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Tabitha P. Hendershot, Susan M. Rogers, Jutta P. Thornberry,
Heather G. Miller, and Charles F. Turner

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Multilingual ACASI: Using English-Speaking Interviewers to Survey Elderly Members of Korean-Speaking Households

Tabitha P. Hendershot, Susan M. Rogers, Jutta P. Thornberry,
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Introduction

Most national surveys presume that respondents speak enough English to communicate adequately with an interviewer or are sufficiently literate in English to read survey instructions and complete a self-administered questionnaire (SAQ). This presumption presents problems for several subpopulations in the U.S. whose written or oral command of English is insufficient to complete an English-language survey. Such individuals are likely to be excluded from most major in-person surveys, due to the logistic and economic difficulties of conducting field interviews in a myriad of foreign languages. Efforts to collect information through proxies are hampered by their incomplete knowledge of the subject or the absence of a bilingual person to serve as a proxy at the time of the interview. Excluding non-English-speaking individuals from U.S. health surveys has left us with an incomplete picture of national health problems and health care needs. This gap may be especially critical among the elderly, a group with varied and sometimes extensive medical problems who may not be as well integrated—either linguistically or culturally—into mainstream American society as younger people.

Scientists at Research Triangle Institute (RTI) have recently developed a new interview technology that may facilitate the inclusion of non-English-speaking populations in national surveys. Audio computer-assisted self-interviewing (ACASI) technology uses a laptop personal computer with a digital audio adapter to administer questionnaires in multiple languages. Subjects hear the questions through headphones and enter responses directly into the computer using the keyboard. ACASI offers several advantages over face-to-face interviews and SAQs. It provides privacy without requiring literacy; every question is asked in exactly the same way and in the same order; the system can be programmed in any spoken language; and it can, if needed, display visual cues, such as pictures of medicines. Because

data files are automatically produced as subjects enter responses, the ACASI system eliminates the delay in coding, entering, and cleaning data, and it also eliminates some of the clerical errors inherent in creating data files from paper-and-pencil interviews (PAPI).

With support from the National Institute of Child Health and Human Development and the National Institute on Aging, we are presently conducting a 4-year program of basic research on the application of ACASI technology to survey measurement. An important aspect of the initial stages of this research focuses on the development and testing of field procedures for multilingual field interviewing using ACASI technology and monolingual field interviewers.

This study reports preliminary findings from an ACASI health survey in a small sample of 30 older Koreans who speak limited or no English. This study has two aims: (a) to evaluate whether or not field interviewers who speak no Korean can screen households, obtain consent from eligible subjects, and administer an ACASI interview to Korean respondents who speak little or no English and (b) to assess the consistency of responses obtained from the multilingual ACASI interviews and from telephone follow-up interviews conducted in Korean.

The present study complements earlier research that successfully used multilingual ACASI to survey a younger sample of Spanish-speaking respondents (Turner, Rogers, Hendershot, Miller, & Thornberry, 1995). As will be discussed later, the present research tests what is in many ways a worst-case scenario for multilingual ACASI interviewing.

Methods

Two community service organizations serving the Korean population in the Washington, DC, metropolitan area provided names of potential respondents. Inclusion criteria limited the sample to Korean-speaking adults over 50 years of age who had limited or no written or oral English language capabilities. Lead letters written in Korean were sent to households of all potential respondents prior to contact by a field interviewer. All interviews were conducted by two experienced field interviewers, neither of

The authors are with the Program in Health and Behavior Measurement and with the Center for Survey Research at the Research Triangle Institute, Rockville, Maryland, branch. The research reported in this paper was supported by the National Institute of Child Health and Human Development and the National Institute on Aging of the National Institutes of Health under grant number HD31067 to Charles Turner.

whom could speak Korean. Training for interviewers included information on administration of the ACASI interview as well as Korean customs and translations of introductory phrases, such as "hello" and "thank you." Each field interviewer carried a cellular phone linking them to a Korean-speaking central office interviewer.

