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Linking Qualitative and Quantitative Methods in Cross-Cultural Survey Research: Techniques from Cognitive Science

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Survey research with diverse cultural and ethnic minority groups is a complex and challenging endeavor that confronts the researcher with problems related to linguistic and conceptual equivalence and measurement as well as problems related to difficulties that respondents have with the sociocultural dimensions of the survey/interview process. One way to improve the quality of cross-cultural surveys and to insure that the findings are culturally relevant and accurate is to combine qualitative and quantitative methods. This paper proposes that certain qualitative techniques from cognitive science, specifically cognitive anthropology and cognitive psychology, are particularly well suited to being combined with survey research. These techniques provide information corresponding to the underlying thought processes of respondents and enable researchers to better understand how different cultural and ethnic groups construe the world. The information obtained can be used improve the formulation of survey questions, design and structure questionnaire formats to coincide with the way particular groups organize concepts, and help researchers understand difficulties respondents may have with the survey/interview process. In addition, the techniques produce data that are easily codifiable and more manageable than traditional qualitative techniques including participant observation and in-depth interviews.

KEY WORDS: cross-cultural; survey research; qualitative and quantitative.

INTRODUCTION

Increasingly, professionals in social welfare, public health, employment training, and other human resource programs are relying on survey data to promote social service goals among cultural and ethnic minority groups

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(Bacerra & Zambrana, 1985; Bowman, 1983; Myers, 1979). Data gathered on different cultural and ethnic minority groups are extremely important because they are used for needs assessment, program evaluation, program planning, allocation of funds, targeting of new programs, and policy making. However, the appropriateness of concepts, questions, and methods of data collection used to study these groups is often questionable, leading to a mistrust of statistical results and overall quality of the data. In short, much of cross-cultural survey research has been described as "conceptually, methodologically, and ethically unacceptable" (Bacerra & Zambrana, 1985).

It has been noted that the data obtained from surveys of the general population "are best when the question is clear, and when the respondent knows the answer and is motivated to report it accurately" (Mechanic, 1989, p. 150). Problems arise when respondents do not recall or know the answer to items, are motivated by fear, stigma, or discomfort to hide or distort information, lack incentive to reconstruct experiences, or misunderstand questions (Mechanic, 1989). Due to linguistic and cultural factors, these barriers to accurate reporting may occur with greater frequency and be more complex in research with diverse cultural and ethnic minority groups.

Research with culturally diverse populations requires an awareness of the cultural issues, a knowledge of the problems and concerns of these special populations, and ways to elicit relevant and accurate information that makes a difference in social service interventions and ultimately in the lives of the people who need help. Cross-cultural researchers also need to be able to communicate their findings in a clear and comprehensive manner so that policy makers and program developers can act on them.

One way to meet these requirements is to combine the qualitative, ethnographic approach with survey research, a quantitative approach. Joining these methods would seem to be a natural course of action, as ethnography originated and was developed in the cross-cultural, anthropological approach. However, research aimed at culturally diverse populations shows that this is not the case. Researchers who suggest linking quantitative and qualitative methods have been few in number and have not taken full advantage of the benefits that could be derived from such a combination (Bacerra & Zambrana, 1985; Hurh & Kim, 1981; Liu, 1982; Loo, 1980; Yu, 1982).

The purpose of this paper is to summarize the major problems and issues that have arisen in survey research with different cultural and ethnic minority groups and to suggest that combining qualitative and quantitative methods may be one way to address these problems. It is proposed that certain qualitative techniques derived from cognitive science, specifically cognitive anthropology and psychology, are particularly well suited to being

combined with survey research and that this linkage can improve the quality and accuracy of information obtained from studies with culturally diverse and ethnically different groups. In addition to addressing common problems that arise in cross-cultural research, data derived from these cognitively based strategies can also provide information to guide the overall design of the study, help test and sharpen research questions, and strengthen the research hypothesis. The data produced by these techniques are manageable and analyzable and can be combined with survey data to substantiate and cross-validate as well as expand research findings.

