

Language of Administration as a Cause of Measurement Error

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Abstract

Large national surveys usually allow respondents to answer in the language of their choice. Yet theories from psycholinguistics suggest that the same person can provide different responses depending on the language of interview even without problems associated with translation. The language of survey administration can serve as a powerful situational cue that primes a cultural meaning system. One likely result is that language affects respondent's reference frame, influencing how respondents perceive the intent of the questions and their affective characteristics.

Analyses of the New Immigrant Survey data are conducted to examine the effect of language of administration on survey responding. The analyses focus on a sample of Mexican immigrants. The lack of random assignment to a language is addressed by estimated propensities to select English based on covariates predictive of language preference. Conditional on the language propensity scores, responses to substantive questions for those interviewed in English and those interviewed in Spanish are compared to test for differences in responses due to language of administration. Consistent with the proposed hypothesis, significant differences between language groups are found in questions related to alcohol consumption. Surprisingly, no language effects are detected in questions related to physical and mental health.

Key Words: Language effects, measurement error, propensity score

1. Introduction

In the age of globalization, modern societies are characterized by an increasing number of people with multiple cultural backgrounds. Often, such individuals speak more than one language and are knowledgeable about more than one culture. U.S. surveys of minorities and immigrants usually allow respondents to answer in the language of their choice (e.g., the New Immigrant Survey; the National Survey of Latinos; the National Latino and Asian American Study). Those who choose to answer in their mother-tongue are likely to differ from those who choose to answer in English in their background characteristics (e.g., level of acculturation, education), substantive answers and response patterns (like item missing data or "Don't Know" responses, see Collet, 2007). While self-selection certainly plays a role in these differences, it would be premature to consider it the sole source of all observed differences between the English and the foreign language versions of the same survey. One obvious source of measurement error is the necessary use of different languages when intending to measure the same phenomena in multiple ethno-cultural groups.

1.1 Language, Cognition and Culture

Multiple studies have demonstrated that language can be used as a cue to prime culture (Botha, 1968; Feldman, 1975; Bond and Yang, 1982; Trafimow, Silverman, Fan and Law, 1997; Watkins and Gerong, 1999; Ross, Xun and Wilson, 2002; Watkins and Regmi, 2002; Kimmelmeier and Cheng, 2004; Marian and Kaushanskaya, 2004). The implication of such findings for survey methodologists is that language has the potential to influence each stage of the response formation process. For example, language can affect comprehension by inducing the cultural frame associated with it, thus potentially changing the literal and pragmatic meaning of survey questions (e.g., Trafimow et al., 1997). Similarly, language can affect retrieval and judgment by evoking a particular mindset related to a given cultural meaning system, thus determining what information is temporally accessible and/or serving as a retrieval cue during information recall (e.g., Marin, Triandis, Betancourt and Kashima, 1983; Marian and Neisser, 2000). Furthermore, the reference frame primed by a language may affect scale anchoring at the formatting stage and/or the necessity to consider particular social norms at the editing stage (e.g., Fu, Lee, Cameron and Xu, 2001; Lee et al., 2001).

Each cultural meaning system serves as an interpretive frame that affects individual's cognition, emotion and behavior (Geertz, 1993; Hong, Chiu and Kung, 1997; Kashima, 2000; Mendoza-Denton, Shoda, Ayduk and Mischel, 1999). Individuals can shift the operative cultural meaning system, depending on situational cues and requirements of the surrounding environment; a phenomenon known as "cultural frame switching." Which cultural identity is dominant

can be affected by generational status (Tsai, Ying and Lee, 2000), language assimilation (Laroche, Kim, Hui and Tomiuk, 1998), sociopolitical climate (Fordman and Ogbu, 1986; Berry, 1990; Gurin, Hurtado and Peng, 1994) or situational cues (Hong et al, 2000, 2001). Of most interest to the present research is language's property to cue culture. For example, Earl, (1969) found that Hong Kong bilinguals provided more "Western" responses to a dogmatism scale when they answered in English versus Chinese. Similar findings demonstrating cultural frame switching have been reported by Ross et al. (2002), Triandis, Davis, Vassiliou and Nassiakou, 1965, Trafimow et al., (1997), Yang and Bond, (1980). This suggests that language of administration may affect survey responses; however, strongest effects may be expected on topics where the two cultures take diverging standpoints.