As a first step in the interview, field interviewers were instructed to create a roster of all household members 18 years old or older, although the eligible subject was known in advance of contacting the household. The household screening instrument, which was available in English and Korean, collected data on the age, sex, and relationship of all individuals living in the dwelling unit to the head of household. Two approaches were used if the interviewer was unable to successfully conduct the screening or recruit the eligible subject: (a) Interviewers sought assistance of an English-speaking member of the household to explain the survey and to elicit consent, or (b) interviewers contacted the Korean-speaking central office interviewer, using a cellular phone to assist in explaining the study and recruiting the preselected respondent. To assist in the refinement of field procedures, interviewers were instructed to complete a standardized questionnaire eliciting details of their interview experience. Administrative problems or other pertinent events that occurred during the interview process were recorded. Subjects received training materials to illustrate use of the ACASI equipment, including a show card for key function, in Korean.

Of the 68 individuals who were sent lead letters, interviewers were not able to locate 11 (16%). Of the remaining 57 eligible subjects, 13 (23%) were not available and nine (16%) refused to participate. One case is not included in these analyses because of the subject's marked hearing impairment, which resulted in a proxy completing the interview. This preliminary study reports findings from 30 interviews with adult Koreans conducted from September 1994 through April 1995.

The ACASI interview consisted of 42 questions on the respondent's health, demographic characteristics, and use of health services. Most questions were closed-ended and used simple response categories; open-ended questions were not complex and generally required a numeric response, such as age or number of children. In addition, there were several questions concerning the respondent's knowledge and use of English and the respondent's evaluation of the ACASI system. All recruited subjects completed the interview; there were no break offs once the interview started. Each respondent was paid \$10 for participating; this payment was not considered to be an incentive, since notification of payment was made at the end of the interview.

To assess the reliability of data obtained using ACASI, a follow-up telephone interview was conducted in Korean by the central office interviewer. Follow-up telephone interviews were conducted within 5 to 38 days (mean of 14.3 days) after the ACASI interview. The follow-up interview consisted of eight questions on health behaviors repeated from the ACASI interview; in addition, the

household screening information was elicited again during the follow-up interview. One of the eight health-related questions was dropped from analyses because the ACASI translation differed from that asked at follow-up.

Results

Characteristics of the 30 respondents who completed the ACASI interview are shown in Table 1. The majority of respondents (64%) were female. The age of subjects ranged from 54 to 84 (with a mean age of 71.3 years). Most respondents were married or living together as a married couple (63%), 20% were widowed, 10% were separated, and 7% had never married. All respondents reported having children. Less than one-half (43%) had completed high school, 13% had attended college, and two respondents (7%) had completed college. Although nearly one-half of respondents reported ever working for pay for one or more months, only three respondents were currently employed.

Respondents were asked to evaluate their understanding of English based on how easily they read and speak English and whether they had ever talked on the telephone in English for longer than two minutes. Approximately one-third of the Korean respondents reported they did not speak or did not read English at all. The vast majority (97% and 93%) expressed some difficulty in speaking or reading English (see Table 2). Eighty percent of respondents indicated they had never conducted a telephone conversation in English that lasted two or more minutes.

In order to assess respondents' experience using the ACASI system, subjects were asked how well they under-

Table 1. Selected characteristics of respondents (N = 30)

Mean age (years)	71
Female	64%
Married/living together as married	63%
Completed high school	43%
Completed college	7%
Currently employed	10%

Table 2. Respondents' subjective assessments of their English language skills (percentages; N = 30)

Difficulty speaking English	
Don't speak English	30
Lots of difficulty or worse	57
Some difficulty or worse	97
Difficulty reading English	
Don't read English	27
Lots of difficulty or worse	50
Some difficulty or worse	93

