Survey methods have been criticized for producing unreliable, invalid data and for failing to provide contextual information to test complex causal hypotheses. We discuss a technique that combines survey and ethnographic methods at every stage of the data collection process to overcome these shortcomings. We use ethnographic and survey evidence to show how the combined approach reduces coverage errors, nonresponse errors and measurement errors arising from the interviewer, the questionnaire, and the respondent. Complete integration of the two methods during data collection can uncover information that a survey alone would have missed. Ethnographic data can also be used to understand the meaning behind relationships among survey variables that would have otherwise been unclear. Finally, although the combined approach is intensive, it is flexible enough to be used in a variety of settings to study many different research questions.

The Microdemographic Community-Study Approach

Improving Survey Data by Integrating the Ethnographic Method

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In this article we discuss a data collection technique combining ethnographic and survey methods—what many demographers refer to as the *microdemographic community-study approach*. Much of the recent work using this approach has been in family and fertility research. Although we describe a similar application to a study of

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family and fertility in Nepal, we believe the technique is also useful for research on many topics in other settings. Our interest here is in developing the multiple ways a combined approach serves to enhance the general quality of the resulting data set. This examination indicates the improvements in survey data likely to result from integrating ethnographic methods such as participant observation and use of local informants in community studies.

Scholarly concerns with the relative merits of survey and ethnographic data collection have a long history in the social sciences. Writing forty years ago, for example, Oscar Lewis asked what anthropology's special contribution to family studies, a substantive area long dominated by other disciplines, might look like (Lewis 1950). Lewis's work in Tepoztlan, a complex and changing village of 3,500 people, convinced him that reliance on a few informants was inadequate to the task of obtaining an accurate picture of culture and society. Questions of sampling and representativeness were as important there as in the study of an urban society. But the advantages of participant observation for highly focussed information on a few cases were not to be discounted; the question for Lewis was how to merge these concerns.

The issues that Lewis raised are still with us as we continue to consider family and demographic change in specific social contexts. And the tension between the intensive knowledge that ethnographic data collection stresses and the more extensive, statistically representative knowledge that survey approaches can provide continue to organize the discussion. Thus both anthropological and demographic literature make reference to joining ethnographic and survey approaches to data collection (Johnson 1978; Bernard 1988; Caldwell, Hill, and Hull 1988; Massey 1987).

Elsewhere, important criticisms of data obtained from national-level sample surveys have also motivated the development of these multimethod efforts. In demography, the World Fertility Surveys (WFS) of the mid-1970s were among the largest and most ambitious survey research efforts ever embarked on (Cleland and Hobcraft 1985). In spite of their attempt to gather comparable estimates of levels and trends of fertility and related behaviors across a wide variety of settings these surveys have been criticized for failing to provide data

needed to test theories of fertility behavior (Caldwell 1985; Davis 1987). Some demographers began to argue, more generally, that national-level surveys cannot provide context-specific measures and community-level information needed to test theories of family and fertility change. Further, specific WFS country surveys have been criticized by anthropologists for failing to provide valid and reliable estimates of the very levels and trends they were designed to measure. One study, for example, suggests that the Nepal Fertility Survey may have grossly underestimated the population's knowledge of family planning methods (Stone and Campbell 1984). Thus, as suspicion of national surveys of family and fertility increased, demographers increasingly began to experiment with alternatives, some of which had been developed a decade earlier in African studies of demographic change (Caldwell 1982, p. 3). Although demographers continue to rely on the survey, it is no longer unusual to see it combined with complementary forms of data collection.

The effort to bring contextual and cultural factors into research strategies has generated a number of potential models from the upgrading of extant survey data by integrating ethnographic materials into analysis through more complex combinations of ethnography and survey in data collection itself. An excellent example of the first is Dyson and Moore's (1983) consideration of kinship and marriage systems and their relationship with demographic outcomes in North and South India. The limitations of this approach are recognized by the authors themselves, however. Also close to the standard survey end of the continuum are survey instruments with high levels of culture-specific content such as the Asian Marriage Survey (Fricke, Syed, and Smith 1986; Cherlin and Chamratrithirong 1988).

Of those models that incorporate actual ethnographic or quasi-ethnographic work into the data collection itself, the closest to combining the mutually reinforcing strengths of survey and ethnography may be Massey's ethnosurvey approach; this is explicitly designed as a "simultaneous application of ethnographic and survey methods within a single study of multiple sites," (Massey 1987, p. 1504) along lines that we argue for here. Caldwell's microdemography also comes close, having been presented as using a research method "indistinguishable in approach from that of anthropologists" (Caldwell, Caldwell, and

Caldwell 1987, p. 33), although there are important differences from both more standard ethnographic and survey techniques. Somewhat further from the ethnographic side are data collection strategies that include the use of focus groups to clarify and extend the depth of analysis possible from surveys (Knodel, Chamratrithirong, and Debavalya 1987). Thus there are numerous examples of the movement toward combining survey and ethnographic approaches.

The specific method we advocate combines a formal, structured survey operation with a complete, intensive ethnographic investigation throughout every phase of the data collection process. We believe that this fully integrated approach goes beyond previous efforts to combine "quantitative" and "qualitative" techniques and represents a useful model for other studies of social and family change in community settings. The data sets generated by this method retain the full advantages one might obtain from either a standard survey or a standard ethnography and they add new capacities, quality control, and data collection.

The advantages deriving from community studies of social change are a by-product of the intensive local knowledge available to the ethnographer and relate to issues of data quality and accuracy, the multiple levels of data that can be collected, and the ability to observe key social processes as they occur. Rapport with members of the study community, for example, comes about as the investigator gets to know people and as people themselves become comfortable with the investigator. One result is that they are less likely to alter their behavior in his or her presence. Further, as the investigator inevitably grows more familiar with personal and community histories he or she is increasingly able to ask questions with concrete references and to observe behavior with knowledge of their local context.

Knowledge of local context means that behavior can be placed into an expanded and meaningful frame with enhanced significance for the study as dictated by the case study method (Mitchell 1983; Fricke 1990). For example, a child gleaning potatoes from an already harvested field is not simply an unknown child of about 12 years in an unknown field. He becomes the son of a particular person, living in a family of known economic status and structure, given permission to glean potatoes in the field of a person with a particular kin or friend or

landlord relationship to his family. At the least, this density of knowledge provides apt illustrations for the more general social processes determined through other means. More fruitfully, the unforeseen events of village life can provide theoretical insights and deepen the interpretation of standardized data gathered through questionnaires.