1.2 Language in Surveys of Bilingual Respondents

Various factors may determine a respondent's self-selection into a language – they can be respondent-related (e.g., level of acculturation and comfort with the mainstream language), interviewer-related (e.g., ethnicity, accent, and visual cultural cues), and interview-situation-related (e.g., perceived sponsorship and possible privacy concerns when other family members are present). At present, little is known about whether controlling for such factors would make language effects negligible. Further, if that were not the case, we do not know the consequences for measurement error of providing different responses depending on language versions. It can be hypothesized that when the cultural identities of the respondent are in opposition to each other (e.g., premarital sex is acceptable in Western cultures, but not in Arabic), language may be a strong cue to what types of responses are socially acceptable. As a result, different answers to the same question may be provided depending on the cultural norms evoked by the language.

The existing cross-cultural and psychological research has demonstrated that Hispanics and Americans differ in the endorsement of individualist and collectivist dimensions of identity, with Hispanics having a stronger collectivist orientation (Marin and Triandis, 1985). Two values that are central to the Hispanic but not the American culture are *familism* (importance and strong connection to family) and *simpatia* (need for being nice and polite with others; agreeableness with others) (Lisansky, 1981; Triandis, Marin, Lisansky and Betancourt, 1984; Sabogal, Marin and Otero-Sabogal, 1987; Marin and Marin, 1991; Vasquez, 1994; Levine, Norenzayan and K., 2001; De Las Fuentes, Baron and Vasquez, 2003). The latter has also been associated with higher tendency among Hispanics to acquiesce (Marin et al., 1983; Hui and Triandis, 1989; Marin, Gamba and Marin, 1992) or to provide socially desirable responses (for example, Ross and Mirowsky, 1984; Warnecke et al., 1997). Such tendencies have been observed in various domains and may explain some puzzling results. For example, the finding that recent immigrants, despite poverty and more difficult access to health care, report better physical and mental health than their more acculturated or U.S.-born counterparts (Vega et al., 1998; Ortega, Rosenheck, Alegria and Desai, 2000; Grant et al., 2004).

In addition, extensive health research reveals that culture often determines whether and what symptoms are reported, whether health care is sought, what meaning is imparted to the illness and how much stigma is attached to it (US Department of Health and Human Services 2001). The value of familism is reflected in different attitudes among Hispanics and European Americans towards various issues, including the belief that the family is responsible for one's health problems (Sabogal et al., 1987) and that mental illness is best treated within the family (Edgerton and Karno, 1971). There is some evidence that psychiatric disorders may have greater stigma attached to them among Hispanics than among European Americans (Silva de Crane and Spielberger, 1981). Thus, we would expect that survey administration in Spanish (versus English) would prompt bilingual bicultural respondents to report fewer psychiatric and general health problems. Similarly, reports of alcohol use can be influenced by social and cultural factors, such as group norms and attitudes towards alcohol. Hispanics have been reported to have more conservative alcohol norms and attitudes than Whites (Caetano and Clark, 1999). Weaker intentions to use alcohol, tobacco and marijuana over the course of adolescence have also been reported for Hispanics relative to other ethnic groups (Maddahian, Newcomb and Bentler, 1988). The existing literature suggest that even though alcohol consumption is more socially undesirable, it is not less prevalent in the Hispanic culture (Clark and Hill, 1991; Greenfield and Kaskutas, 1998). Given this, we would expect to see underreporting of alcohol consumption when bilingual bicultural respondents are reminded of their Hispanic identity by being interviewed in Spanish as compared to English.

Survey questions vary in their susceptibility to measurement error and in the mechanisms that induce measurement error. It can be expected that that language, as an external stimulus to response formation, may not perform similarly across different types of survey questions. Language is likely to be most powerful when the questions pertain to topics on which the cultures hold different expectations (e.g., Triandis et al., 1965). On the other hand, questions related to well-defined and accessible facts, such as one's marital status, number of biological children, or whether respondent lives alone, are not likely to change depending on the language of interview. Thus, we would examine the hypothesis that language of survey administration will affect responses among Hispanic bicultural-bilingual respondents in the

U.S. if and only if the two cultures differ in their social desirability norms relevant to the questions being answered. Specifically, we would predict that Hispanic bicultural-bilingual respondents interviewed in Spanish will report lower rates of general and mental health problems and alcohol consumption relative to those interviewed in English, as a result of language cueing Hispanic cultural values and inducing socially desirable responses for this culture. In contrast, we would expect that language of survey administration will have no effect on responses provided by Hispanic bicultural-bilingual respondents to questions related to well-defined and stable facts, such as number of biological children, marital status and living situation.