NOTE: These estimates were tabulated from responses to the following two questions: (a) "Now we would like to ask you some questions about your understanding of English. Would you say that you can speak English easily, with some difficulty, with a lot of difficulty, or not at all?" and (b) "Would you say that you can read English easily, with some difficulty, with a lot of difficulty, or not at all?"

stood the audio component and how comfortable they were using the keyboard (see Table 3). The majority (77%) indicated that it was either very easy or somewhat easy to understand the Korean questions through the headphones. Only three respondents (10%) reported problems understanding the questions being asked and also reported difficulty using the keyboard but managed to complete the interview. Of the five respondents who reported using a hearing aid, only one reported problems understanding ACASI questions. The vast majority of respondents (87%)

Table 3. Respondents' evaluation of ease of use of ACASI technology (percentages; $N = 30$)

Ease in use of computer	
Very comfortable	50
Somewhat comfortable	37
Somewhat uncomfortable	13
Very uncomfortable	0
Understanding of questions	
Very easy	27
Somewhat/very easy	50
Somewhat difficult	13
Very difficult	10

NOTE: Tabulated from responses to the following questions: "How easy or difficult was it for you to understand the questions being asked in the tape recording? Was it very easy, somewhat easy, somewhat difficult, or very difficult for you to understand the questions being asked?" and, "How comfortable did you feel typing into the computer? Did you feel very comfortable, somewhat comfortable, somewhat uncomfortable, or very uncomfortable typing your answers into the computer?"

indicated that they were very comfortable or somewhat comfortable using the computer. Time to complete the ACASI interview ranged from 9 to 27 minutes; the mean completion time was 16.4 minutes. On average, time to complete the ACASI interview did not differ by age of the respondent. Time to complete the survey was slightly longer ($p = .05$) among those who expressed more than "some difficulty" reading English, compared with those who read English easily or with some difficulty. To assess the reliability of respondents' answers to the ACASI interview, telephone follow-up interviews were conducted by the Korean-speaking central office interviewer an average of 14.3 days after the initial household interview. Results of these comparisons for 27 respondents are presented in Table 4.

Overall, the proportion of consistent responses is not very impressive and ranges from 70% to 93%. Consistency appears to vary by the retrospective period of report. For example, reports on current smoking were fairly consistent (range of 83% to 100%), as were reports on current use of eyeglasses or contact lenses (range of 78% to 100%) when comparing respondents who had hearing problems (column a), were younger (column b), or had higher levels of education (column c) with all respondents. In contrast, consistency of reports of visiting a dentist in the last year ranged from 60% to 80% and ever having had a cholesterol test ranged from 56% to 100%. It is unclear if inconsistency in reports of cholesterol tests reflects the lifetime retrospective period or a misunderstanding of the question. Although the ACASI and follow-up interviews both used the

Table 4. Consistency of responses in (a) multilingual ACASI interviews and (b) telephone follow-up interviews

Measurements	All	Korean			Spanish
		Exclude hearing problems ^a	< 70 ^b	High school graduates ^c	All
No. children	70*	70**	80*	75*	88*
Attended high school	81***	85***	90***	67	92***
Ever worked for pay for 1+ months	81***	85***	90***	83***	85***
Smokes cigarettes now	93***	100***	90†	83‡	100***
Wears eyeglasses or contact lenses ^d	85‡	90†	100***	92†	92***
Visited dentist in past year	74***	80***	60	75‡	81***
Ever had a cholesterol test	70†	80***	90***	67	84***
Base N	27	20	10	12	26

^aExcludes five respondents with completed follow-ups who reported use of a hearing aid plus two additional respondents who reported problems with volume and speed of ACASI questions.

^bExcludes 17 respondents aged 70 or older.

^cExcludes 15 respondents who reported in Korean telephone interview that they had not completed high school.

^dNote that there was a slight change in the wording of this question between interviews. The ACASI instrument asked respondents if they wore "eyeglasses or lenses," while the follow-up interview asked if they wore "eyeglasses or contact lenses."