From the point of view of quantifiable data, our study demonstrates the possibilities for gathering high-quality quantitative information in remote settings. Our data for such hard to measure variables as animal holdings show a high level of internal consistency and are, moreover, consistent with independent data-gathering efforts by both our own project members and others. We will also show that community studies need not be incompatible with the collection of sufficient data for sophisticated statistical analyses. Our total coverage of each of our settings has allowed the construction of life tables for theoretically important experiences across cohorts. Completed analyses demonstrate our ability to apply multivariate and event history statistical techniques to our data for the testing of causal models (Fricke, Thornton, and Dahal forthcoming; Axinn 1990). In fact, below we demonstrate how the combined approach can discover information that might have been missed by a standard survey, and how including such information in causal models can dramatically alter our substantive conclusions. At the same time, the fully contextualized meanings of the associations we are discovering among variables is made possible by the ethnographic and historical materials, field notes, and transcripts from informal interviews we have also gathered.

More prosaically, our work suggests important techniques and revision of received wisdom for data collection strategies themselves. For example, analyses have shown that ethnicity need be no bar to collecting data in the complex Nepali context and they have demonstrated the important implications of interviewer gender for both data quality and responses (Axinn 1989, forthcoming). Another finding is that robust life history information suitable for the analysis of historical trajectories within communities can be gathered within largely illiterate populations. Finally, the possibilities for gathering deeply textured forms of data from communities suggests that studies combining anthropology and survey research provide an important adjunct to national-level surveys (cf. Kertzer 1984; Greenhalgh 1990). They

can contribute to our knowledge of concrete social processes in unique ways that can aid the interpretation of these national efforts.

THE TAMANG FAMILY RESEARCH PROJECT

The application we discuss comes from the Tamang Family Research Project (TFRP), a study of social change, family process, and fertility among a single ethnic group in Nepal. The data collection described here took place during 1987 and 1988 in two communities inhabited by the Tamang ethnic group.[1] As in many research projects, we had to overcome numerous obstacles to the collection of high-quality data, including some level of mistrust toward outsiders, high levels of illiteracy, and extremely low levels of transportation and communication infrastructure. The data collection techniques had to overcome the problems associated with these characteristics even as they were designed to collect data for tests of specific causal hypotheses. In this section we describe the steps taken to overcome these problems.

Theoretical model. Our substantive hypotheses arose from a causal model which has family structure and relationships influencing fertility behavior. At the same time, social and economic change have dramatic influences on aspects of family life. Instrument design grew from our definition of the individual life course as the unit of analysis, with three culturally relevant periods of life critical to the nature of family and household relationships. These periods may occur in early socialization embodied in childhood and adolescence (from birth until marriage becomes acceptable), early adulthood (the period centering on marriage), and adulthood (the period of establishing independent households and building families). Each of these occurs within definite contexts composed of village, family, and the constraints and opportunities posed by past actions in the individual life course.

Figure 1 presents a schematic representation of this model. It identifies the classes of important contextual and behavioral variables we gathered and examined in this research. Although a dynamic perspective implies three dimensions of change (village, family, and

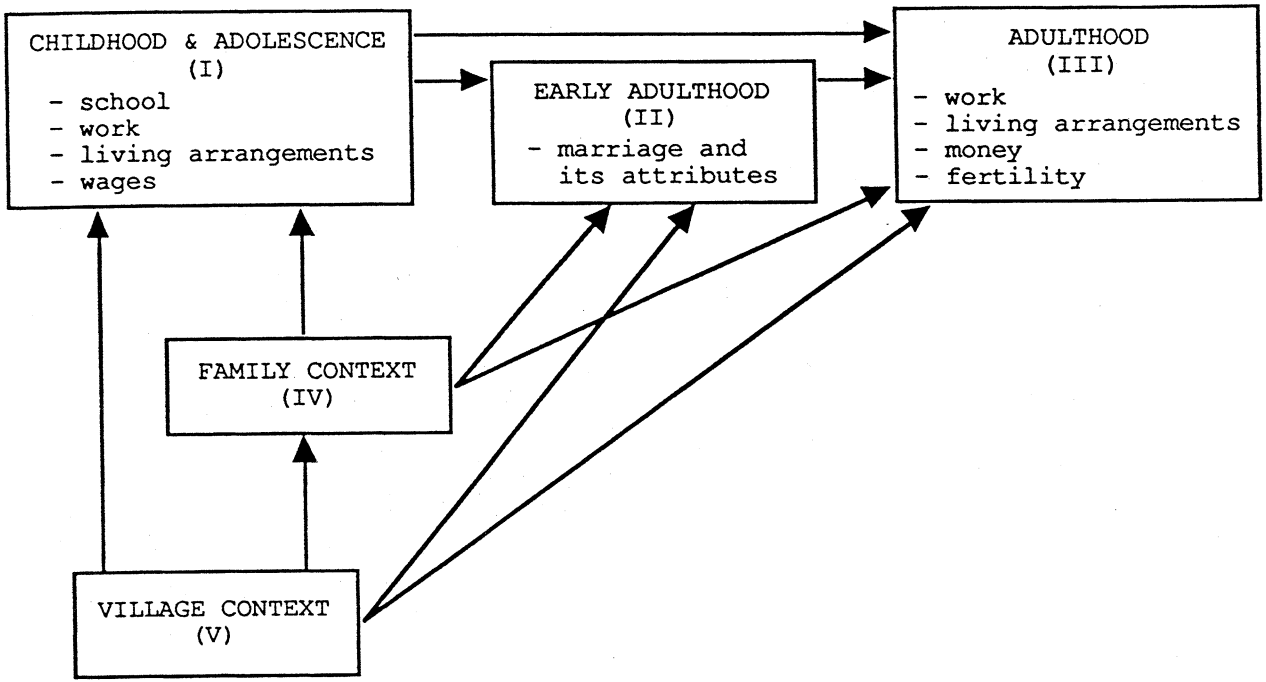

Figure 1: Heuristic Causal Model to Be Examined Among Tamang

individual) corresponding to historical, family, and individual time, we have simplified the diagram to represent features of village and family that remain fairly constant throughout the individual life course periods of primary interest.