2. Data and Methods

2.1 Dataset

An investigation of the effects of language on survey measurement error would ideally be based on a large scale survey using a random assignment of bicultural bilinguals to one of the two relevant languages. However, the general practice of U.S. surveys that employ multiple languages has been to leave the choice of language to the respondent. As language effects are likely to be item-specific, it is important to be able to study them even in the absence of random assignment to a language. Statistical methods, such as propensity score modeling, albeit dependent on the specification of the propensity model, allow us to explore the influence of language when respondents self-select themselves in a language of survey administration.

The New Immigrant Survey (NIS) is a longitudinal study of legal immigrants to the United States and their children, assessing migration behavior and its impact on economy. The design involves drawing representative samples of new immigrant cohorts every four years and following each cohort over time. Each cohort is selected from the electronic administrative records compiled by the United States Citizenship and Immigration Services and the Office of Immigration Statistics. Eligible sample persons include adult immigrants and their children legally admitted for permanent residence. Immigrants are interviewed in the language of their choice; however, not all languages are treated equally. NIS classifies languages into tiers based on expected origin-country distribution, native language distribution and preferred language by country. Thus, there are 5 tiers – tier 0 is English and based on the pilot results, it was expected to be the preferred language (Jasso, Massey, Rosenzweig and Smith, 2005); tier 1 is Spanish; tier 2 includes Chinese, Korean, Polish, Russian, Tagalog, and Vietnamese; tier 3 includes Arabic, Croatian, Farsi, French, Gujarati, Hindi, Serbian, Ukrainian and Urdu, and tier 4 includes all other languages. Only Spanish (tier 1) was treated equally to English and received a CAPI implementation. The survey instrument was fully translated only into tier 1 and tier 2 languages. Only key concepts (such as citizen, alien, lottery visa, child support, food stamps, etc.) were translated in the other language tiers and presented to the respondents along with the English original. The survey questionnaire was translated into Spanish by a professional translation firm, and an assessment of the translation was carried out by NORC team of bilingual translation experts.

The questionnaire covers a variety of topics such as health, schooling, English language skills, income and assets, employment, use of government services, social networks, travel and religion. Some of these topics differ in social desirability in the United States and other countries (for example, health, alcohol consumption, etc.).

Data from the first cohort of new immigrants (2003) have been collected and released. The overall response rate of the survey is 69%.

For the purpose of this investigation, the analyses are limited to Spanish-English bilingual adults, identified based on Latin American immigrants' self-reported ability to understand and speak English. Thus, the total subsample size is 632 self-identified bilinguals, 261 of which chose to be interviewed in English. Almost half of this subsample were respondents born in Mexico (n=301), while the rest came from Colombia, Cuba, Dominican Republic, El Salvador, Guatemala and Peru.

2.2 Causal Inference in the Absence of Random Assignment

In order to study the effect of language on survey responding in the absence of random assignment to a language of interview, we need to account for the self-selection of respondents to a particular language by controlling for many background characteristics. Respondents could be grouped using correlates of language selection, so within each group they are equally likely to select a given language. The propensity score technique (Rosenbaum and Rubin, 1983) addresses this issue by replacing the collection of correlates with a single composite characteristic (a propensity score). This approach enables us to assess whether the two language groups overlap enough in terms of respondent characteristics to allow estimation of language effects from the data set. The propensity score is estimated by

predicting group membership (i.e., being interviewed in English versus Spanish) from the set of confounding covariates (e.g., education, ability to speak and understand English, language used at home, etc.) using logistic regression. Each respondent has an estimated probability (determined by the covariate values) of being interviewed in English rather than Spanish, regardless of the language he/she actually selected in this survey. The region of overlap of the propensity scores for those interviewed in English and those interviewed in Spanish is an important indicator for the usefulness of this approach. When the overlap is limited, causal conclusions about the differential effect of language cannot be supported.

A fundamental assumption in the use of propensity scores to remove bias from self-selection is that they include correlates of the (language) selection process. For language selection, the literature would suggest the inclusion of measures of acculturation, reasons for immigration, language use and demographic characteristics (e.g., Laroche et al., 1998).

