may affect the likelihood of collecting the type of direct and matched responses or data that survey researchers expect. This kind of analysis has furthered our understanding of Chinese linguistic behaviors in context and will help survey researchers' design and improve questionnaire for survey interviews. The findings also demonstrated that the indirect speech style and contrary-to-face-value responses provided by Chinese respondents may have far reaching implications on the data validity beyond the initial confusions it causes the interviewer.

Although our study sample was not randomly selected, the demographic characteristics of this sample were carefully matched to those of the survey respondents to the 2006 American Community Survey to enhance the representativeness of the sample so that our results maybe generalizable to the larger Chinese speaking population.

Future study should apply the new metric used for this study to a random sample and control for social demographics factors identified in this research. This will strengthen the findings from the current study and allow an estimation of the magnitude of this Chinese linguistic behavior to generalize beyond the cognitive laboratory sample and enhance the external validity of the current study.

7. Limitations

One of the main limitations of this study is the use of ready-made broad transcripts and interview summaries. Although the 2006 data are verbatim transcripts, other important clues for the analysis of spoken discourse such as pause length and overlapping were not available in the transcripts. More subtle information conveyed through body language and intonation was lost. Apart from all these limitations, the 2008 data are further limited by the fact that these data were translated broad summaries of the interviews, the ability for discourse analysis is limited; the entire conversation and numbers of the actual turns may be limited, the sentence structure and choice of word in the translated data may also be affected by the idiosyncratic language style of the individual translator. The study

sample is much larger than most qualitative analyses but nevertheless, the study sample was purposive and the generalizability of the current study remains limited.

Despite some limitations and the need for further research, a number of important insights can be drawn from the present research. These insights are relevant to survey researchers and data users analyzing subgroup differences.

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