Two Tamang communities. Village context is crucial to our entire research strategy.[2] We chose two settings for our study—Timling, a remote settlement near the border with Tibet, and Sangila, a cluster of villages near Kathmandu (see Figure 2). Key differences between our settings are in historical relations, proximity to Kathmandu, and the extent of educational and wage labor opportunities. Timling was chosen as a relatively subsistence-oriented setting for this research. Although wage earning was not entirely absent in the past, its importance to the overall economy was extremely attenuated.

Even with changes resulting from the wage labor participation of Timling's population, the village remains 5 or 6 days away, by foot, from the nearest motorable road and bazaar in Trisuli. Timling's households rely most heavily on local production and immersion in the wage labor market is yet incipient.

If Timling can be said to represent a subsistence setting, the Kathmandu Valley site is a representative of the monetized end of the continuum for the Tamang. This setting consists of a cluster of villages and hamlets at the north edge of the Kathmandu Valley and near a motorable road to Kathmandu served by buses and taxis (Figure 3). Many households within the area (which extends in a 3 mile arc centering on the main paved road from the city) are minutes from the bus stop while others are a hour's brisk walk from the road.

This setting's stable agrarian system continued more or less undisturbed from the early 19th century until 1950 when Nepal's borders opened to foreigners after a century and a half of closed feudal rule. Schools were built in the dispersed collection of hamlets and settlements beginning in the early 1960s. An earlier temple school that taught reading for religious purposes to a very few students was converted to a public school in the mid-1950s. These earliest schools provided classes up to Grade 3, but rapid expansion to keep up with the level of village students followed and four schools now provide education at various levels through Grade 10.

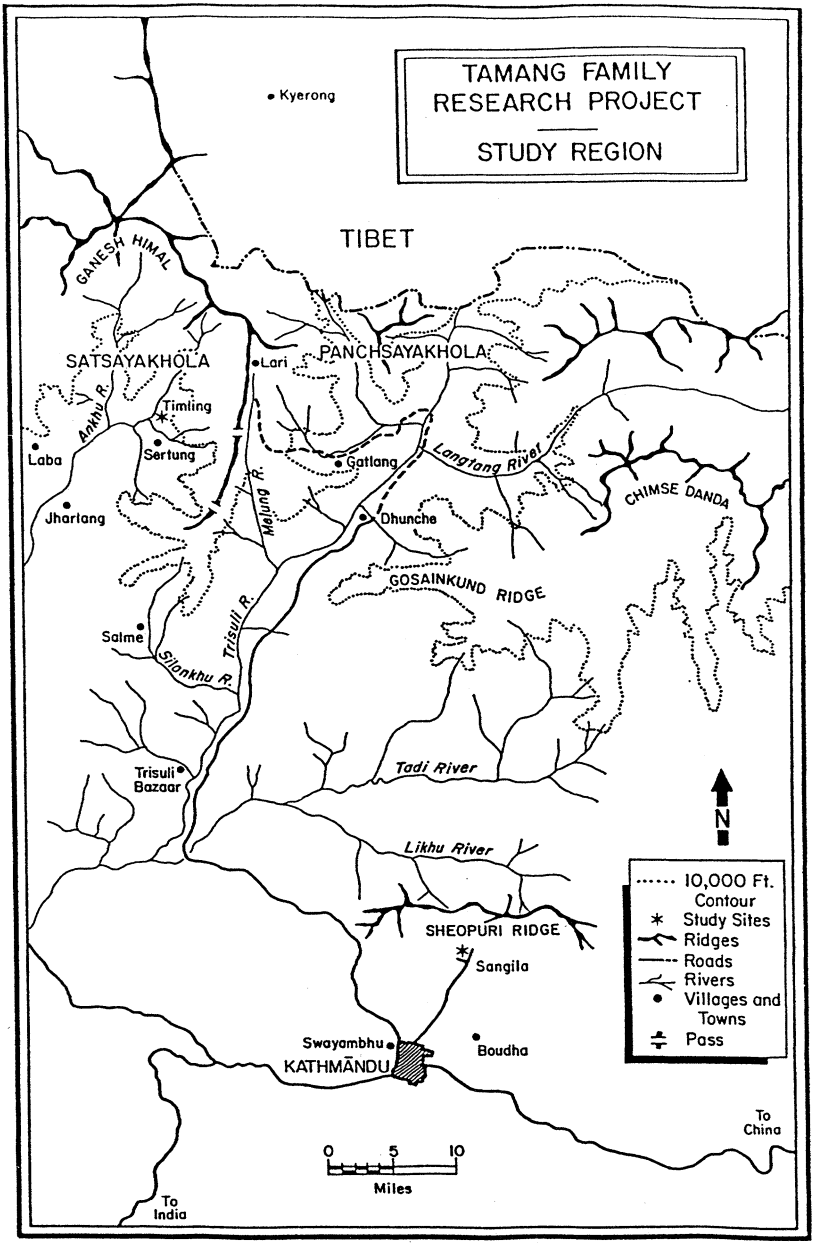

Figure 2: Area Studied

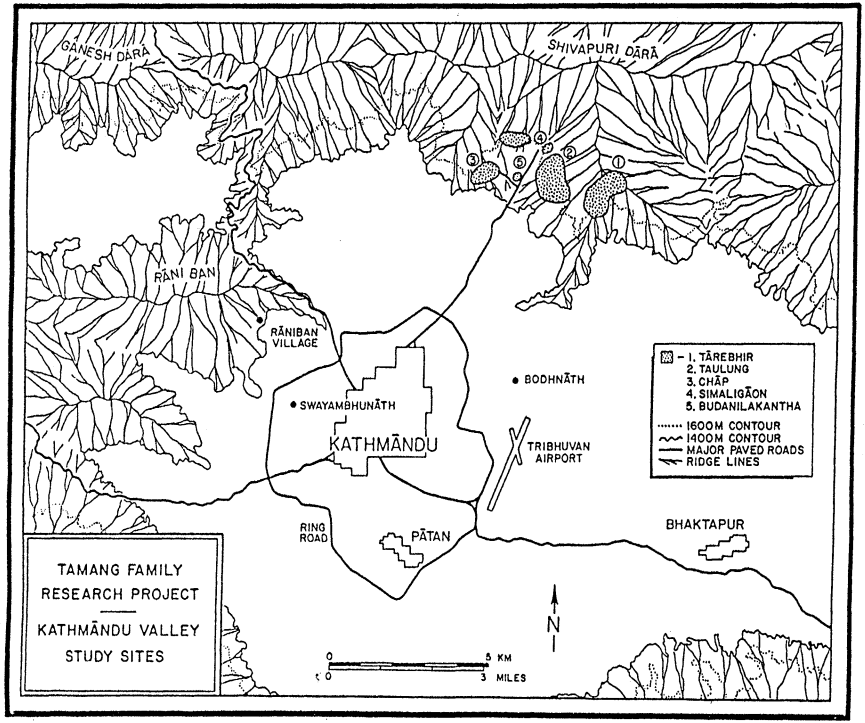

Figure 3: Kathmandu Valley Study Sites

Wage labor participation is extensive and various (Fricke, Thornton, and Dahal forthcoming). Although wage labor in Timling tends to be in the limited form of seasonal work at road construction or portering, the Sangila area provides a spectrum including government service jobs, carpentry, work in stores, work in a variety of factories, and other possibilities in addition to road work and hauling loads. At the same time, nearly all households continue to have some component of their domestic economy tied to farming in their village fields. As with Timling, extensive participation in the wage economy has increased within the lifetime of the oldest respondents.