PROBLEMS IN CROSS-CULTURAL SURVEY RESEARCH

During the course of cross-cultural survey research certain problems routinely arise that can potentially affect the quality and accuracy of the data obtained. These problems can be divided into three areas: (a) problems with linguistic and conceptual equivalence; (b) problems with measurement; and (c) problems arising from the nature of the survey/interview process.

Problems with Conceptual and Linguistic Equivalence

The most basic question in cross-cultural research is whether the concepts under study have any meaning or equivalent meaning for the groups considered (Warwick, 1973). Conceptual equivalence differs from linguistic equivalence which is a matter of accurate translation and which has been improved upon by techniques such as back-translation, in which material is carefully translated from the source to the target language and back to the source (Brislin, 1986; Brislin, Lonner, & Thorndike, 1973), decentering, a looser translation of the original version (Carroll & Irvine, 1980), and the random probe, a technique to probe closed questions on a survey (Schuman, 1973). For example, the words *freund, ami, tomodachi* and *amigo* are all equivalent translations of the word "friend" and will be reproduced accurately by back-translation, but important linguistic nuances in levels of intimacy contained in the meaning are not conveyed (Deutcher, 1973).

Terms such as mother, illness, treatment, and socialization may contain levels of meaning that vary from one culture to another. In Anglo-American culture, the word "dependency" can be associated with immaturity and pathology. However, in Japanese culture *amae* (dependency) is not only accepted but actively fostered because Japanese culture has long prized group cohesion and solidarity over independence and autonomy (DeVos, 1973;

Marsella et al., 1973). Also, some concepts have meaning in one culture but not in others. For example, the terms social welfare and identity have no direct equivalent in Japanese. Many cultures have no equivalent concepts or terms for the concept of depression as it is viewed in the West (Kleinman & Good, 1985; Marsella, Hirschfied, & Katz, 1987).

Problems with Measurement

Even if the researcher is assured of conceptual and linguistic equivalence, different indicators may be required to measure the same concept across cultures. For example, indicators measuring the degree of marital satisfaction, or severity of depression, may vary from culture to culture. In Japan, when assessing marital satisfaction, a measure of the level of intimacy would be less significant than the extent to which a partner performs his/her social role (DeVos, 1973). There is also growing evidence that the experiences, expressions, and correlates of depressive disorders as they are construed in the West are not universal but vary as a function of ethnocultural experience (Marsella et al., 1973, 1987). In many non-Western cultures, there is an absence of psychological dimensions in the manifestation of depression (i.e., self-denigration, suicidal thoughts, sadness), but somatic dimensions seem to be present (i.e., sleep difficulties, fatigue, and weakness) (Marsella et al., 1973).

Certain concepts may also differ in their salience to respondents (Warwick, 1973). Topics may be irrelevant — respondents are asked for information on subjects about which they have no information or no opinion. Topics may be taboo or culturally insensitive. Certain respondents may be unwilling to discuss issues like welfare status, citizenship status, migratory experience, or previous political affiliations for fear of reprisals. Some topics may be too painful to discuss. Also, respondents may be unable or unaccustomed to discussing certain topics like sexual practices, religion, or income.

Tasks or methodological techniques presented to respondents may be unfamiliar or confusing leading to problems of scale equivalence. Some respondents may have difficulty with Likert scales, or forced-choice questions. It cannot be assumed that all respondents will understand different scale formats or that they will result in valid indicators of behavior.

Problems with the Survey/Interview Process

For some cultural and ethnic groups, the entire survey and interviewing process may constitute an uncomfortable and unfamiliar social situation. Surveys involve encounters and exchange of information with strangers, and there

are wide cultural variations prescribed for interactions and the language used in such an exchange. For example, courtesy is such an important and persuasive value for certain Asian groups that it may define the interview situation in a manner that can interfere with obtaining reliable information (Deutcher, 1973). This "courtesy bias" can interfere with the way the survey is administered and the quality of responses that are obtained.

