Respondent Cooperation and Requests for

Contacts in Longitudinal Research

By

Colter Mitchell

Department of Sociology and
The Institute for Social Research
University of Michigan

and

Vaughn R. A. Call

Department of Sociology
Brigham Young University

***Working Manuscript-Please do not cite without permission of the authors.

ABSTRACT

Researchers contemplating panel research designs regularly face the problem of panel attrition. A vital tool in reducing panel attrition is first wave information, which can be used to locate respondents who move. We analyze data from the 1988 National Survey of Families and Households (N = 13,007) to examine the extent of respondent cooperation to a request made during the initial interview for the names and addresses of friends and relatives who might help researchers locate panel members who move. About 90 percent of the respondents to the 1988 survey provided at least one contact. Compared to respondents who provide 0 contacts, respondents who provide one contacts have 192% higher odds of being tracked between waves and those who provide 2-3 contacts have 2.9-3.0 times higher odds of being located between waves. Conditional on being located, having more contacts increases the respondent's odds of participating in the second wave up to 92% higher odds for those who have 3 contacts compared to respondents who gave no contacts. Utilizing censored Poisson regression we find that respondents with larger family and social networks supply more contacts. Conversely, respondents from racial minority groups and those who live in the East provide fewer contacts. Employing this information in preparation for and execution of a longitudinal study should alleviate some panel attrition.

Respondent Cooperation and Requests for Contacts in Longitudinal Research

The number of major national and regional panel studies has increased greatly during the last three decades, and they have become effective tools in documenting causal relationships in the social sciences (Phelps, Furstenberg, and Colby 2002). Observing individuals at multiple time points can provide correct temporal ordering to enable causal hypotheses to be tested, and changes to be documented (Halaby 2004). However, a crucial threat to the strength, validity and reliability of results of these studies is panel attrition (Campbell and Stanley 1963; Little and Rubin 2002). There are several recognized procedures for reducing panel attrition and its effects on results (Call, Otto and Spenner 1982; Thomas, Frankenberg and Smith, 2001; Groves, et al 2004). This paper focuses on the commonly used, but rarely discussed, procedure of collecting information from nonresident family and friends, often called contacts, in order to help researchers locate a respondent who has moved.

In this paper we address three important gaps in the literature on attrition in longitudinal studies. First, although researchers have been gathering contact information for several decades now, there is little information on the degree to which panel members cooperate with this request. Second, other than the anecdotal evidence that asking for contacts is helpful and not asking for contacts is detrimental to longitudinal studies, there is no empirical evidence that providing contacts (or providing more contacts) makes someone more, or less, difficult to relocated or to reinterview (Freedman, Thornton, and Camburn 1980; Ortiz and Ballon 2007). Finally, there is a lack of research on predictors for the number of contacts provided by respondents. To satisfy these research needs, we use data from the first and second waves of the National Survey of Families and Households (NSFH) to examine the extent and nature of respondent cooperation in identifying people who know where to contact the respondent for a reinterview.

We also discuss the uses of this information in the continuing effort to improve panel respondent retention. We argue that knowing the importance of contacts will encourage researchers to spend extra effort in obtaining the initial contacts. More importantly, however, we detail the possible uses of the predictors of contacts to conduct more efficient respondent tracking and to provide higher reinterview rates. By knowing which subgroups of the population are more cooperative, or who provide higher numbers of contacts, not only can studies better prepare for studies within different subgroups, but they can determine which individuals will need more attention to be retained. This should reduce the amount of time and money required to track people, while having the same, if not lower, attrition rate.

LONGITUDINAL RESEARCH

The primary characteristic and strength of longitudinal research is that the same individuals (or other sampling unit) are measured at least two time points, thus allowing researchers the possibility of analyzing change in a measurement. Not surprisingly, a critical goal of longitudinal research is to lose as few respondents as possible to attrition. Failure to measure the same people over the various time points reduces the number of people in the study, thereby reducing the study's inferential power. More importantly, however, attrition often leads to estimate bias because attrition is typically non-random (Little and Rubin 2002). And although there are mechanisms for imputation of longitudinal studies, they are complex and require strong assumptions about the causes and distributions of the error (Little and Rubin 2002). In the end, most researchers would prefer to lower the attrition rate to as low as possible.

There are several published reports on procedures used to track respondents and to reduce panel attrition (Coen, Patrick, and Shern 1996; Ribisl et al 1996; Cohen et al 1993; Gregory, Lohr, and Gilchrist 1992; Dodds, Furlong, and Croxford 1989; Ellickson, Bianca, and Schoeff 1988; Booth and Johnson 1985; Call, Otto, and Spenner 1982; Thornton, Freedman, and Camburn 1982; Freedman, Thornton, and Camburn 1980; Clarridge, Sheehy, and Hauser 1978; Temme 1975; Crider, Willits, and Bealer 1971), and the methodological problems associated with panel research designs are well known. In part this is because attrition can occur through several mechanisms during the research process (Kish, 1987). By comparing attrition to the broader literature on representation in surveys these mechanisms are apparent (Groves et al. 2004). By reframing the longitudinal study as a standard cross-sectional study where the previous (or even initial) wave of the study is the target population we gain insights into mechanisms of attrition. For example, any difference between the target population and sampling frame would be considered a coverage error and therefore, any loss of respondent information (i.e. who they are, where the lived) would result in a similar coverage-like error. Considering the value of each respondent this seems unlikely, but also considering the size of many of the studies it is not impossible. Although many longitudinal studies attempt to follow everyone in the target population (or previous wave in this example), some studies do sample certain individuals to continue, this then would result in attrition due to sampling error. Typically the largest cause of attrition would fall under unit nonresponse. For some it would be due to the inability to deliver the survey. Like many cross-sectional studies, this could be due to the respondent being unavailable to participate if they are too ill or deceased or because they are never at home to receive the survey during the data collection period, or even because of barriers to getting to the respondent (e.g. gated subdivision, apartment complex doormen, caller id, etc) (Groves et al. 2004; Groves and Couper 1998). More unique to longitudinal studies, however, is that people may no longer be living at

the original survey participation location. Finally, respondents may contribute unit nonresponse attrition if they refuse to respond to the survey. Although very similar to refusals in cross-sectional data collection, refusals in longitudinal research are different in that the respondent not only knows what the study is about but might also have a sense of the costs and benefits of partipation (Groves, Presser, Dipko 2004). Using the framework of the previous wave being like a target population shows that cross-sectional and longitudinal studies share many of the same mechanisms for lack of correct population representation—although every loss of a unit is arguably more costly in longitudinal research.