Instrument design. Two types of instruments were designed to gather information we considered appropriate for trained interviewers. The first type was a household census and family genealogy that enumerated all household members and the network of kin relationships for each member, up to three previous generations. Parental and sibling information on these instruments may also be considered as family context variables.

The second type was an individual questionnaire. Our theoretical orientation determined the classes of data elicited in this instrument. These are described in Figure 4 along with the theoretically motivated categories to which specific sections relate in Figure 1. Additional questions, triggered by appropriate responses in sections D and E, gathered data on former spouses and on each child ever born alive.

Several steps were taken to assure that interviewers using these formal instruments would gather accurate and reliable data. Most important, the investigators who designed the instruments spoke the language of the study population fluently and had lived with the study population and related communities. This issue is often taken for granted when studying one's own society, but it is crucial in a study of another society (Briggs 1986). Linguistic fluency is essential to questionnaire construction which assumes shared interpretation by respondents and investigators. But the issue is even more complex, because the flow of questions must be designed to rest the respondent's natural anxiety in an unfamiliar context. These issues certainly require attention in cross-national or cross-cultural research, but they also deserve attention in studies of one's own society, particularly with

Relevant Section	Section Contents	Model Categories
Section A.	Education: respondent's schooling, reasons for leaving, literacy	I
Section B.	Residence: residence history outside of natal village, relationship of co-residents, ages at first events, visits to natal villages	I,II
Section C.	Parental background: education, wage-labor employment, literacy for respondent's parents	IV
Section D.	Marriage: timing, autonomy of decision, transactions, relationship between spouses before marriage, ceremony, residence, dissolution timing and decisions (for 1st, 2nd, and last marriages)	II,III,IV
Section E.	Fertility and contraception: timing of births, breastfeeding, survival of children, ages at death, education and marriage for each	III
Section F.	Employment: formal and informal economy participation; ages at first time and first time after marriage; wage work and amounts in 12 months preceding interview	I,III
Section G.	Inheritance: contents of and timing for men and women.	III
Section H.	Media exposure: exposure to movies, print media, television; ages at first exposure, levels of exposure in 12 months preceding interview.	I,III
Section I.	Networks: relationship of people relied on when sick; relationship of people helped in last 12 months, mode of payment; relationships of people in informal work groups	IV
Section J.	Household economy: crops planted, animals owned and sold in last 12 months: number of those providing help from outside of household and their relationship to household head (section asked of household head only).	IV
Section K.	Interviewer observations: household quality and possessions.	IV

Figure 4: Data Summary for Primary Instrument

regard to subpopulations with whom investigators do not have shared experience.

In the current case, the investigators' prior knowledge of the Tamang and Nepalese languages and of Tamang communities in Nepal were both essential background for constructing formal interview instruments, but we were confronted with an additional problem insofar as Tamang is an unwritten language. Although it may be roughly tran-

scribed in the national alphabet, the dialect differences that may appear from village to village together with the low probability of hiring sufficient numbers of educated Tamang-speaking interviewers caused us to formulate the instruments in Nepali, the national language. This allowed us to be reasonably certain that the questions elicited standard meanings across settings. A side-effect of this, however, was a decision to keep questions at a largely behavioral rather than attitudinal level.

Thus our aim was the creation of a Nepalese language questionnaire. Individual questions were originally constructed in both English and Nepalese. Drafts of these instruments were translated from English into Nepalese by native Nepalese speakers. They were then translated back to cross-check the meaning of each question. This process was repeated over several iterations. Investigators also used previous research findings and their own knowledge of setting to locate questions in an appropriate sequence within the questionnaire. Indeed, the sorts of questions asked were likely to find their way into trailside conversations throughout Nepal. Finally the formal instruments were taken to Nepal and pretested in a Tamang village similar to those to be studied later. This pretest was critical in our effort to insure that the questionnaires were linguistically appropriate to the local population. Once the pretest was completed instruments were again revised with the input of both native Nepalese scholars and investigators. Additional steps taken during the data collection to insure that these questions held a shared meaning for investigators and respondents are described below.

Interviewer training and supervision. Interviewers were recruited in Nepal from survey research organizations, university campuses, and Tamang communities similar to those being studied. We made special efforts to hire native Tamang interviewers, because some respondents in Timling were likely to require questions to be translated from Nepalese to Tamang. We also recruited female interviewers, because many previous surveys in Nepal limited the sex of interviewers for convenience but with unknown implications (Axinn 1989, forthcoming).

Candidates were originally screened on their reading and writing abilities. A pool of 32 was then given a 1-week intensive training course in interviewing techniques modelled after the course used at the Survey Research Center of the University of Michigan (Survey Research Center 1976). This course was followed by training in an actual field context—a Tamang village not a part of our study.[3] The best 16 of these interviewers were hired.

Interviewers and investigators lived under one roof for the entire 3-month period of data collection at the Sangila site where work commenced. The stay began with 3 more days of intensive interviewer training and continued visits by the project anthropologist to community households.[4] Ethnographic data collection began as a part of this rapport building and the survey operation was initiated only after each household had been visited. Moreover, the first instruments administered were the least threatening census and genealogy sheets. Investigators accompanied interviewers to the field each day to supervise. One investigator gathered ethnographic data and the other circulated through the village supervising and assisting interviewers who had problems.