Even if the interview process is culturally acceptable and comfortable, interactions between the interviewer and respondent can influence the accuracy of response. Interviewer characteristics including gender, age, ethnicity, personality, and professional status can have a positive or negative effect. The place, timing, and presence of other people can also influence response, as can verbal and nonverbal behavior.

In addition, the sponsoring agency or institution and its political ties can have an important impact on how respondents react to the research process. The literature pertaining to cultural and ethnic minority groups frequently points to how researchers are culturally insensitive, have exploited residents of the community, and are more interested in their own gains than improving the plight of the culturally diverse groups they are studying (Bowman, 1983; Liu, 1982; Myers, 1977, 1979). Researchers have also been criticized for not including community members in the research process.

The three areas, linguistic and conceptual equivalence, problems with measurement, and difficulties with the survey/interview process and its larger sociocultural context, need to be addressed for research with culturally different and ethnic minority groups to be more effective and responses more accurate. To accomplish this, it is essential that the researcher have a grasp of the problems and issues as they pertain to and affect the lives of the respondents, and be able to examine and understand the nature of the world as it is seen by members of a particular cultural or ethnic group. This involves being able to encompass different ways of knowing about the world and different versions of cultural reality. To accomplish these goals, the cross-cultural researcher has to become familiar with cultural milieus and populations that are likely beyond his/her own experience (Lofland, 1971), and to establish emotional and physical proximity (Bacerra & Zambrana, 1985; Loo, 1980).

RATIONALE FOR LINKING QUALITATIVE AND QUANTITATIVE METHODS IN CROSS-CULTURAL RESEARCH

One way to establish a deeper understanding of different cultural and ethnic realities so as to address some of the problems outlined in the previous section is to link the quantitative methods of survey research with

the methods derived from the qualitative, ethnographic approach. The quantitative approach to research employs the assumptions of the natural science and logical positivist model. It is based on the assumptions that (a) scientists can attain objective knowledge in the study of both the social and natural worlds; and (b) the natural and social sciences share a basic methodology, and because they are similar, they employ the same logic of inquiry and similar research procedures (Filstead, 1979). Quantitative researchers translate their observations into numbers via counting and measuring, and are concerned with discovering, verifying, or identifying causal relationships among concepts that derive from specific theoretical schemes. The selection of subjects is of concern and efforts are made to use random selection or sampling techniques to minimize bias and random error that could have an impact on results.

Quantitative or survey data are extremely valuable because they can provide information about a substantial number of respondents that can be generalized to a larger population. Data obtained from the standardized items used in surveys can help researchers understand how certain trends, characteristics, and needs of various ethnic and cultural minority groups differ from those of the general population. Findings can also be used to formulate policy and plan programs for different cultural groups. However, the way the researcher selects response categories, frames questions, and orders items substantially reflects the answers received (Mechanic, 1989). Much of the quantitative data gathered may be in error as respondents may have difficulty in recall, want to withhold information, or may wish to present themselves in a particular way contrary to the facts. As illustrated in the first part of this paper, these problems may be seriously compounded when the respondent is from a different cultural or ethnic group, or speaks a different language. Also, the quantitative data obtained from social surveys typically are collected without attention to the historical and social contexts in which they are embedded, making the data highly sensitive to changes in environmental conditions (Mechanic, 1989).

Qualitative, ethnographic methods, which originated in the anthropological tradition, particularly lend themselves to cross-cultural research because they provide ways for the researcher to examine closely the unique characteristics and behavior of a particular group. Qualitative research makes use of an inductive approach in which the researcher tries to make sense of the world without imposing preexisting expectations or preformulated theories. Researchers begin with specific observations, and build towards general patterns, formulating a theory as the process unfolds. The qualitative researcher emphasizes the context of the research situation. This natural world is not fixed or static, but shifting, changing, and dynamic, and presents the researcher with multiple realities. Given these charac-