Despite the similarities with cross-sectional research, unit nonresponse due to inability to deliver the study because of the respondents mobility seems particularly vital to longitudinal research. It is not surprising then to note that residential mobility is the major source of potential panel attrition in most longitudinal studies (Call et al. 1982). In 2003, 14 percent of the United States population moved, and this was one of the lowest rates of residential mobility in the last 50 years (Schachter 2004). More typically, about a fifth of the U.S. population moves each year (U.S. Bureau of the Census 1989). The magnitude of potential attrition risk from residential mobility varies considerably by age (Schachter 2004). For example, researchers contemplating a five-year longitudinal study of high school seniors face the prospect of almost all panel members moving to a new address. Conversely, a five-year longitudinal study of 55-year-olds would find a large proportion of panel members still living in the same residence. In longitudinal studies of the general population such as the NSFH, one-third of the panel members moved within three 3 years of the initial interview (Call 1991). People who are difficult to locate during follow-ups to panel studies also differ from other panel members with respect to marital status, race, age, level of education, residence (urban or rural), and geographic location (Kandel, Raveis, and Logan 1983). Whether the risk of panel attrition becomes a reality, however, depends in large part on the researcher's ability to develop a comprehensive tracking strategy that minimizes the effects of residential mobility (Call et al. 1982).

Tacking theory from Call et al 1982-things to discuss: 1) lots of tracking possibilities with some being more successful than others, 2) importance of getting information from people or institutions as close to the person as possible (i.e. circles diagram). For the most part I think this is a fairly short part and may just be 1-2 paragraphs plus the 4 below.

Access to contacts is a key mechanism to facilitate tracking mobile respondents and lowering the cost of

longitudinal studies (Call, Otto and Spenner 1982). Researchers frequently obtain the names of at least two or three friends or relatives who could easily locate a respondent who changes residence. This may appear to be an easy task. However, some evidence suggests otherwise. For example, in one study, a request for the name of a contact at the end of a telephone interview resulted in only 72 percent of respondents providing a contact (Booth and Johnson 1985). Even though they completed the interview, over a fourth of the respondents in this study refused to provide a contact's name. Nevertheless, the frequency of obtaining some contact information in panel studies is extremely high (Coen, Patrick, and Shern 1996; Ribisl et al 1996; Cohen et al 1993; Gregory, Lohr, and Gilchrist 1992; Dodds, Furlong, and Croxford 1989; Ellickson, Bianca, and Schoeff 1988; Booth and Johnson 1985; Call, Otto, and Spenner 1982; Thornton, Freedman, and Camburn 1982; Freedman, Thornton, and Camburn 1980; Clarridge, Sheehy, and Hauser 1978; Temme 1975; Crider, Willits, and Bealer 1971).

Obtaining names of contacts from respondents during the first wave of a panel study can reduce panel attrition in four ways. First, if a respondent moves, it permits the researcher to quickly identify someone who can provide the respondent's new address. Second, it gives legitimacy to a request for a new address. Instead of asking potential informants if they are related to Jimmy Smith and if they know where Jimmy Smith lives, the researcher can state that Jimmy Smith provided his aunt's name, address, and phone number so that he could be contacted if he moved. Offering such information, rather than questions that raise suspicions about the researcher's motives, should greatly enhance the probability of obtaining a new address from the informant. Third, the researcher can obtain a new address for Jimmy Smith without making an additional contact with him. This reduces the opportunity for a respondent to refuse further participation in the study without first receiving letters and information brochures that legitimize the continuing study and increase the probability that the respondent will continue to participate (Groves and Lyberg 1988). Fourth, it permits the researcher to identify difficult tracking cases and the geographic and social characteristics of panel members who may be difficult to locate prior to a study's implementation. This allows researchers to tailor the tracking design to adequately address the extent and type of potentially difficult cases prior to initiating tracking rather than belatedly trying to adjust procedures to handle unexpectedly high numbers of "lost" panel members. Using the respondent's information in conjunction with contact information can help in using the various tracking methods currently available to researchers. Of course, the quality of the contact information, the willingness and ability of the contacts to provide location information

for the respondent and the mobility of the contacts themselves all have important effects on the usefulness of the contacts in finding the respondent.

Although the amount and type of information the researcher has on panel members' family and social networks is key parameter many tracking strategies little is know about it. Few researchers report how many contacts were asked, and even fewer report how many contacts were reported (Thornton, Freedman and Camburn 1982; Ortiz and Ballon 2007). More surprising, and arguably more vital, is that there is no research analyzing what effect contacts have on tracking and later participation. Finally, there is also no research on what factors predict providing any (or multiple) contacts. This purpose of this paper is to fill these important gaps in our knowledge with the aim of providing researchers with a more accurate knowledge of role of contacts in longitudinal research.

DATA AND METHODS

Sample

To address the three issues raised in the preceding paragraph we use the 1988 and 1993 National Survey of Families and Households (NSFH). This study consists of interviews in 1987–88 with a nationally representative sample of 13,007 respondents. The sample design includes a main sample of 9,643 males and females aged 19 and over and an oversampling of some smaller populations of interest. Seventy-five percent of the eligible respondents completed the face-to-face interview. The average interview took an hour and 40 minutes to complete. A detailed explanation of the content and design of the NSFH is reported in Sweet, Bumpass, and Call (1988). We also use participation information from the second, 1993 wave of the NSFH.

Contacts

The research design for the NSFH contained provisions for a five-year follow-up with the 13,007 panel members. At the end of the initial interview, interviewers requested the names and addresses of friends and relatives who would know the panel member's whereabouts if he/she moved:

> *This is an ongoing research study. In about five years we may wish to contact you again to see how things are going. These last three questions are for our records only, so that we can get in touch with you if you move. Remember, everything you say is completely confidential.*

Think of three relatives who, five years from now, would know where you have moved. This could be your (or your husband's/wife's) parents, a brother or sister, an adult child, or a favorite relative you keep in touch with. Who are the three relatives who will know where you are?

The interviewer recorded the name, address, telephone number, spouse's name, and relationship to the respondent for each name mentioned. If a respondent could not name a relative, interviewers probed for friends or someone who would know where they had moved. For older respondents, interviewers asked for the names and addresses of children or younger siblings.