Because the investigators lived with the interviewers in the field, supervision was nearly constant. Every evening investigators read every interview completed that day. This allowed investigators to examine work for errors and omissions throughout the data collection. Responses on questionnaires were cross-checked during the ethnographic data collection for additional continuous monitoring of the interviewers' performance. Because more interviewers than necessary were hired, those who did not perform adequately could be released; during the first 3 months of data collection four such interviewers were let go. The firing of interviewers who clearly failed to follow protocols had a considerable positive effect on the morale of interviewers who had worked hard to follow our rules, as well as reinforcing the rules themselves. Finally, constant training refreshers were easily incorporated into the daily regimen as investigators noted problems in their reading of completed questionnaires.

After completing the data collection in Sangila, investigators and a group of the demonstrably best interviewers moved data collection to Timling where these same procedures organized activities.

Data gathered using ethnographic techniques. In addition to the data gathered through formal survey instruments, our combination of fieldwork strategies allowed us to gather a wealth of other material. Historical material for the villages allowed us to establish important local watershed dates: building of schools and roads, the availability of particular categories of work such as participation in the British army's Gurkha regiments, and the like. In addition, extremely detailed patrilineal histories were gathered. These continue to be important for the analysis of enduring relationships among clans and patrilines and were immediately important in establishing the specific cultural and social organizational context of marital events that were analyzed statistically.

Extensive informal interviews were conducted with selected informants on a range of topics related to family organization and relationships, marriage, village histories, and other relevant topics. Many of these were taped on cassette in the field and have thus far resulted in over 1,000 pages of transcribed material. Of particular interest for the purposes of the TFRP, for example, are transcriptions of spontaneous informant comments on the tension surrounding household fission in the newly emergent wage labor economy and the expectations of wealth flows from children's wage labor jobs. Both of these are useful for fleshing out the cultural meaning of trends revealed by the behavioral data from the questionnaires.

Finally, case history materials focusing on specific life course and family transitions and the value context within which they occur were gathered. Case material exists for: (a) relationships between parents and children working for wages away from the villages, (b) marriages and elopements, (c) the process of household formation and fission from parental households, (d) reactions and consequences of deaths for children and adults, (e) the organization of work on road crews and in the markets of Kathmandu. Extensive social structural information was collected, especially that having to do with auspicious and forbidden categories of marriage and culturally expected behavior among various categories of relatives. All of this information not only provided an important context for statistical analyses but redresses those criticisms of research on family and demographic change which

suggest that too much is inferred from behavioral data alone (Kertzer 1984; Stone and Campbell 1984).

REDUCING SURVEY ERRORS FROM COMMON SOURCES

A fully integrated ethnographic and survey approach can be used to minimize survey errors. Groves (1987) divides survey errors that affect data quality between errors of nonobservation and measurement errors. Errors of nonobservation include coverage errors, nonresponse errors, and sampling errors, whereas measurement errors include errors arising from the interviewer, from the respondent, and from the questionnaire. Here we use the categories of errors suggested by Groves (1987) to demonstrate the ways survey research can benefit from integration with an ethnographic approach.

Errors of nonobservation. In the TFRP we aimed to interview every resident over age 11 in each of the two communities being studied. The issue of sampling error becomes moot in a community study aimed at obtaining information from every resident.[5] We attempted to interview the entire population of each community, not a sample. In this situation, coverage errors and nonresponse become the two major sources of nonobservation errors.

The combined approach helped investigators to minimize coverage errors by allowing them to live in the community and become familiar with all of its households, collect genealogical information that could be used to locate every living relative of someone residing in the village, and visit each dwelling unit repeatedly to discover unrelated residents. This depth of information generated by ethnographic techniques was used to ensure that every dwelling unit and every individual residing in the community was contacted. The combined approach also minimized nonresponse. A number of rapport-building techniques common for ethnographic data collection were used to generate a high level of respondent cooperation. These techniques included living among the respondents, becoming involved in casual conversations revolving around the sharing of tea or cigarettes, taking pictures for respondents and providing some first-aid medical assistance to

respondents. The success of these techniques, however, was partly a result of the investigators' previous field experiences in Nepal.

In the primary data collection effort, we obtained data for 1,520 out of 1,521 respondents identified as eligible for interview in the two settings, virtually 100%. Of the 1,521 total eligible respondents, 1,415 (93%) were interviewed in face-to-face visits by our staff. These include both residents who were present in the community and those who migrated to take temporary jobs. In both settings we traced such migrants, sought out their temporary residence, and interviewed them face-to-face whenever possible. There were no refusals in either setting. However, 7% of the interviews were conducted with proxy respondents because the respondent was either physically unable to participate or we were unable to locate the respondent. Most proxy interviews were conducted with spouses or parents, if they were available, and secondarily with siblings. Because the questionnaires focussed on behavioral information, these knowledgeable sources were generally able to provide adequate detail. Further, for some analyses, the definition of a household member includes only those who regularly eat and sleep at the house, so people who were away for extended periods were not counted among those eligible for the study.

Nonetheless, we took a number of measures to reduce the percentage of proxy interviews in both settings. Where possible, interviewers attempted to visit respondents at their places of work, such as the carpet factories of the Kathmandu Valley. From Timling, we sent interviewers to the road-building work-camps, a 2-day walk over extremely rugged country. Where respondents were unavailable at the initial interviewer visit, interviewers were required to make callbacks at frequent intervals and differing times of the day to meet them. These callbacks were virtually daily events. In both settings, proxies were not authorized until the final 2 weeks of data collection when the opportunities for meeting the actual respondent were exhausted.

The attention to meeting eligible members of the population has resulted in a very high percentage of questionnaires administered to the respondents themselves. There are no large differences in the percentages of young or old, male or female respondents met in face-to-face interviews. Thus, we have regular interviews with the respon-

dents themselves for 1,103 out of 1,166, 94%, of the ever-married respondents; we have regular interviews for 312 out of 354, 88%, of the never-married respondents. Similarly, 91% of the male and 96% of the female interviews are regular interviews with respondents.

We believe the interview experience was enjoyed by our respondents and that this enjoyment enhances the quality of our data. In the village setting an unpleasant encounter would be impossible to conceal, yet, far from having people avoid interviews, we had the unusual experience of respondents in both settings seeking us out to have their interview taken. Part of the explanation for this is the real appreciation we found for a study of the Tamang, a sense among the Tamang themselves that it was important to see how they lived and how they were changing. Certainly, there was a strong sense of our sincerity communicated by the very fact of residence in the study areas for lengthy periods. This occasioned many approving remarks and effectively built and maintained rapport between the Tamang villagers and the researchers.