teristics, ethnographic techniques are suitable for the study of hard-to-access groups, for behaviors that are often denied, underreported, or hidden, or for groups that may be generally resistant to survey research. This includes refugees, immigrants, and especially illegal aliens who may be particularly hesitant to respond or cooperate with interviewers. Ethnography can be a particularly powerful tool for doing research with these hard to reach populations as it "provides a window into the lives of invisible people," providing information about the tacit elements of a cultural system as well as the explicit rules, beliefs, and behavior that a group of people demonstrate (Trotter, 1993). This type of information is not easy to obtain through survey or experimental research. In short, ethnographic methods enable the researcher to "lift the veils that obscure what is going on" (Blumer, 1979) so as to study a particular population more closely and in more detail. Ethnographic techniques can help the researcher design studies, create instruments, and interpret statistical data in ways that are more relevant to different cultural and ethnic groups.

Ethnographic Techniques and Survey Research

The idea of linking qualitative and quantitative methods in research is not a new one. As early as 1957, Trow stated "let us be done with the arguments of participant observation vs. interviewing . . . and get on with the business of attacking our problems with the widest array of conceptual and methodological tools that we possess and they demand" (p. 135). Not many followed this advice until Sieber (1973) proposed integrating fieldwork and survey methods on the basis that each method could be strengthened by appealing to the unique qualities of the other; yielding benefits in all phases of research — design, data collection, and analysis. Sieber described the contributions fieldwork could make to survey research and vice versa, and called for a new style of research born of the marriage of fieldwork and survey research. Later, Trend (1978) described a study in which experimental methods and participant observation were combined, and concluded that even when methods do not converge, much can be gained from the combination and that divergence of results can lead to new theories and insights.

The idea of combining methods has been taken up by evaluation researchers (Cook & Reichardt, 1979; Filstead, 1979; Iani & Orr, 1979; Patton, 1980) and those in the field of organizational behavior (Jick, 1979; McClintock et al., 1983; Van Maanen, 1983). The most common designs have been those that integrate traditional ethnographic methods, including participant observation and in-depth interviews, with survey research.

Although investigators involved in research with diverse cultural and ethnic minority groups have advocated linking participant observation and ethnographic interviews with survey methods to improve data collection and interpretation of results, as well as a way to establish closer ties with the community (Bacerra & Zambrana, 1985; Liu, 1982; Loo, 1980; Myers, 1977; Yu, 1982), few have actually utilized a multimethod approach. Combining in-depth interviews and participant observation with survey research fails to address the problems outlined in the beginning of this paper. The use of participant observation and in-depth interviews yields data that provide valuable information regarding the broader sociocultural aspects of the interview and the topics under study, but may not address specific problems of conceptual/linguistic equivalence and measurement.

There are also many disadvantages to studies that involve participant observation and in-depth interviews, as well as other extensive ethnographic fieldwork methods in combination with survey research. Participant observation and in-depth interviews are extremely costly and time-consuming. The recommended amount of time for an adequate study is 18–24 months which may include 24 hours per day in the field (Knapp, 1979). Both yield tremendous amounts of data which can be exceedingly cumbersome and can take years to analyze (Jick, 1979; Trend, 1978). Although some researchers have made recommendations regarding the analysis of qualitative data (Bernard, 1988; Miles & Huberman, 1984), the vast quantity of data still makes it a ponderous enterprise. Also, studies involving the use of the traditional and extensive methods from ethnographic fieldwork are difficult to replicate, because very few researchers specify the details of their research.

The next section provides an explanation of a few, less well-known, techniques derived from cognitive science, including cognitive anthropology and cognitive psychology. While these strategies are basically ethnographic in nature, utilizing qualitative rules of inference and emphasizing context and underlying meaning, they are more easily codifiable than traditional ethnographic techniques and, consequently, less labor intensive. It is shown how these techniques can respond to problems in research with diverse cultural and ethnic minority groups, augment the researcher's repertoire of techniques, and are more suitable in a study that combines other methods like survey research.