During the data entry process we did not count listed contacts who resided outside the United States, contacts who lived at the same address as the respondent (unless they had a different phone number), or situations where the respondent listed a contact's name but did not provide an address for that contact. These restrictions affected only 156 respondents.

About 90 percent of respondents to the NSFH provided the name and address of at least one contact. About a fifth provided one contact, a fourth provided two contacts, and just under half of all respondents provided three contacts. Of the respondents who did not provide any contacts, 35 percent overtly refused to provide references. An additional four percent could not think of anyone to list or insisted that there was no need for references. This latter reason was often given by older respondents who stated that they would "either be dead or still living here." Interviewers did not record any comment for the remaining 61 percent of the people without any listed contacts. These people may have refused or could not provide any names. Or these blanks may represent interviewer error; that is, the interviewers may have failed to ask for contacts. Nevertheless these results suggest that, at least at a national level, the vast majority of people are willing to supply some information.

Tracking and Participation

To better understand what role contacts have in predicting in tacking and survey participation we use the number of contacts provide as a predictor of if the person was located during the tracking between waves and as well as if they participated in the 2nd wave of the NSFH 5 years later. Since those who were not found, despite using several tracking strategies (Call et al 1982; Call 1991), between waves obviously would not participate in the second wave, we remove them in order to see the effect of contacts, after removing the tracking effect. Just less than 95% of the original sample

was located between the 5 year waves, and approximately 77% of the wave1 respondents participated in the second wave. Both of these measures are dichotomous variables and therefore we use logistic regression to estimate these models (Powers and Xie 2000; Hoffmann 2004). For ease of presentation we present the exponentiated log-odds coefficients of the logistic regressions described above.

—Table 1 about here—

Also, because survey participation varies for several groups of the population we also control for important subgroups. For example we include the respondents' age, sex, and race. All three measures come from self-reported questions on the NSFH. Approximately 47 percent of the respondents were male. The ages of the respondents ranged from 19 to 95, with the average age being 43 and a median age of 38. Finally, our weighted sample reported the following racial and ethnic breakdown: 80 % *White*, 11% *Black*, 7% *Hispanic*, and 2% *other* (of which about 70% were Asian and 28% were Native American).

Education is measured in years of total schooling (0 to 20), with a high school graduation or GED coded as *12,* two years of college or an associate's degree coded as *14,* a bachelor's degree recorded as *16,* a master's degree as *18,* and a professional degree or PhD as *20*. The average number of years of schooling for the sample respondents was 12.6 and the median was 12.

Also included are the urbanicity and the region where the respondent lived. Approximately 75 percent of respondents lived in an urban setting, 16 percent lived in suburbs, and approximately 8 percent lived in a rural setting. We measure region broadly, with 25 percent of respondents living in the North Central United States, 22 percent living in the East, 20 percent living in the West, and 34 percent living in the South.

—Table 2 about here—

We begin by look at the first two columns of results presented in Table2. These two models predict the if the NSFH wave 1 respondents was located one year after the initial interview. Allow not contacted, often research attempt to stay abreast of respondents changes in address with regular tracking. The first column shows that there is a very strong relationship between the number of contacts provided at the end of the wave 1 interview and the odds of the respondent being found 1 year later. It shows that, compared to respondents who provided no contacts, respondents who give 1 contact have 1.8 times higher odds of being located 1 year later. Those who provide 2 or 3 contacts have even higher odds, 3.3 and 4.4 times higher respectively, of been located compared to respondent who provided no contacts.

The strong relationship between contacts and tracking remains even when additional controls are added. After controlling for the sex, race, age, wave 1 martial status and wave1 region and urbanicity, compared to respondents who provided no contacts, respondents who provided 1, 2, or 3 contacts had 1.9, 2.9 and 3.0 time higher odds, respectively, of being found one year after the initial interview. The modification of the effects of contacts suggests that these additional controls do have effects on both the number of contacts and being found—and this will be explored in later analyses. However, the effects are still extremely large. To give some perspective on the strength of these effects it is noteworthy to show that the predictive power of contacts is similar to that of race. Although in opposite directions here, the 0 to 1 contact comparision is about the same magnitude and the white to black comparison in predicting being found. Similarly the 0 to 2 and 0 to 3 effect sizes are between the white to Hispanic and white to other effects sizes. In other words, race and contacts provide about the same amount of predictive power, and overall they are the two largest predictors of being found one year after the interview. Finally, we want to note that the results of all the controls are inline with the literature (Groves and Couper 1998).

We now turn our attention to the models predicting participation in wave 2 of the NSFH, found in the last two columns of table 2. Recall that for these models we removed those respondents who were not located between waves, and therefore this is a model of participation after removing the effect of tracking.[1] Although not as strong as in the previous models predicting tracking, the strength of the relationship between contacts and wave 2 participation is impressive. Compared to respondents who provided 0 contacts those who provided 1, 2 and 3 contacts have, respectively, 1.5, 1.9 and 2.3 times higher odds of participating in the second wave, five years later. Not surprisingly these results do diminish—to 34%, 63% and 93% higher odds—when we include several important controls, but they are robust. In fact it is interesting to note that race, marital status and urbanicity appear to primarily work through tracking to affect participation, whereas contacts—data collected explicitly for tracking—actually has a unique effect on tracking and participation conditional on tracking. In sum, the number of contacts appears to be the most consistent strong measure of both tracking and participation success in these models.

Predicting the number of Contacts

Based on the previous results it is clear that contact information is a useful and highly predictive measure of

[1] Combining tracking and participation we can estimate the total effects of contacts. Compared to respondents who provided 0 contacts those who provided 1, 2 and 3 contacts have, respectively, 1.6, 2.3 and 2.8 times higher odds of participating in the second wave.

tracking and even later participation. Therefore it is also important to have information on who provides more, or any contacts. The paragraphs below indicate our analysis plan. We first begin by documenting the measures, which are in addition to the measures included in the previous analysis, that are theoretically relevant to the number of contacts a respondent provides. Finally, we address the interesting statistical aspects predicting the number of contacts.

As well, based on tracking theory we know that the closer we can get to the individual the more likely the information is to be accurate (Call et al. 1982). However, an important consideration in predicting the number of contacts supplied is that some respondents have limited family and social networks and therefore cannot provide as many contacts. Therefore, while we again control for all of the same measures as in the previous analysis predicting tracking and participation, we also include several additional measures of social networks.