After the model is built, subclassification of respondents into about five groups (usually, quintiles) based on their individual propensity scores is performed (Rosenbaum and Rubin, 1983). Within a group of respondents with the same or similar propensity scores, those interviewed in English and Spanish essentially have the same likelihood of choosing English regardless of the language in which they were interviewed, that is, within each propensity score group, we simulate random assignment conditional on the propensity model specification. Before examining any causal relations between language of interview and any outcome measures of interest, the subclasses are examined for balance with respect to the covariates. If the propensity scores are relatively constant within each stratum, then the distribution of covariates should also be approximately the same in both language groups within a stratum (Rosenbaum and Rubin, 1984). If significant within-stratum differences are found on some covariates, then the propensity score prediction model has to be reparameterized or it has to be concluded that the covariates do not overlap sufficiently, so the subclassification does not have the property of adjusting for these covariates (for an example of this process, see Rosenbaum and Rubin, 1984).

Finally, analyses of residuals can reveal omitted model interactions. Separate models for each covariate as a dependent variable and the raw propensity score as the predictor are run and the Pearson residuals plotted for those interviewed in English and those interviewed in Spanish. If the residuals for the two groups do not overlap, further reparameterization of the propensity model is needed.

The outcome measures of interest (reports of mental and health problems, alcohol consumption, marital status, living situation and number of biological children) are then compared for the language groups, accounting for stratification by propensity score. Most outcome measures in this investigation are dichotomous. An indicator for reported health problems was constructed based on multiple questions that asked about diagnoses of high blood pressure, diabetes, cancer, lung disease, heart disease, stroke, arthritis, asthma and whether the respondent was often troubled by pain.

When interpreting the results, it is important to keep in mind that propensity score methods can only adjust for the observed confounding covariates. In observational studies, confidence in the causal conclusions is often based on replication and how sensitive the conclusions are to deviations from the model assumptions.

3. Results

3.1 Propensity Score Model

A logistic model predicting the probability to select English over Spanish among bilingual immigrants was fit as a function of available correlates of language selection (Table 1). Bilingualism was determined based on self-reported ability to understand and speak English on a four point scale (very well, well, not well, not at all) – only those who identified themselves as able to understand and speak English “very well” and “well” were included in the analyses. Those unable to understand and speak English well were not of interest for the current investigation because of the possible different mechanism related to their second language use¹. One possible weakness of this approach is the potential for measurement error in self-reports – to the extent to which ability to speak and understand English is a socially desirable characteristic of immigrants to the U.S. and reports of such ability are influenced by the language of

¹ According to the Revised Hierarchical Models for representation of bilingual’s languages (Kroll and Sholl, 1992; Kroll and Steward, 1994; Dufour and Kroll, 1995), novice bilinguals access semantic referents through their first-language lexicon – a “think-then-translate-then-speak process”. In contrast, expert bilinguals think in their second language.

interview (completed in the self-selected language), the sample of self-determined bilingual respondents may not be ideal for testing language influences.

The pseudo R-square for the model was 0.24 and the Hosmer and Lemeshow goodness of fit test was $\chi^2_8 = 8.39$. The strongest predictors of likelihood to select English as the language of interview were number of years in a U.S. school, respondent's self-evaluation of ability to speak English, language spoken at home and country of birth ($p < 0.001$).

Propensity score methods rely on sufficient overlap between the groups defined on the independent variables; if no overlap exists, there are no comparable respondents across the two selected languages. There was a large enough region of overlap of raw propensity scores for those interviewed in English and those interviewed in Spanish to suggest we can sensibly estimate the effect of language from these data. Next, the raw scores were divided into quintiles (propensity strata). The distributions of covariates within each propensity stratum were not significantly different (based on Chi-square and t-tests) for the two language groups. Finally, the overlap of residuals for the two language group was examined and no need for model reparameterization was discovered (results from these analyses not shown).