Strategies Derived from Cognitive Science

Cognitive scientists have long been interested in areas such as language recall, perception, judgment, estimation, memory, and thought processing. They have studied ways people classify and categorize information and the underlying processes for responding to questions and retrieving

information — all of which hold potential importance for cross-cultural researchers and possible solutions to the problems mentioned earlier. In addition, cognitive theory of memory organization involves the identification of complex conceptual structures known as scripts (Abelson, 1981) and schemata (Rumelhart & Ortony, 1977) which are organized packages of beliefs, feelings, and knowledge about particular situations or things. Information about these structures may contain particular relevance for cross-cultural research. Much of the work on scripts and schemata has centered on ways in which people conceptualize certain situations and roles. For example, a script about seeking help for an illness involves assumptions about where to go, why, the sequence of events, and the required or acceptable behavior. Scripts may differ from one cultural/ethnic group to another. A better understanding of these underlying belief systems could lead to the formation of more culturally sensitive questions as well as a better understanding of how people view the entire interview process. While there has been a growing awareness of the possible connection between the work of cognitive scientists and survey researchers (Bradburn, Rips, & Shevell, 1987; Jabine, Straf, Tanur, & Tourangeau, 1984; Lessler & Sirken, 1985; Loftus, Feinberg, & Tanur, 1985), this interest has yet to permeate the field of cross-cultural and cross-ethnic research.

One area of cognitive science that is of particular interest for research with differing cultural and ethnic minority groups is the field of Ethnoscience or Cognitive Anthropology. Cognitive Anthropology concerns itself with how people acquire information about the world, how they process that information to reach decisions, and how they act on the information in ways that other members of the culture consider appropriate (Bernard, 1988). Goodenough (1980), the leading proponent of this view, defined culture as being "in the hearts and minds of men" and consisting of whatever one has to know or believe in order to operate in a manner acceptable to the members of a particular group. Research in this tradition strives to uncover underlying rules of behavior and the categories people use to order their world, and Cognitive Anthropologists aim to uncover a "grammar" behind the behavior of a culture. A battery of specialized techniques, and often videotapes and tape recorders, are used to gauge and record the underlying rules and categories of different cultural groups.

The specialized techniques derived from Cognitive Anthropology produce a wealth of information about specific cultural and ethnic groups and can also be compared across cultures. Because these strategies emphasize meaning and ways in which different cultural groups construct reality, they are particularly useful for addressing the problems related to linguistic and conceptual equivalence and measurement discussed earlier. The strategies are easy to implement and produce data that are specific and focused, and

often codifiable and quantifiable, and can easily be combined with survey research. While ways in which some of these techniques can be used in research on drug use in different cultures have been suggested (Gilbert, 1993), they have yet to be linked with survey research. Some of the most common techniques, including free listings, frames, pile sorts, triad tests, and rank order tests, have been described in detail by Bernard (1988) and are summarized in the next section.

According to cognitive anthropologists, uncovering ways in which various cultural groups classify and divide concepts provides valuable insight into the way a particular group defines and organizes reality. In Cognitive Anthropology, both the free listing and the frame technique are used to define and explore conceptual domains and taxonomies. A *domain* can be defined as an organized set of words, concepts, or sentences that all relate to a single concept (Weller & Romney, 1988), for example, treatment providers, mental illness, and symptoms. To facilitate comprehension and organization, domains can be organized into *taxonomies,* which are systems of classifications and subclassifications, often graphically represented by a tree diagram (Figure 1).