The NSFH contains considerable detail on family relationships between children, siblings, and parents. This permits a count of the number of living parents, siblings, and children age 19 and older. Since a partner's parents and siblings are important contacts for most couples, the number of living partner's parents and siblings is included with the number of living biological parents and siblings. The count of children age 19 and above includes both biological and stepchildren. The total number of living parents, siblings, and children should determine the level of difficulty a respondent would have in complying with a request to name three close relatives.

The number of organizational affiliations is an indicator of the extensiveness of friendship networks in the community. The NSFH contains respondent reports on participation in 15 different kinds of organizations. Religious groups, sports groups, and school-related groups had the highest levels of participation. The organizational affiliation indicator is a sum of listed organizations that the respondent participated in at least several times a year.

Considering both family and social networks, we can determine the size of a respondent's "pool" of possible contacts. Only 42 percent of people age 19 and older reported that both their parents were still alive. For a third of the population, neither parent was still alive. When parent in-laws are taken into account, over a fourth of the sample still had no parent alive. Almost 20 percent had only one living parent, and approximately 13 percent of the population was married or cohabiting with both sets of parents still living. Thirty-six percent of respondents reported one or more adult children. Over 93 percent of respondents had at least one living brother, sister, brother-in-law, or sister-in-law. Two-thirds of all respondents indicated that they participated in at least one type of organizational activity. When all factors were combined, less than 1 percent of respondents had no family or organizational ties, with most respondents having several

ties to either family or social organizations.

Modeling the number of contacts provides an interesting statistical problem. Although the dependent variable is a count of the number of contacts given, it is unlike a standard count variable because certain values are truncated. That is, although the probability that someone would give more than three contacts may be low, because only three were requested (and recorded), we cannot know if indeed anyone would have provided any more than three.

If we did have a standard count variable we might have used a standard Poisson or negative binomial regression (Hoffmann 2004). However, in order to account for the truncation (or censoring) of those cases reporting three contacts (i.e., most would have still only given three, but some may have given more), a censored Poisson regression[2] is required (Hilbe and Judson 1999). The censored Poisson regression model can be extended to handle left- and right-censored data.

The censored Poisson regression correctly estimates regression coefficients, while adjusting the standard errors and properly weighting the data. This allows us to use more complex survey sampling weights, which in the end means more generalizable and correct population estimates. This is the first substantive application of censored Poisson regression using survey sampling weights.

Hilbe and Judson (1999:187–88) document the likelihood function as

$$L(u, X) = \prod_{i=1}^{N} f(x_i, u)^{I(p_i=1)} \left(\sum_{j=0}^{x_i} f(j, u) \right)^{I(p_i=0)} \left(1 - \sum_{j=0}^{x_i} f(j, u) \right)^{I(p_i=-1)}$$

where

- N is the number of cases;
- p_i = 1 if the ith observation is not censored, 0 if left censored, or -1 if right censored;
- $I(p_i)$ is the indicator function, taking the value 1

  when the statement in parentheses is true, otherwise

  taking the value 0;
- f is the probability density of a Poisson random variable with parameter u;
- $u = \exp(X\beta)$;

[2] We use the STATA command *Cepois*, which allows for weighted regression. We thank Joe Hilbe for modifying his *Cenpois* command to allow for weights.

- $1 - \sum_{j=0}^{x_i} f(j; u)$ is the probability of observing x_i, or more events when $E(Y) = u$;

- $\sum_{j=0}^{x_i} f(j; u)$ is the probability of observing x_i, or fewer events when $E(Y) = u$.

The model works assuming the count is non-negative; the distribution of that count can be reasonably acceptable as a Poisson distribution, and not all of the cases are censored (Hilbe and Judson 1999). A common problem in Poisson regression is that when the mean is not equal to the variance, the estimates of coefficients are consistent, but the standard errors are incorrect. For this reason robust standard errors are used when reporting significance.

As mentioned, an important aspect of this model is its ability to correctly adjust for various types of weighted data. NSFH provides a case weight that is the product of the basic sampling weight, a screening nonresponse adjustment, an interview nonresponse adjustment, and a post-stratification adjustment (a detailed explanation of the weights can be found in Appendix L of the 1988 National Survey of Families and Households Codebook). This weight is the inverse of the individual respondent's probability of selection. In order to correctly estimate the model we use these probability weights throughout our analysis.

Although the censored Poisson regression models the number of contacts, it assumes a constant effect of the predictors on the number of contacts, when in fact there may be multiple relationships. For example the model for providing any contact may be significantly different from the model of providing any or multiple contacts. To allow the models to differ in predicting the number of contacts we use a multinomial logistic regression (Hoffmann 2004; Powers and Xie 2000). We code the number of contacts into 3 groups: no contacts, only one contact and multiple contacts[3]. In order to accentuate the difference between the models predicting providing no contacts and models providing any or multiple contacts we make those providing one contact the comparison group. Because the previous censored poison model is still new and fairly untested, this also provides a nice comparison to validate our previous findings. Also, to simplify interpretation we reverse the sign of the comparison of the 0 and 1 contact groups so that we can compare each model as an increase in the number of contacts provide. All reported coefficients are exponentiated.

—Table 4 about here—

[3] The multinomial model allowing all four categories (0, 1, 2, 3) was not significantly or substantively different from this model, and so for the sake of clarity we present the three category model.

Table 4 presents the results of both the censored Poisson and Multinomial Logistic regressions predicting the number of contacts provided by respondents. In the first row all three columns indicate that men provide few contacts than women, but this effect overall seems to be small. The difference between men and women is not significant in the Censored Poisson model nor in predicting giving 1 contact over no contacts. The only significant difference indicates that men may less likely to provide multiple contacts—17% lower odds. This is to be expected since norms typically expect women to maintain family relationships, and therefore would provide more contacts (Auriat 1993).

The second and third rows provide estimates associated with age. The literature suggests that since the elderly are more disconnected from society (Quadagno 1999), they should also provide fewer contacts. There is some small evidence to suggest this is the case. From the Censored Poisson model we see that do find that every year increase in age is associated with 1 percent fewer contacts. The effect of age-squared, however, indicates that this effect does diminish overtime. Also, the multinomial model shows no significant age effect, thus suggesting that age is, in general a very small predictor of providing contacts.