3.2 Hypotheses Tests

Table 2 presents the results of language comparisons across measures of physical health, mental health and alcohol consumption, marital status and living situation, accounting for stratification by propensity class. We examine the probability that those who were interviewed in English report more physical health problems, psychiatric problems, depression and use of alcohol relative to those interviewed in Spanish. The Mantel-Haenszel test for stratified contingency tables allows us to avoid the Simpson paradox and to test for tendencies of a particular cell to be higher or lower in series of tables. The results are rather surprising – we found significant effect of language of survey administration only on reports of current alcohol consumption i.e., those who were interviewed in English were 1.24 times more likely to report current alcohol use relative to those interviewed in Spanish. The magnitude of this effect varied across propensity strata and was strongest in the stratum of respondents with medium propensity to choose English as the language of interview (results not shown). Language was not a significant predictor for reports of diagnosed health and psychiatric problems. Interestingly, language effects varied in both magnitude and direction across strata – a meek suggestion that language may have a differential impact on survey answers depending on the respondents' propensities to choose English over their mother-tongue and a likely explanation for the nonsignificant results.

It is possible that a larger effect of language would emerge if we could control on covariates that explain some of the variation in the outcome measures of interest. We ran logistic regression models where diagnosed emotional and psychiatric problems, depression, diagnosed health problems and alcohol consumption were regressed on major correlates of these conditions among Hispanics and language of survey interview (results not shown). Indeed, the coefficient for language of interview was slightly larger (0.63 versus 0.54) after controlling for the major predictors of alcohol use among Hispanics, namely, gender, depression and emotional problems (Caetano, 1987). However, controlling for the main correlates of diagnosed health, emotional problems and depression among Hispanics, namely, ethnic group membership (e.g., Portes, 1992; Collins et al., 2002; Harris, Edlund and Larson, 2005), English language proficiency (e.g., Padilla, 1986; Padilla, Cervantes and Maldonado, 1988; Alva, 1991; Brach, Fraser and Paez, 2005) and gender (e.g., Caetano, 1987; Mazzoni, Boiko, Katon and Russo, 2007), the coefficients for language did not reach statistical significance. Thus, trying to find expected effects by controlling on confounding covariates did not increase support for the hypothesized language effects.

We also hypothesized what types of questions should be immune to the expected language effects. As predicted, language of interview did not affect responses to well established and readily accessible facts such as marital status and living situation (see Table 2).

Table 1: Logistic Regression Coefficients for Likelihood of Selecting English Language for the Survey Interview

<i>Predictor</i>	<i>Coefficient</i>	<i>Standard Error</i>
Intercept	-0.64	0.56
Adjustment status: New arrival	0.15	0.41
Adjusted immigrant	-	-
Visa status: US citizen spouse	0.31	0.25
Employment	0.76**	0.34
Green card lottery	2.45	1.32
Other	-	-
Gender: Male	0.11	0.21
Age: 59+	-0.27	1.22
49-58	1.085	0.56
44-48	-0.28	0.58
39-43	-0.046	0.41
34-38	0.16	0.37
29-33	-0.34	0.33
24-28	-0.0039	0.32
18-23	-	-
Years spent in school	0.020	0.031
Years in school in the US	0.16***	0.038
Enrolled in English Classes	0.098	0.30
Current language at home: Not English	-0.60***	0.21
Language at work: Not English	-0.42	0.44
Language with friends: Not English	-0.53**	0.25
Country of birth: Not Mexico	-0.56***	0.21
Country of childhood: Not Spanish speaking	0.018	0.38
Country of childhood: Rural	-0.010	0.22
Not worked since moved to the US	-0.64**	0.29
Employment: temporarily out of job	0.92	0.52
Retired/disabled	-0.019	1.10
Homemaker	1.28**	0.57
Student	0.27	0.71
Employed	-	-
Understands Spoken English Well	0.28	0.28
Understands Spoken English Very Well	-	-
Speaks English Well	-0.97***	0.28
Speaks English Very Well	-	-
Took English Classes before coming to the US	0.52**	0.22
Member of a church	0.053	0.21
Does not plan to Travel Home Next 12 months	0.17	0.20
Telephone mode of administration	0.0069	0.20

*** p<0.001 **p<0.05

Table 2: Relative Risk for the English Language Group versus Spanish across Measures by Expectations of Language Effect

<i>Outcome Measure</i>	<i>Mantel-Haenszel Relative Risk for English</i>	<i>95% Confidence Interval[†]</i>		
Language Effects Expected				
Emotional, nervous or psychiatric problems	0.90	0.54	1.50	
Sad, depressed for two weeks or more	0.80	0.63	1.01	
At least one diagnosed health problem	1.07	0.87	1.32	
Respondent drinks alcoholic beverages	1.24***	1.05	1.46	
Language Effects not Expected				
Marital Status	Married vs. Divorced/Widowed	1.02	0.64	1.65
	Married vs. Never married	1.12	0.94	1.33
Living alone	0.81	0.51	1.29	