Free listing is used to define culturally specific domains. The researcher begins by asking respondents to list all the items they believe are included in a group-recognized domain. Sentences like, "What kinds of (*illnesses*) are there?," facilitate the free listing exercise (Bernard, 1988). These lists can be rank ordered on several dimensions — for example, most-to-least categories (serious, life-threatening, common, etc.). Kinzie et al. (1982), for example, asked Southeast Asian refugees to list words/phrases linked to depression in order to determine how the illness was construed and whether there were important indigenous concepts or symptoms. The information was used to construct a Vietnamese-language Depression Rating Scale. The technique can be used to generate other types of rating scales included in surveys. For example, for a survey on alcohol use and related problems, respondents could be asked to list the social and physical problems associated with problem drinking. The results could be used to construct more culturally relevant items asking about the consequences of drinking in a particular culture. Key informants (designated cultural ex-

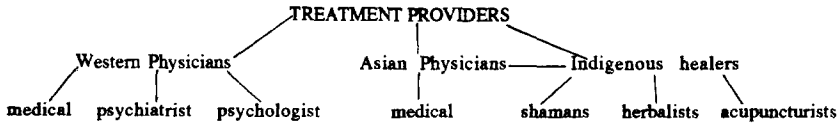

Fig. 1. Taxonomies represented by a tree diagram.

perts) or a focus group (a group of cultural experts) can be used to identify potential domains for the free listing technique. (For more information on key informants and focus groups, see Bernard, 1988; Gilbert, 1993.)

The data produced by the free listing exercise can be compiled and analyzed to determine the consistency with which items are listed by respondents and the relative position of items on the list. A *coherent domain* is one in which the position of items on the list are statistically determined to be consistent across respondents, and tends to be revealed in a relatively small number of informants, 20–30 (Weller & Romney, 1988, 1990). Questions for free listing are easy to generate and can be administered in an interview or questionnaire format to a large number of respondents.

The *frame technique* is used to organize domains. This technique provides more detailed information on the domains and enables the researcher to construct taxonomies. Frames can be constructed in a yes/no or a true/false format. An example of the frame technique appears in Garro's (1986) study in which he used the yes/no format to compare information from healers and nonhealers in Mexico. Eighteen illnesses in 22 sentence frames were used. Substituting each illness in a frame like, "Can ___ come from ___?", produced 18 by 22 yes/no matrices for each respondent. Bernard (1988) described how the matrices can be added together and analyzed using multidimensional scaling. Like free listing, frame tests are easy to construct and can be used with a large number of respondents. Consultation with key informants or focus groups can help provide culturally relevant frame alternatives.

The *Pile Sorts* (card sorting) technique is used to develop taxonomies and classifications and usually follows the free listing and frame techniques. Respondents are given a pack of cards with terms that have been generated from the free listing and frame techniques or through information from focus groups and key informants and written in their native language. They proceed to sort the cards into smaller piles according to whatever criteria makes sense to them and at each sorting level criteria for association and subdivision are recorded (Bernard, 1988). Criteria for classification usually change at each level (see Figure 1). To summarize the information, a tree diagram can be constructed after each respondent finishes a sort and questions can be asked that generate words or phrases to explain relationships between each level.

Items at the same subdivision level can be compared across respondents and group data can be presented in tree form and analyzed with hierarchical clustering which aggregates data across subjects at each subdivision (Weller & Romney, 1988, 1990). With a large enough sample, intracultural variations in discrete cultural domains can be tested (Bernard, 1988). For example, concepts of illness/symptoms/types of healers may dif-

fer according to respondents' age, socioeconomic status, gender, education, and time in the United States. Information generated from this technique can help researchers better understand different levels of meaning related to specific concepts or behavior. For example, information on where respondents go for help with specific health and mental health problems and ways in which respondents prioritize help-seeking alternatives could be obtained and included in a survey on health and mental health service delivery. This technique provides a common stimulus for respondents and gives them the freedom to classify the information in many ways, but is limited to literate respondents.

Triad tests involve giving respondents three items, for example, photographs, plants, cards with written concepts, and instructing them to choose the one that does not fit, or the two that are the same. This is followed by questions regarding why certain items were selected. The responses can be tape-recorded and differences in cognition among cultures and within subcultures can be explored. The responses can be analyzed simply, by computing how many informants in a culture select the same items from the triads and why. They can also be organized in a "similarity matrix" which measures the similarity between any two items in a list and analyzed with multidimensional scaling (Bernard, 1988). This technique can provide valuable information on different levels of meaning and conceptual understanding. Again sociodemographic differences within groups can be examined. While this test can be used with a large number of subjects, it is advisable to limit the number of items used.