Although minorities may often have extensive social networks within the community, suspicions regarding a researcher's motive for contacting them is often cited as a reason for lower minority response rates (Lewis 1972). This suspicion may also apply to requests for the names of friends and relatives. We find that race has the single largest effect on providing contacts. Looking at Censored Poisson model, compared to Whites, Blacks have about 11 percent fewer contacts, Hispanics provided over 13 percent fewer contacts, and other races provided 28 percent fewer contacts. By looking at the multinomial model, we see that although race has an effect on providing 1 contact over no contacts, it has a much strong effect on providing multiple contacts. Namely, compared to Whites, Blacks have 27% lower odds of providing one contact, Hispanics have 5% lower odds and other races had 47% lower odds. Compared to Whites, the odds of giving multiple contacts (instead on just one contact) are 37% lower for Blacks, 65% lower for Hispanics, and 56% lower for other races. All these results suggest that race has an important role in determining if someone will provide a contact and how many contacts to provide.

It is possible that some of the race effect may be stem from recent immigration to the United States and the decision not to count contacts listed from other countries. For example, many of the foreign addresses in the NSFH were in Mexico. Also, illegal alien status may have discouraged some respondents from listing any contacts in the United States. Whatever the reason, minority reluctance to cooperate or inability to provide the names of contacts makes re-

establishing contact even more difficult, which in turn makes later studies more prone to racially selective attrition.

Looking at the row examining educational attainment suggests that education has no effect on providing contacts—or at least not as specified in this measure and model.

The next set of covariates measure the marital status of the respondent in wave 1. Based on the Censored Poisson marital status has little effect on the amount of contacts provided by the respondent. One small exception is that widows seem to provide about 10% more contacts than their married counterparts. From the multinomial logistic regression we then see that much of this effect may come from widows providing multiple contacts. This result is not too surprising considering that widows/widowers are probably more closely linked to family networks since they have lost a spouse. Although a similar argument could be made for divorcees, widows often seem to receive a great deal of (and various types of) support whether needed or not, whereas divorcees may not (Miller, Smerglia, and Bouchet 2004).

The multinomial logistic appears to show one interesting marital status finding concerning cohabitation. Although the Censored Poisson model shows no significant difference from married people, the multinomial logistic regression demonstrates that cohabiters have 66% higher odds of giving one contact, compared to married people, but have 28% lower odds of providing multiple contacts. One interpretation for this is that they provide their partner's information as a way to track them, something a married person would be much less apt to do, but do not provide anyone else's. Yet another interpretation is that since cohabitation does not have the same social ties as marriage, people may only put their own parents, since most cohabiters are still fairly young (especially in the late 1980's went these data were collected), and not put the other partner's family information (Cherlin 1992; Axinn and Thornton 2000).

We note that the number of living parents, siblings, and children are all significantly (and positively) related to providing at least one contact. However, the number of family members seems to have an even stronger effect on providing multiple contacts. Thus, it may be possible that a family network has little to do with deciding to give any contacts but a great deal to do with how many contacts are given. Again, we find a positive correlation with being widowed, although it is only significant in deciding to give any contacts, not whether one provides multiple contacts. An interesting new result is that cohabiters are less likely than married respondents to provide multiple contacts. This may be due to cohabiters listing only their partner as a contact.

As with the number of family members, we see that the effects are quite small, but nevertheless they are

significant. We suggest that this is an indicator of the number of friends the person may have to list as a contact. It is also interesting to note that in the models in Table 3 we see that the effect of social organizations is slightly, although not significantly, larger for predicting whether any contacts are given than whether multiple contacts are provided.

The next set of covariates deal with where people were living at wave 1, and can easily be interpreted together. There is some evidence to suggest that people in more rural or suburban are more likely (32% and 20% higher odds) to provide multiple contacts than urban respondents, but overall there seems to be little difference. It also appears that people in the East have 58% lower odds of providing a contact than their North Central counterparts, which results in 9% fewer contacts overall.

The final six independent variables are intended to measure the respondent's pool of potential contacts, with the idea that the larger the pool of potential contacts, the higher the likelihood of providing a contact. The results of both regressions suggest this is true. We find that the for each social organization, living parent, living child not residing in the home, and each living sibling the number of contacts increases by about 1-2% This effects are not large, but altogether they can contribute to substantial differences. Particularly interesting is that, based on the multinomial regression, these networks have a much larger effect on how many contacts to give (6-25% higher odds for each person or organization) rather than whether or not to give (3-5% higher odds).

Implications for Survey Research

The preceding results fill an important gap in our current knowledge about longitudinal studies. We suggest that much of this information can be quickly integrated into the survey methods of longitudinal research to improve the quality of panel study data. Knowing that contacts are not only strong predictors of tracking between waves, but are even predictive of participation conditional being properly tracked implies that contacts are incredibly useful in multiple applications of survey research. This is particularly true since it appears that most people are willing to provide one or more contacts. Considering the cost of not collecting contacts and the relative ease of doing so, we argue that collecting contacts should become standard if it is not already.

As well, we recommend people use the contacts as a way tailor a tracking strategy for different groups. For example, as the results indicate those who provide 2 or more connects are much more likely to remain in the study, and therefore may not need a great deal of tracking energy. On the other hand, those with one or, more importantly, no

contacts should receive additional focus on tracking, including, possibly more frequent address verifications. For example people who do not provide contacts or provide only one contact may have smaller family and social networks that limit the number of names they can provide. Asking for someone who would know the respondent's whereabouts in five years might limit the choices even further. Therefore trying to improve probes or other tracking methods may be helpful for these groups. Certainly any additional effort has both financial and methodological costs, but the number of contacts may help in reducing unnecessary costs.

Of course, just because contacts are useful for the researchers, does not mean that some groups will stop providing fewer contacts. However, knowing the predictors of contacts helps in two ways. First, knowing who is likely to provide fewer contacts can help researchers prepare interviewers to probe in different ways to get the needed contacts. Second, researchers knowing before hand that certain groups will be more difficult may need to derive new methods of gaining contact information or even entirely new methods of tracking to compensate for this lack of information. Further research should be made on tracking methods of these groups with limited or less available, networks.