* $p \leq .01$ for test of association between measurements of interval level variables at two time points (by Pearson product moment correlation).

** $p \leq .05$ for test of association between measurements of interval level variables at two time points (by Pearson product moment correlation).

*** $p \leq .01$ for test of association between measurements of two-category variable at two time points (by likelihood ratio chi-square test of independence model for 2×2 table; $df = 1$).

† $p \leq .05$ for test of association between measurements of two-category variable at two time points (by likelihood ratio chi-square test of independence model for 2×2 table; $df = 1$).

‡ $.10 \leq p \leq .05$ for test of association between measurements of two-category variable at two time points (by likelihood ratio chi-square test of independence model for 2×2 table; $df = 1$).

English and Korean words for cholesterol, several respondents did not understand the Korean word for cholesterol but did recognize the English word.

Consistency also appears to vary by certain characteristics of respondents. Compared with all respondents, respondents who did not report hearing problems (column a) have a slightly higher proportion of consistent responses for all questions except number of children, which is essentially the same. Younger respondents (column b) also have higher rates of consistency for all questions except current cigarette use (which is essentially the same) and visiting the dentist in the past year (which is slightly lower). However, the consistency of responses does not appear to improve as a function of increased education (column c). There were gender differences in response consistency, but no clear trend emerges from these data. This may be related to small sample size, especially for male respondents.

Particularly striking is the lack of consistency of reports of number of children and whether or not the respondent had attended high school. Overall, only 70% of respondents reported the same number of children during the ACASI interview and at follow-up. The central office interviewer indicated that this question was problematic for several reasons. Some subjects reported the number of sons and had to be prompted to give the number of daughters; other subjects reported the number of children in the United States and had to be reminded to include the number of children remaining in Korea. Ultimately, the question asked at follow-up was reworded, asking subjects how many children *in total* they had. In the ACASI interview, two female respondents reported that they were never married and had children. At both the screening and follow-up interviews, both women reported that they were currently single heads of household and that they had children. The central office interviewer indicated that it would be very rare for this birth cohort of Korean women to have had children out of wedlock. It is possible that these respondents misunderstood the ACASI question on marital status, marking "single" instead of "widowed," "divorced," or "separated." It is unclear why the correlations are poor for the question on high school attendance, although the Korean-speaking central office interviewer thought that some people might have interpreted the question to mean graduation from high school.

Conclusions

The small sample size leaves us with suggestive rather than definitive results. Findings from this pretest suggest that monolingual English-speaking field interviewers can successfully administer an ACASI health survey to older Korean-speaking respondents. Use of an automated data collection system prevented problems associated with skip patterns that are often encountered in SAQs. In addition, the Korean language ACASI program coupled with cellular phone access to one Korean-speaking central office inter-

viewer obviated the need for multilingual field interviewers. The Korean-speaking central office interviewer was crucial in the recruitment of subjects. However, after gaining entry into the household, the field interviewers were able to accomplish most of the remaining tasks by themselves. This is remarkable, given the absence of English-speaking proxies in the majority of recruited households.

While these results are promising, this study is not without its share of problems. Some problems could be avoided in future iterations of research; others resist solution. Accessing potential respondents was hindered by physical and cultural barriers. Many apartment buildings in the Washington area use intercom systems to alert residents to visitors at the building's entrance. It was not possible to use the central office interviewer to communicate to residents via the apartment building's intercom system. Moreover, many Washington area residents are hesitant about admitting strangers into their residence, and this tendency may be more pronounced among the elderly. Thus, field interviewers found it difficult to recruit subjects living in secured apartment buildings. Not surprisingly, most respondents were unfamiliar with RTI. It might have been helpful to provide more information on the bona fides and research activities of RTI in the lead letter that was sent to subjects prior to contact by the field interviewer. In addition, the concept of surveying populations was not necessarily familiar to this group of subjects. The contact and recruitment rates may have been increased by providing in the lead letter a more detailed description of this survey research and how the findings will be used.