The rankings and ratings technique is often used with the free listing technique, and produces interval level data. Weller (1984), for example, asked 20 women in California and 20 women in Guatemala to name all the illnesses they could think of and to describe each. The most commonly mentioned English and Spanish terms were extracted and rank ordered by the respondents. Rank ordering can be used to describe ways in which social hierarchies, occupations, illnesses, symptoms, and so forth, are perceived by different cultural and ethnic groups. Rating scales are useful in producing ordinal level data. Domains can be rated or scaled according to a specific dimension. This technique is often combined with the Pile Sort technique.

All of the strategies described above can be helpful in addressing the problems of linguistic and conceptual meaning and measurement in cross-cultural surveys. The information obtained can help formulate the questions that are asked in cross-cultural surveys and can provide additional information to help substantiate findings.

Another useful technique for research with cross-cultural and cross-ethnic groups is Protocol Analysis. This technique was developed by cog-

nitive psychologists who, like cognitive anthropologists, are interested in ways people think and how they understand, recall, and organize information. Respondents are instructed to "think aloud" or "talk aloud" as they perform a task or respond to questions. The responses are tape-recorded and subsequently coded and analyzed. The aim is to understand better the thinking processes of respondents.

Protocol Analysis has been used in psychology to study problem-solving and decision-making processes; in education, to assess and evaluate learning processes; and in business and management research to explore decision-making and evaluation strategies. It has also been employed in research on consumer behavior and marketing and in research pertaining to man–machine behavior and artificial intelligence. More recently, the method has been used by survey researchers (Jabine et al., 1984; Lessler & Sirken, 1985; Loftus et al., 1985) to explore strategies respondents use to answer general survey questions.

Researchers at the National Center for Health Statistics (Lessler & Sirken, 1985; Lessler, Tourangeau, & Salter, 1989; Sirken, Mingay, Royston, Bercini, & Jobe, 1986) have used Protocol Analysis to develop and test questions used in national surveys and report that the method was useful in improving questions involving complex concepts like chronic illnesses, questions regarding sensitive or threatening topics and those involving long recall periods. The technique has also been used in studies to improve respondent accuracy when answering standard alcohol questions (Midanik, 1989; Midanik & Hines, 1991). Hines and Snowden (1993) discuss in detail how Protocol Analysis can provide useful information about how people from different cultural and ethnic backgrounds think about survey questions and formulate their answers.

When using Protocol Analysis, respondents are instructed to verbalize all thoughts that occur to them, not only those relating to the specific goals of the researcher. Studies using Protocol Analysis have shown that respondents were able to provide useful amounts of data when instructed to "think aloud" (Midanik & Hines, 1991; Payne, Braustein, & Carroll, 1978). The responses are tape-recorded and transcribed verbatim.

Protocol data can be coded and analyzed in two ways. One method uses coding categories that have been determined a priori, according to the concepts of a specific theoretical model. Judges make the coding assessments for which interrater reliability scores can be obtained. To analyze the response protocols to standard alcohol questions, Midanik & Hines (1991) adopted a coding scheme from a study that designed and tested the 1986 dental supplement for the National Health Interview (Lessler et al., 1989). Coding and analyzing the data according to predetermined catego-

ries helps organize the vast amounts of data, but can also result in a loss of a substantial amount of valuable data.

The "grounded theory" (Glaser & Strauss, 1967) approach to data analysis can also be employed. Instead of using a predetermined coding scheme, the search for interpretation of the data proceeds in parallel with search for an appropriate theory. With this approach, the protocols are divided into short segments, creating units of analysis that are encoded while the appropriate theoretical model is being generated (Ericcson & Simon, 1984; Payne *et al.* 1978). The data can be analyzed employing Glaser and Strauss's (1967) method of constant comparative analysis in which data are coded as categories emerge or as data emerge that fit an existing category. The advantage of this second approach is that most of the protocol data are retained and used in the formulation of results. This approach to analysis also enables the researcher to develop theoretical frameworks and coding schemes that may be more relevant for specific cultural and ethnic groups.