*** p<0.001

[†] Standard errors reflect stratification by propensity strata

Surprisingly however, language was a significant predictor for number of biological children the respondent had given birth to or fathered. The mean for those interviewed in English was 1.13 (0.08)², while it was significantly higher for those interviewed in Spanish – 1.38 (0.07). A possible post-hoc explanation of this difference brings up the value of familism in the Hispanic culture and the possibility that it is socially desirable to report having a large family. Thus, the question related to number of biological children, even though initially considered simply factual, may hold different affective characteristics in the Hispanic and American cultures. An alternative hypothesis is that sample persons with large families disproportionately chose to be interviewed in Spanish, in a way not reflected in the propensity model.

4. Discussion and Conclusions

The results from the NIS data failed to demonstrate strong support for the effect of language of survey administration on the question answering process. We found partial support for the theory that language would influence responses to questions that differ in affective characteristics across the two cultures. Specifically, we found support for the hypothesis that Hispanic bilingual bicultural respondents interviewed in Spanish will report lower rates of alcohol consumption relative to those interviewed in English. However, we did not find significant effect of language on questions related to mental and health problems. Even though the topic of the questions should have induced cultural frame switching, it is possible that the question wording and/or translational issues prevented us from detecting such effects. It is also possible that the social desirability effects are not that different across the two cultures. Furthermore, it is unclear whether bilingual interviewers were able and allowed to go back and forth between language versions of the survey, possibly diminishing the effect of language priming a particular mind frame within which respondents interpreted the questions, accessed relevant information and provided a response consistent with their activated cultural identity.

We found support for the hypothesis that language will not affect all types of survey questions and specifically, that responses to questions related to well established and readily accessible autobiographical facts, such as marital status or living conditions, will not be influenced by language of interview. The significant effect of language on reports of number of children was surprising, but could possibly be related to the central value of familism in the Hispanic culture; thus, induced by the socially desirable standard of having a large family. An alternative explanation for the unexpected result, however, is that the propensity strata were not sufficiently homogenous with respect to unobserved confounding covariates (e.g., family size, presence of family members during the interview). Despite their promise in addressing causal questions in the absence of randomization, propensity score methods can only adjust for observed

² Standard error, reflecting stratification by propensity strata.

confounding covariates; therefore, any unobserved covariates may challenge the interpretation of results. Thus, an examination of the effects of language on survey responding should also be conducted on the basis of random assignment.

Even not as strong as expected, the results of this investigation have implications for surveys of immigrants and ethnic minorities – they suggest that leaving the choice of language to the bilingual respondent may not be a good practice. Ideally, researchers would be able to inform language assignment based on knowledge about domains where cultural differences and the direction of such differences may be expected, or depending on what respondent cultural identity is of interest. If such knowledge is not available, random assignment of bilingual respondents to a language would at least allow estimation of language effects.

This study was a necessary first step in examining the effect of language on survey responding; however, it reveals many additional avenues for research. First, it is important to simultaneously examine language and interviewer effects (for example, observable characteristics such as ethnic group membership, accent, gender). It can be hypothesized that when interviewer physical characteristics and accent do not match the physical characteristics and accent of the culture associated with the language of interview, language effects may be dampened. Second, it is essential to explore how language can be used to reduce measurement error in recall – several studies have demonstrated that the language in which mental activity is carried out during information encoding creates an internal context analogous to a mental state and can serve as a retrieval cue during information recall. Similarly, the language spoken aloud during an event creates an external context analogous to a physical context and can serve as a situational cue during event recall (Schrauf and Rubin, 1998; Schrauf and Rubin, 2000; Marian and Neisser, 2000). This implies that language may facilitate the recall of information from life-periods or domains in which the same language is spoken. Third, language may be used to manipulate response styles associated with particular cultures. For example, there is a popular belief in the cross-cultural survey world that Asian respondents avoid extreme responses (Zax and Takahashi, 1967; Chun, Campbell and Yoo, 1974; Stening and Everett, 1984; Hayashi, 1992). By evoking a different cultural mind set in bilingual respondents, we may be able to attenuate response bias. Finally, to fully understand the effect of language on survey responding, it is important to disentangle the various mechanisms that may produce such effects – for example, cultural-frame switching from language dependent recall.

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