More specifically, returning to the concept of circles of people, we suggest that family relationships are the best source of information for quickly locating a panel member who moves. Unless a person cuts all ties, family members usually know the location and activities of other family members. For example, over 87 percent of NSFH participants reported at least one living sibling. Almost 90 percent of those with a sibling had either seen or received a letter or telephone call from a brother or sister within the last month. Of respondents with a living mother, two-thirds had talked with her or received a letter from her within the last week. Even though a person may move thousands of miles away, family relationships are usually maintained. The biggest difficulty in using family relationships to locate respondents is obtaining access to the respondent's family network. Aside from the strategies of phoning people with the same last name and contacting neighbors, there are few ways to identify family relationships other than getting the information directly from the respondent during the initial interview.

The number of family members and relatives a person can name as contacts varies considerably. The number of potential contacts is limited by the number of living parents, siblings, adult children, and relatives a respondent has. Thus, respondents with smaller kinship networks have fewer people they can list. The type and number of kin that can be mentioned also varies by the respondent's age. Younger respondents usually can name parents, grandparents, aunts, uncles, and other relatives. Among older respondents, most parents, older relatives, and many siblings may have died.

Adult children often are the only family members older respondents can name as someone who would know their whereabouts in subsequent years. Marriage increases the number of relatives a respondent can name, while a subsequent divorce may eliminate some or all of these in-laws from consideration as a contact person.

Previous tracking experience suggests that siblings may not be as good a contact source as parents and children (Call et al. 1982). Siblings often decline to provide address information for a brother or sister. Instead, they will refer the researcher to their parent for the address. This deferral by siblings appears to occur most frequently when the sought brother or sister is in some financial, marital, or legal difficulty. People who have two or fewer siblings are more likely to list no contacts or just one contact. This difference persists even when age is taken into account.

In addition to family members and in-laws, researchers often ask for the names and addresses of friends to supplement the number of contacts available for each respondent. Social relationships are supplemental because friendships tend to be transitory relationships that are largely dependent on residence and employment. When respondents move or change jobs, their friendship networks may change substantially. Also, even though the distance moved may not be great, many moves are associated with major life-course events such as home-leaving, marriage, divorce, or employment changes that disrupt previous social networks. These transitions often result in new friendship networks and a gradual loss of contact with previous friends and neighbors. Young people and those who have never married are especially difficult to locate because they move more frequently and generally have limited social networks (Bright 1967). Once the annual exchange of Christmas cards ceases and multiple moves occur, former friends and neighbors lose contact with respondents. While they may still know valuable information about the respondent, they often do not know the respondent's whereabouts. While it is easy to locate the names and addresses of neighbors through city directories and list-marketing services, it is difficult to identify respondents' friends without the respondents providing friends' names or information about organizational affiliations.

People with extensive social networks in community-based organizations make numerous acquaintances while participating in organization activities. Some of these acquaintances may become close friends, while others only know the respondent through interactions at organization meetings and activities. People who actively participate in community-based organizations are easy to locate through their acquaintances (Crider and Willits 1973). A residential move may not mean a change in church or club affiliations or employer. If a change is made, former pastors, club members, coworkers, and employers can often provide valuable information about the respondent's whereabouts or the whereabouts of another

family member. Like social relationships, however, knowledge of the respondent's whereabouts quickly fades with time and multiple moves. Nonetheless, increased participation in community organizations provides respondents with a wider range of friends who may know where the respondent has moved.

CONCLUSIONS

A key mechanism for reducing panel attrition in longitudinal research is to obtain, at the time of the initial interview, the names and addresses of each respondent's primary family (and social) contacts. When asked for the names and addresses of three relatives, about 90 percent of all respondents will provide at least one name as a contact. About half provide all three. The more contacts a respondent provides, the easier it can be to locate that respondent in the future.

There is a clear pattern between increased probability of being located later in the panel study and the number of contacts provided. Although there are significant differences between no contacts, one contact, and multiple contacts, there is no difference between two and three contacts. However, we suggest that a key part of any tracking strategy should be acquiring names and addresses for at least three relatives. The three contacts provide researchers with a sufficient number of primary family members who are the most likely to know a panel member's whereabouts. This is probably even more important for longitudinal studies that span several years. Also of note is that even conditional on being properly tracked into the next wave, people who provide more contacts are more likely to actually participate in the next wave. This information could be used in several ways to decrease panel attrition.

Relative to other variables in the model, the extent of cooperation with a request for names and addresses of family and friends is primarily dependent upon the respondent's the respondent's race, and the number of primary contacts available to a respondent. Of the social background and residence variables included in the model, race had the largest impact on the average number of contacts listed. Minorities provide a lower than average number of contacts.

As expected, the number of primary family members and relatives impacts the average number of contacts listed. Net of other variables in the model, people with fewer adult living siblings provided fewer contacts. Increased participation in organizations followed a similar pattern. Given the emphasis on relatives and the weak measurement of friendship networks, this study may not provide a good indication of the value of asking for friends as contacts. Nonetheless, participation in more organizations does increase the average number of contacts a person will provide.

These findings are applicable to requests for contacts made in a face-to-face interview. The degree to which respondents will cooperate with a request for contacts during a telephone interview or on a mail questionnaire remains

unanswered. Previous work using a mail-back questionnaire that included a request for two contact names at the end of follow-up interviews with 30-year-olds resulted in a 96 percent positive response to the request for contacts (Otto, Call, and Spenner 1981). By contrast, only 72 percent of the participants complied with a request for a contact name and address at the end of a telephone interview that was initiated using random-digit dialing procedures (Booth and Johnson 1985). This limited evidence suggests that there may be response differences among survey modes.

Locating 95 to 98 percent of panel members after a period of one year, and especially after 10 or 15 years since the first contact, does not happen by chance. A comprehensive, multimethod tracking plan must be developed to reduce panel attrition (Call et al. 1982). A major aspect of this tracking plan is to maintain contact with the respondent at least every 11 months between the waves. By using the U.S. postal forwarding service, which lasts for a year after the address change, researchers can reduce sample attrition due to mobility (Call et al. 1982).

Most respondents will provide the names and addresses of contacts if the researcher adequately explains why the contacts are needed and clearly defines the type of people who should be listed. While we did not code the presence of comments, respondents who listed fewer than the requested three contacts frequently were apologetic that they could not think of any other relative who would know where they were. A special sequence of probes for a forgotten relative or for a very close friend may be needed to obtain additional contacts. Rather than a specific probe, the NSFH only provided a set of general interviewer instructions. In retrospect, more contacts might have been obtained if a probe for close friends was included in the interview schedule.