Thus, the ethnographic approach employed by the TFRP helped the data collection avoid errors of nonobservation. This coverage of the population ensures that nonresponse will not be a serious threat to the integrity of our results.

Measurement errors. Measurement errors arising from the interviewer are usually minimized by their careful training and supervision. Although we took great care to train interviewers, as described above, our efforts also went beyond prefield training. Here we recapitulate the advantages of having senior study staff members residing in the community during the period of the survey: They were able to supervise the work of the interviewers constantly. Interviews were observed in progress and all questionnaires were read by senior project staff every day. Because the staff resided with the interviewers there was daily opportunity to comment on individual work. Periodic training sessions were scheduled during the data collection to deal with problems and keep interviewers thinking about their technique. Because we overhired interviewers at the onset, those who did not perform acceptably could be released without hampering the data collection. Along with evaluating individual interviewer performance, the inten-

sive interviewer supervision was used to evaluate the effects of interviewer characteristics of data quality. The results of these investigations are described in detail elsewhere (Axinn 1989, forthcoming), so we do not discuss them here.

From the other end, prior knowledge of the study population and intensive knowledge of the local community helped investigators reduce measurement errors arising from respondents. Questions of timing and recall provide an important example. From previous work, investigators knew the Tamang used a special calendar based on the Tibetan system of counting cycles of twelve years, each year associated with the name of an animal. Although the system's usefulness is fully realized in the aging of respondents, we also incorporated it into key timing questions in the questionnaire to aid respondent recall of event timings. Similarly, historical data collected using ethnographic methods could be used to estimate the timing of particularly memorable historical events. Such events could then be used by investigators or interviewers to help respondents recall the timing of particular events in their own lives.

It should also be pointed out that cross-checks of responses with respondents, their families, their neighbors and public documents were used as a check on respondents as well as interviewers. Because investigators resided in the village, discrepancies discovered after the interview could be reconciled with the respondent and corrected. A good example of this might be a marriage timing. A man might report that he married at a particular age, in error. But as the data collection proceeded investigators had the opportunity to ask his wife, his parents, his wife's parents and others about the timing of that same event. Discrepancies of this type could be and were reconciled and resolved while still in the field.

Linguistic incomprehensibility and unfamiliarity with the structured interview situation are important sources of measurement errors arising from the questionnaire (Stone and Campbell 1984; Briggs 1986). Because the investigators spoke the local languages fluently before designing the questionnaire, some questions were written directly in one of those languages and others were easily translated. As described earlier, other steps taken to increase the comprehensibility of the questions included translations by native speakers and pretests.

Ultimately, however, our aim was to insure that respondents interpreted the questions as having the same meaning investigators intended. Because investigators were present in the community as the survey was administered, they were able to examine responses immediately for misinterpretations. These examinations allowed investigators to make adjustments in wording or interviewers' techniques and readminister questions to the entire population without perceptibly slowing the study down. Only a small number of such adjustments were necessary, and most of them were carried out very early in the survey, but the presence and involvement of senior study staff allowed the changes to be made during the data collection.

Thus, the full integration of ethnographic and survey data collection, carried out simultaneously in the field, gave researchers unique opportunities to minimize measurement errors. Now we turn to examples of the ways data collected using ethnographic methods can enrich analyses of data collected from a simultaneous survey.

INFORMATION THAT MAY BE MISSED BY STANDARD SURVEYS

Earlier we described the types of data that were gathered without formal instruments, including historical materials, informal interviews and case studies. These data often provided information on issues which were not represented in the main questionnaire. This included information on events or activities that investigators were unaware of at the time the questionnaire was designed, but about which they ideally would have liked questions to be asked of every member of the study population. Because such information was discovered via ethnographic methods during field work, it was possible to obtain measures using supplementary procedures.

One example from the TFRP was the discovery of a unit of social organization, called *memekhor*, specific to the local area of our Kathmandu setting and historically important to the definition of eligible marriage partners. Because marriage was a focal subject in our study, it was essential to know the *memekhor* of each married member of the study population even though the instruments included no reference to this unit of organization because it was discovered after

investigators were already in the field. However, our strategy of living in the community for an extended period made it possible to gather this material in an additional one-page questionnaire that was developed to gather information on other aspects of the marriage process specific to this setting. Thus, potentially important information discovered as a result of the residence of primary investigators in the community was not missed.

Another important example of this was the discovery of a development project that operated in parts of the Sangila research site. The project, called the Small Farmers Development Program or SFDP, is active in many parts of Nepal, but its activities are highly localized. The SFDP provides production credit to poor farmers in part of the Sangila community. The project also carries out a number of other activities likely to affect fertility behavior, particularly contraceptive use (Axinn 1990). Because fertility behavior was one focus of the TFRP, the questionnaire was designed to measure important factors linked to fertility. Yet the questionnaire did not contain measures of participation in the SFDP. It was only discovered through informal, ethnographic interviews conducted in the field.

Moreover, membership in the SFDP is also related to other variables that were measured in the questionnaire and that were predicted to affect fertility behavior. For example, women whose husbands were involved in nonfamily wage work were expected to be more likely to use contraception than other women. But wage work considerably reduces the chances of participating in the SFDP, because one requirement for membership is that the household's income come from farming. So, theory predicts a positive effect of SFDP membership on contraceptive use, a positive effect of wage work on contraceptive use, and a negative effect of wage work on SFDP membership. Thus, tests estimating the effects of wage work, which was measured, on contraceptive use will be biased by excluding SFDP membership, which was not measured.

The discovery during data collection of SFDP activities in the area gave investigators an opportunity to collect records of residents' participation in this program. These records were linked to data collected with questionnaires and provide the means to test hypotheses

concerning contraceptive use without omitting a critical variable and misspecifying the model.

Below we provide estimates testing the effects of husbands' wage work on contraceptive use, with and without SFDP membership in the model, to demonstrate the effects of omitting this variable. For this purpose we borrowed models of contraceptive use from Axinn (1990), where a more detailed description of the measures used may be found. The dependent variable is a dichotomy, coded 1 if a woman has ever done anything to avoid or delay becoming pregnant and 0 if not. Because it is dichotomous, we used logistic regression procedures to estimate our multivariate models (Kmenta 1986; Morgan and Teachman 1988). We also measured husbands' nonfamily wage work with a dichotomy, coded 1 if they ever had this experience before marriage and 0 if not. Whether or not the household participated in the SFDP was also measured by a dichotomy, coded 1 if the household had participated in the SFDP. Finally, the multivariate models of contraceptive use contain four important control variables. They are a dichotomy coded 1 if the interviewer was female, a dichotomy coded 1 if the household was located outside the SFDP project site, a continuous measure of the number of years women had lived as married, and a continuous measure of women's ages at marriage in years.