It is important to note that several subjects in this study were very old and had hearing problems. It was difficult for some respondents to hear the questions asked during the ACASI interview; some noted that the rapid pace of speech and short time interval between questions made responding difficult. While we clearly cannot change the auditory capabilities of subjects, we can change some characteristics of the ACASI system to increase acceptability for elderly respondents. As *misconfigured* in this study, the ACASI system delivered sound through only one side of the headset at one predetermined volume level. Allowing respondents to vary volume and providing sound through both sides of the headset would be a logical improvement. In addition, several respondents commented on the youthfulness of the recorded voice. Because age and experience are positively valued in Korean culture, using an older woman to record the interview at a slower rate of speech would be preferable.

There may be other operational changes that would make the ACASI system more user-friendly. Several older respondents expressed anxiety about using the computer, and some wanted to quit when they experienced a problem. In addition, after the study was completed, we identified some irregularities due to software problems in the ACASI program that prevented all subjects from hearing the full set of instructions in Korean. In particular, the function and location of the enter key and the role of function keys in

changing answers proved problematic for several respondents. A software bug had caused this part of the Korean instructions to be omitted from some of the interviews. Clearly, more careful testing of programs and equipment could improve matters, but this will require greater involvement of bilingual staff in these tasks. (In contrast to our earlier multilingual ACASI research with Spanish-speaking respondents, none of the authors had any knowledge of Korean.) In addition, we believe that simplifying instructions on how to use the computer and ensuring that all subjects receive adequate instruction are needed. It may also be desirable to design a simplified version of the keyboard, perhaps with a limited number of color-coded keys. While difficulties were reported by some, it should be pointed out that all recruited respondents completed the interview, with very little help provided over the cellular phone by the Korean-speaking central office interviewer.

This study may represent one of the worst-case scenarios for monolingual English-speaking interviewers to conduct ACASI interviews with a non-English-speaking population. The Koreans interviewed for this study were very old, and many had hearing problems; few had English-speaking proxies available in the households to help with recruitment and interview procedures; and surveys were foreign activities for them.

Our results from multilingual ACASI interviewing of Spanish-speaking respondents (Turner et al., 1995) provide a useful perspective on our results from Koreans. We found many fewer problems accessing respondents, and, as shown in the final column of Table 4, we achieved higher rates of consistency in responses. Interviews, which included the same questions asked of the Korean cohort but spoken in Spanish, were completed with 30 of 34 pre-identified Spanish-speaking respondents (2 subjects refused to participate, 1 was unlocatable, and 1 was ineligible). Our Hispanic sample was much younger (mean age of 36.6 years) than the Koreans, and they reported more variability in

English speaking and reading skills. We found that virtually all of the Spanish-speaking respondents (97%) reported no difficulties using the ACASI technology. Comparison of responses given during the ACASI interview to those given during a Spanish telephone follow-up interview showed higher rates of consistency than we found for our elderly Korean sample (see Table 4). In the Hispanic sample, there were no differences in consistency of responses between those with "good" English skills and those with "poor" English skills. All respondents who reported that they currently smoked gave the same answer at reinterview. Over 90% of responses were consistent for questions concerning the number of children, educational level, and use of eyeglasses or contact lenses, and more than 80% were consistent for questions on ever having tested for blood cholesterol, working for pay for one or more months, and having visited the dentist within the past year.

Given the exploratory nature of our studies to date and the small sample sizes we have used, our results remain suggestive. However, the evidence to date does suggest that multilingual ACASI surveying is feasible, and in many cases, it can yield data that are quite consistent with that obtained by interviewers who speak the respondents' native languages. It is also clear that at a minimum, hearing loss will pose some problems when using this technology with the elderly. Future investigations using larger and more diverse samples of non-English-speaking respondents will help us better delineate the survey conditions under which it will be most appropriate to use multilingual ACASI interviewing.

Reference

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