The above findings reinforce the need for researchers to train interviewers to focus particular attention on obtaining contacts from minority respondents and respondents in the East. These respondents are less likely to provide contacts even when the number of potential contacts and their interest in the survey is taken into account. Thus, any survey or oversample of these groups is particularly prone to panel attrition. If known beforehand, special training and design may encourage more contacts and thus better long-term tracking.

Interviewer error is another source of missing contacts. Inspection of the tracking forms revealed that a few interviewers left the entire tracking page blank or filled in only a portion of the page. In some instances interviewers may have skipped the request-for-contacts page. Others may have obtained one contact and failed to ask for more. More interviewer training and closer inspection by supervisors should reduce many of these contact omission errors. This additional attention to training and supervision to ensure that contact information is available for each respondent may

cause modest increases in the cost of the initial interview, but it could preclude substantial tracking expenses to locate hard-to-find panel members during the subsequent re-interview.

On a methodological note, we find that the use of the censored Poisson model efficiently and correctly estimated our results. And although the multinomial logistic regression found some differences of note, this model provided a good summary of our findings. Considering this is the first substantive use of this model that we are aware of, we encourage others to incorporate it into their list of models. It appears to work well for count models where the counts are left or right censored. The most recent program *cepois* in STATA also allows for the inclusion of survey weights.

In sum, researchers should not be reticent to ask respondents for contacts. By training interviewers to examine the respondent's social characteristics, the number of potential family contacts, and the respondent's level of interest in the survey and by providing strategies for coping with factors that reduce the number of listed contacts, researchers can minimize the cost of future follow-ups and substantially decrease panel attrition.

REFERENCES

Auriat, Nadia. 1993. "'My Wife Knows Best': A Comparison of Event Dating Accuracy Between the Wife, the Husband, and the Belgium Population Register." *Public Opinion Quarterly* 57:165–90.

Axinn, William G. and Arland Thornton. 2000. "The Transformation in the Meaning of Marriage." P. 147-165 in *The Ties that Bind: Perspectives on Marriage* Linda Waite (ed) New York: Aldine De Gruyter.

Booth, Alan, and David R. Johnson. 1985. "Tracking Respondents in a Telephone Interview Panel Selected by Random Digit Dialing." *Sociological Methods and Research* 14:53–64.

Bright, Margaret. 1967. "A Follow-up Study of the Commission on Chronic Illness Morbidity Survey in Baltimore: I. Tracing a Large Population Sample over Time." *Journal of Chronic Disabilities* 20:707–16.

Call, Vaughn R. A. 1991. "Keeping Track of Panel Members in Longitudinal Research: The Experience of the National Survey of Families and Households." University of Wisconsin-Madison: NSFH Working Paper #38.

Call, Vaughn R. A., Luther B. Otto, and Kenneth I. Spenner. 1982. *Tracking Respondents: A Multi-Method Approach*. Lexington, MA: Lexington Books.

Cherlin, Andrew J. *Marriage, Divorce, Remarriage, Revised and Enlarged Edition* Cambridge, MA: Harvard University Press.

Clarridge, Brian R., Linda L. Sheehy, and Taissa S. Hauser. 1978 "Tracing Members of a Panel: a 17-Year Follow-up." Pp. 185-203 in *Sociological Methodology,* edited by Karl F. Schuessler. San Francisco: Jossey-Bass.

Coen, Anita S., Diane C. Patrick, and David L. Shern. 1996. "Minimizing Attrition in Longitudinal Studies of Special Populations: An Integrated Management Approach." *Evaluation and Program Planning* 19(4):309–19.

Cohen, Evan H., Carol T. Mowbray, Deborah Bybee, Susan Yeich, Kurt Ribisl, and Paul P. Freddolino. 1993. "Tracking and Follow-Up Methods for Research on Homelessness." *Evaluation Review* 17(3):331–52.

Couper, Mick P. 1997. "Survey Introductions and Data Quality." *Public Opinion Quarterly* 61(2):317–38.

Crider, Donald M., and Fern K. Willits. 1973. "Respondent Retrieval Bias in a Longitudinal Survey." *Sociology and Social Research* 58:56–65.

Crider, Donald M., Fern K. Willits, and Robert C. Bealer. 1971. "Tracking respondents in longitudinal surveys." *Public*

Opinion Quarterly 35:613–20.

Dillman, Don A. 1978. *Mail and telephone surveys: The total design method.* New York: Wiley-Interscience.

Dillman, Don A. 2000. *Mail and internet surveys: The total design method.* New York: Wiley & Sons.

Dodds, Suzanne, Andy Furlong, and Linda Croxford. 1989. "Quality and Quantity: Tackling Non-Contact Attrition in a Longitudinal Survey." *Sociology* 23(2):275–84.

Ellickson, Phyllis L., Domenica Bianca, and Diane C. Schoeff. 1988. "Containing Attrition in School-Based Research: An Innovative Approach." *Evaluation Review* 12(4):331–51.

Freedman, Deborah S., Arland Thornton, and Donald Camburn. 1980. "Maintaining Response Rates in Longitudinal Studies." *Sociological Methods and Research* 9:87–98.

Goudy, Willis J. 1990. "Community Attachment in a Rural Region." *Rural Sociology* 55:178–98.

Gregory, Marilyn M., Mary J. Lohr, and Lewayne D. Gilchrist. 1992. "Methods for Tracking Pregnant and Parenting Adolescents." *Evaluation Review* 16(1):69–81.

Groves, Robert M. 1989. *Survey Errors and Survey Costs*. New York: John Wiley & Sons.

Groves, Robert M., and Lars E. Lyberg. 1988. "An Overview of Nonresponse Issues in Telephone Surveys." Pp. 191–211 in *Telephone Survey Methodology,* edited by Robert M. Groves, Paul P. Biemer, Lars E. Lyberg, James T. Massey, William L. Nichols II, and Joseph Waksberg. New York: John Wiley & Sons.

Groves, Robert M., and Mick P. Couper. 1998. *Nonreponse in Household Interview Surveys* New York: John Wiley & Sons.

Groves, Robert M., Floyd J. Fowler, Jr., Mick P. Couper, James M. Lepkowski, Eleanor Singer, and Roger Tourangeau. 2004 *Survey Methodology* New York, NY: John Wiley and Sons.