The data obtained from Protocol Analysis can be used to construct questions and survey designs that conform better to the cultural realities of different ethnic and cultural minority groups. In addition to providing information about how respondents answer specific questions, Protocol Analysis can provide data on how respondents view the survey/interview process. Information regarding reactions of different cultural groups to specific topics under study can also be obtained. Scripts and schemata for various situations and events that are related to the research questions can be elicited, recorded, and analyzed.

CONCLUSION

This paper has illustrated that linking qualitative strategies from cognitive science with survey research can address some of the more common problems confronting cross-cultural researchers and lead to studies that yield more accurate and reliable survey data. By employing the techniques described above the researcher can understand better the underlying thought processes that govern ways members of different cultural and ethnic groups construct their world view. This information can be used to design and improve survey questions and to structure questionnaire formats and organization to coincide with the way particular cultural groups organize concepts. The techniques from cognitive anthropology are particularly well suited to addressing problems with linguistic and conceptual equivalence and measurement. The strategies can help researchers identify instances in which fixed alternatives to questions may indicate an expected

range of information, but fail to provide respondents with choices that correspond to their belief systems and internal representations of a construct. The data obtained from pile sorts, free listings, frames, triad tests, and rank order tests provide the cross-cultural researcher with information to construct more relevant items and scales.

Protocol analysis can be especially helpful in detecting poorly designed questionnaires in which the investigator asks for information that is not readily available to the respondent, or for information that the respondent cannot be expected to remember. In their study, which used Protocol Analysis to understand how respondents answered standard alcohol consumption questions, Midanik and Hines (1991) found that respondents rarely produced an initial accurate response. Instead, after using contextual or temporal cues to retrieve and review past events, respondents often adjusted their answers. The results suggest that cues to assist recall and memory of drinking behavior improves response accuracy and should be incorporated into the survey/interview questionnaire. Information of this kind might be especially pertinent for respondents from different cultural and ethnic groups. Protocol Analysis can also provide the researcher with useful information about how various cultural and ethnic groups view the survey and interviewing process. The technique can help elicit underlying scripts and schemata and enable the researcher to understand the behavior that is expected in this particular social situation.

All of the strategies described in this paper can provide the cross-cultural researcher with the type of detailed and specific information needed to better understand a particular cultural or ethnic group, but without the vast and sometimes overwhelming amount of data gathered through more traditional ethnographic methods. However, the techniques from cognitive science are not without their limitations. While cognitive strategies guarantee input from the groups under study and enable the researcher to be more assured that the concepts used and the format adopted is relevant to the respondents, they alone do not necessarily facilitate access to the population or insure cooperation of the respondents. To be effective, the strategies should be preceded by focus groups or guided by information from key informants.

Also, the techniques described in this paper are obtrusive, that is, the information obtained is biased in some way by the very techniques used. It is important to note that the techniques themselves may be culturally biased and not appropriate or comfortable for all cultures and ethnic groups. However, familiarity with the strategies from cognitive science can add to the researcher's repertoire of available methods, enabling the researcher to choose the one that is most culturally appropriate and useful.

This paper has outlined ways for cross-cultural researchers to uncover special languages, unique and particular problems and distinct patterns of thought and action, and to grapple with the complexity of the lives and people they are studying. While the content of this paper has focused on cross-cultural research that deals with different cultural and ethnic minority groups, the methods and ideas presented could be applied to research with other special populations. Linking qualitative and quantitative methods, using a multimethod, multidiscipline approach is one way to meet Strauss's (1987) challenge that social science research can and should handle more complexity than it does. It is also one way to insure that the methods we are using and the results we are obtaining have cultural relevance and meaning for the groups we are studying.

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