Logistic regression estimates of these multivariate models are displayed in Table 1. The first model estimates the effect of husbands' nonfamily wage work experiences on subsequent contraceptive use without including participation in the SFDP. In this model we find that wage work does have a positive effect on contraceptive use, but this effect is not statistically significant. Indeed, the overall model chi-square also fails the significance test; the results from tests of this model thus provide only weak support for the hypothesis predicting a positive effect of wage work on contraceptive use.

When information on the SFDP is included in the model, however, the picture changes dramatically. The second model in Table 1 estimates the effect of wage work controlling for SFDP participation. Here we find the effect of wage work on contraceptive use positive, larger than before, and statistically significant. As expected, the effect of participation in the SFDP is also positive and statistically significant.

TABLE 1: **Logistic Regression Estimates of the Effects of Husbands' Nonfamily Work Experiences on Couples' Contraceptive Use: Asked of Currently Married Women Ages 35 to 44**

	Excluding Information on the SFDP	*Including Information on the SFDP*
Husband had a nonfamily work experience before his first marriage	0.98	1.32*
Household participated in the Small Farmers Development Program (SFDP)		1.83*
Controls		
Interviewer was female	0.80	0.99
Household was located outside project site	–1.97*	–1.38*
Years in the married state	–0.01	0.02
Age at marriage	–0.08	–0.03
Chi-square	9.79	14.92*
(*df*)	(5)	(6)
N	59	59

*$p < .05$, one-tailed

In fact, in this model the overall chi-square statistic is also statistically significant. Thus, omitting information on SFDP membership leads to a downward bias of our estimate of the effect of wage work. This downward bias leads us to conclude that wage work has no significant effect on contraceptive use; models including SFDP membership lead us to conclude the opposite.

Clearly, information on the SFDP, discovered during ethnographic data collection in the field, was critical to our task of evaluating the effect of wage work on contraceptive use with survey data. A standard survey, with questionnaires completely determined before beginning the field work, would not have measured this experience. Such an oversight would have left researchers with no alternative but to use what data was available to construct misspecified models. Tests of such misspecified models might easily result in researchers drawing incorrect conclusions with regard to a number of hypotheses. Instead, a combined ethnographic and survey approach helps researchers discover and incorporate information that standard surveys may miss.

INSIGHT INTO THE MEANING OF SURVEY DATA USING ETHNOGRAPHIC DATA

Any well-developed survey approach will, of course, construct instruments based on knowledge of the population being studied. In our case, instruments were designed from prior knowledge of one segment of the population, in addition to extensive reading of comparative ethnographic material from other Tamang communities in Nepal. Similarly, surveys devised for studies that are explicitly without a community focus can include "culture specific" question sets intended to be generally appropriate to the particular ethnic group or society of study. Community studies introduce a new order of complexity in the range of data that can be gathered. Recent work in anthropology, for example, suggests that highly localized historical events and relationships among families may have important implications for behavior (cf. Greenhalgh 1990; Roseberry 1989). In the discussion above we have shown that our relatively long residence in our field sites allowed previously unexpected data to be gathered. This new data enhanced the specification of analytic models in important ways. Here we discuss a related topic: the value of ethnographic knowledge for understanding the meaning of relationships between variables within community contexts. Our example comes from an analysis of historical patterns in marriage alliance in the remote setting (Fricke 1990).

Consider clan membership. By itself, it is little more than an indicator of extended family identity which would have no more place in typical analyses than a surname. A relationship between such an identifier and other variables would generally not be analytically useful and would create rather than solve a puzzle. An analyst would want to know what forces are proxied by clan identity and might suggest that the relationship was one of differential wealth. In the remote TFRP setting of Timling, extensive informal discussions with members of the community revealed that clan membership was an important component of village political history. Moreover, the reasons for these relationships had to do with the particular past of this village and were not generalizable to the Kathmandu setting. The collection of historical details from the recent past as well as legends

TABLE 2: Multiple Classification of Proportion of Women in Reciprocal Alliance Marriage by Background Characteristics

Characteristic	(N)	*Unadjusted Mean*	*Adjusted Mean*[a]	*Adjusted Mean*[b]
Wife's birth position				
First	(30)	.27	.34	.35
Later	(82)	.48	.45	.45
(Eta^2)		(.04)	(.01)	(.01)
Marital decision for wife				
Mostly seniors	(53)	.60	.62	.62
Jointly	(15)	.27	.24	.27
Mostly wife	(44)	.25	.24	.23
(Eta^2)		(.12)	(.14)	(.14)
Affinal proximity				
In Timling	(78)	.47	.49	.50
Outside	(34)	.29	.25	.24
(Eta^2)		(.03)	(.05)	(.06)
Relative family land				
Equal/husband more	(72)	.47	.50	.49
Wife family more	(40)	.33	.28	.30
(Eta^2)		(.02)	(.04)	(.03)
Wife's clan				
Tamang	(60)	.53	—	.53
Ghale	(52)	.29	—	.29
(Eta^2)		(.06)	—	(.06)
Grand mean			.42	.42
Total cases	(112)			
R^2			.22	.28

a. Adjusted for effects of all variables except wife's clan.
b. Adjusted for effects of all variables including wife's clan.

of village settlement were combined with an understanding of the structure of marriage alliance among the Tamang to develop hypotheses about the relationship between clan and the form of a daughter's first marriage.

Table 2 shows that membership in a particular clan was powerfully related to the form of alliance entered into or renewed by a daughter's first marriage.[6] Moreover, clan is shown to be more than a proxy for differential wealth because, in this setting, land is the single most

important indicator of this (Fricke 1986) and a measure for such differences between families is included in the model. The understanding of specific clan political histories allows clan to be incorporated into the model, resulting in an additional 6% of explained variance. Not only were we able to test specific hypotheses related to very specific community political relationships and marriage as a result of our ethnographic materials, but we were alerted to an important control to be inserted in subsequent quantitative analyses with data from this setting.

A survey alone would have missed the significance of these context-dependent relationships. Further, the finding of these relationships in Timling caused us to explore the data from our other setting for similar relationships that may have resulted from such political family histories. Ethnographic work in that area suggested that none would be found, because dominant families had long since lost their political control of the area and no such relationships were found in the data.

DISCUSSION

The crucial features of the approach we describe are the simultaneous use of rigorous survey and ethnographic methods, integrated in the field throughout the data collection. This approach goes beyond other attempts to combine "quantitative" and "qualitative" data collection techniques. For example, some approaches focus on survey data collection and seek to supplement survey data with "qualitative" information gathered using other methods. But a full-fledged ethnographic data collection is aimed at a holistic understanding of the social, cultural, and historical context within which individuals act. As discussed above, this holistic aim allowed investigators to both gather information they had not foreseen and interpret context specific relationships in the data. Qualitative data-gathering techniques designed as a simple supplement to surveys, which focus on the topics covered in the survey, are not likely to provide the means of attaining these additional goals.

Likewise, approaches designed more explicitly to collect "qualitative" data often add surveys to check the extent of specific behaviors

or opinions only after they have been discovered in the field. Such an approach robs the survey of important aspects of its contribution to the data collection. One aspect is the structured questionnaire with standardized questions designed before the field work specifically to measure theoretically critical variables. This type of instrument can be used by interviewers trained to read the questions with a standardized technique to gather data from a complete population, or a fully representative sample of that population. Such a thorough survey approach provides the "quantitative" data needed to specify and test complex causal models using statistical tools. As mentioned earlier, such tests provide the means of evaluating the theoretical questions a specific data collection is designed to answer.

Finally, it is the integration of this genuine ethnographic data gathering and authentic survey data collection that provides the methodological innovation advocated here. Integration at every phase of the data collection process requires investigators to have strong ethnographic knowledge of the study population before designing the survey instruments. Investigators must be in the field gathering ethnographic data on individuals and the local context throughout the survey's field period. Also, investigators need to supervise the interviewers, read the questionnaires as they are completed, collect redundant information ethnographically, and be prepared to alter either the survey or the ethnographic questioning depending on what they learn from the other source. The examples provided above are intended to illustrate the many ways this integration can enhance the quality of the final data set. The combined approach can reduce nonsampling errors from common sources such as nonobservation, nonresponse and measurement errors arising from the interviewer, the respondent, or the questionnaire. It also provides a method of discovering and collecting data on issues or events the investigators were unaware of at the time they designed the survey element of the study. Last, and perhaps most important, the integrated approach can collect contextual information that can be employed to better specify our individual-level hypothesis tests.

Thus, an integration of ethnographic and survey techniques must not be an excuse for doing less than a complete job with each of the components. Much of the mutually reinforcing benefit is only possible

when both methods are treated rigorously. The survey questionnaire must be designed carefully, interviewers need to be thoroughly trained and meticulously supervised, and the study population, or sample of that population, should be chosen scientifically. The extensive coverage of the population of interest and the comparability of questions are two important strengths that the survey adds to the ethnography. Likewise, the ethnographer needs to have an intensive exposure to the group to be studied before the study begins. In cross-national research, this exposure may need to include learning a new language and becoming familiar with a foreign culture. This investment is not trivial. Together the investigators had several years experience working with rural Nepalese before embarking on the study described here. Such a large investment of time may not always be necessary, but separate field experience with the group to be studied, before the study, certainly contributes to the successful merger of the two approaches. During the field phase, the ethnographer must reside in the community being studied, participate in local activities over an extended period, and collect information using a variety of unstandardized techniques. This intensive knowledge and unstructured approach are two important strengths that the ethnography adds to the survey. Thus, we argue that the benefits of this multimethod strategy are fully realized only when rigorous survey and ethnographic techniques are applied simultaneously and integrated at every phase of the data collection process.

Further, many of the benefits arising from the method we describe result from its application to a finite population small enough for the simultaneous survey and ethnographic work to constantly rub up against one another. It is the contact between the two approaches that allows the strengths of each to compensate for the weaknesses of the other. So, although studies might undertake to sample a number of communities, we advocate applying this simultaneous mixture of survey and ethnography one community at a time.

We wish to emphasize that the data collection strategies we advocate are not intended as a replacement for national-level sample surveys. Rather, we offer the combined survey and ethnographic approach as a supplement to national-level data collections. The methods described here involve a high level of investment by investigators just to collect data on one community. The level of investment

needed for a national data collection of this type could easily be prohibitive. For some research problems, such as estimating national levels of some behavior or opinion, the combined ethnographic and survey approach may be less appropriate than national sample surveys. However, research problems that require context-specific measures and community-level information in order to test specific theories or hypotheses may well benefit from using the approach described here.

Finally, a fully integrated combination of survey and ethnographic methods, the microdemographic community-study approach, may be a useful data collection tool in a variety of settings. The examples we provide point toward its utility in cross-cultural studies. However, the heightened quality control, collection of both individual and contextual information, measurement of factors unforeseen at the study's onset, and insight into the meaning of measures that this method can generate are assets in any setting. In fact, this type of method has been advocated for the study of various sociodemographic phenomena, including the social aspects of fertility, mortality, and migration behaviors (Caldwell 1985; Caldwell, Reddy, and Caldwell 1983; Massey 1987). The rich data sets generated by combining ethnographic and survey approaches may be ideal for testing many different types of theories in the behavioral sciences.

NOTES

1. Earlier research was conducted from 1981 to 1982 by one of the principal investigators in the more remote of our two settings (Fricke 1986).

2. By village context we mean the overall environment—economic, educational, social—in which individual and family processes are carried out.

3. Raniban Village. See Kathmandu Valley map, Figure 3.

4. These visits were begun earlier, even before the interviewer training. The impending data collection was explained throughout the study area and permission to conduct our research, once government clearance was given and obtained from community leaders, older clan members, and representatives of each household. The total period of presurvey rapport-building in the first community was approximately 3 weeks. The presurvey rapport-building in the second community was shorter, but one of the investigators had previously spent 8 months in that village, which contributed significantly to the projects rapport.

5. Of course, the issue of sampling error is relevant at a higher level of aggregation, that is, when we are concerned with the choice of communities. Our study chose two Tamang communities representing opposite ends of a Tamang spectrum of access to wage labor and

schooling opportunities. Although our choice was not arrived at systematically, it would certainly be possible to employ systematic sampling procedures to choose the communities to be studied.

6. The analysis is presented in multiple classification format. See Andrews, Morgan, Sonquist, and Klem 1973 for details. Eta squared is comparable to R squared in standard regression models.

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