Groves, Robert M., Stanley Presser, and Sarah Dipko. 2004. "The Role of Topic Interest in Survey Participation Decisions." *Public Opinion Quarterly* 68:2–31.

Halaby, Charles. 2004. Panel Models in Sociological Research: Theory into Practice *Annual Review of Sociology* 30:507–544.

Hilbe, Joseph, and Dean H. Judson. 1999. "Right, Left, and Uncensored Poisson Regression." P. 94 in *Stata Technical*

Bulletin Reprint, vol.8. College Station, TX: Stata Press.

Hoffmann, John P. 2004. *Generalized Linear Models: An Applied Approach*. Boston: Allyn and Bacon.

Kandel, Denise, Victoria Raveis, and John Logan. 1983. "Sex Differences in the Characteristics of Members Lost to a Longitudinal Panel: A Speculative Research Note." *Public Opinion Quarterly* 47:567–75.

Kish, Leslie. 1987. *Statistical Design for Research*. New York: John Wiley & Sons.

Lewis, Morgan V. 1972. "Finding the Hard-to-locate: A Review of Best Practices." Pp. 165–73 in *Evaluating the Impact of Manpower Programs,* edited by Michael E. Borus. Lexington, MA: Lexington Books.

Little, Roderick J. and Donald B. Rubin. 2002. *Statistical Analyses with Missing Data*. New York, NY: John Wiley and Sons.

Long, J. Scott, and Jeremy Freese. 2003. *Regression Models for Categorical Dependent Variables Using Stata*. College Station, TX: Stata Press.

Miller, Nancy B., Virginia L. Smerglia, and Nicole Bouchet. 2004. "Women's Adjustment to Widowhood: Does Social Support Really Matter." *Journal of Women and Ageing* 16(3/4):149–66.

Ortiz, Vilma and Estela G. Ballon. 2007. "Longitudinal Research at the Turn of the Century: Searching for the Mexican American People."*Sociological Methods Research* 36: 112-137.

Otto, Luther B., Vaughn R. A. Call, and Kenneth I. Spenner. 1981. *Design for a Study of Entry into Careers.* Lexington, MA: Lexington Books.

Phelps, Erin, Frank F. Furstenburg, and Anne Colby (Eds.). 2002. *Looking at Lives: American Longitudinal Studies of the 20th Century*. New York: Russell Sage Foundation.

Powers, Daniel A., and Yu Xie. 2000. *Statistical Methods for Categorical Data Analysis*. Boston: Academic Press.

Quadagno, Jill. 1999. *Aging and the Life Course*. New York: McGraw Hill.

Ribisl, Kurt M., Maureen A. Walton, Carol T. Mowbray, Douglas A. Luke, William S. Davidson II, and Bonnie J. Bootsmiller. 1996. "Minimizing Participant Attrition in Panel Studies through the Use of Effective Retention and Tracking Strategies: Review and Recommendations." *Evaluation and Program Planning* 19(1):1–25.

Schachter, Jason P. 2004. "Geographic Mobility 2002 to 2003"

Current Population Reports P20-594 Washington D.C.:
U.S. Census Bureau.

Sweet, James A., Larry L. Bumpass, and Vaughn R. A. Call. 1988. "The Design and Content of the National Survey of Families and Households." University of Wisconsin-Madison: NSFH Working Paper #1.

Temme, Lloyd V. 1975. "The History and Methodology of the 'Adolescent Society' Follow-up Study." Washington, D.C.: Bureau of Social Science Research.

Thomas, Duncan, Elizabeth Frankenberg, and James P. Smith. 2001. "Lost But Not Forgotten: Attrition and Follow-up in the Indonesia Family Life Survey." *Journal of Human Resources* 36(3): 556-592.

Thornton, Arland, Deborah S. Freedman, and Donald Camburn. 1982. "Obtaining Respondent Cooperation in Family Panel Studies." *Sociological Methods and Research* 11:33–51.

United States Bureau of the Census. 1989. Statistical Abstracts of the United States. Washington D.C.: United States Government Printing Office.

Table 1 Means, Standard Deviations, Medians, and Count of Valid Responses

Variables	Range	Statistics Weighted Mean	Median	N (of 13,007)
Contacts	0–3	2.05	2	13,007
0		0.11		
1		0.19		
2		0.25		
3		0.45		
Sex (Male=1)	0–1	0.47	0	13,007
Age	19–95	43.37	38	13,003
Race	0–1		NA	12,982
White		0.80		
Black		0.11		
Hispanic		0.07		
Other		0.02		
Educational Attainment	0–20	12.56	12	12, 952
Marital Status	0–1		NA	13,006
Married		0.61		
Cohabitating		0.04		
Separated/Divorced		0.09		
Widow(er)		0.07		
Single		0.18		
Urbanicity	0–1		NA	13,007
Urban		0.75		
Suburban		0.16		
Rural		.008		
Region	0–1		NA	13,007
North Central		0.25		
East		0.22		
West		0.20		
South		0.34		
# Social Organizational Ties	0–15	1.90	1	13,007
# Living Parents	0–4	1.67	2	13,007
# Living Children	0–12	1.17	0	12,996
# Living Siblings	0–30	4.49	4	12,981
# Times Married	0–7	0.99	1	13,001
From an Intact Family	0–1	0.69	NA	13,005

Table 2 Logistic Regression Predicting Respondent Tracking and Participation
(All effects are exponentiated—e ^{coefficient})

Variables	Odds Ratios: Located Between Waves		Odds Ratios: Conditional on Being Located, Participating in wave 2	
Contacts				
0	--	--	--	--
1	1.81***	1.92***	1.48***	1.34**
2	3.32***	2.90***	1.88***	1.63***
3	4.40***	2.97***	2.34***	1.92***
Sex (Male=1)		0.71***		0.69***
Age		1.04		1.04***
Age-Squared		1.00		.99***
Race				
White		--		--
Black		0.42***		1.01
Hispanic		0.36***		0.84
Other		0.32***		0.47***
Educational Attainment		1.13***		1.08***
Marital Status				
Married		--		--
Cohabitating		0.56***		0.97
Separated/Divorced		0.53***		1.05
Widow(er)		0.58*		0.99
Single		1.01		1.02
Urbanicity				
Urban		--		--
Suburban		2.36***		1.11
Rural		1.68*		1.13
Region				
North Central		--		--
East		0.87		0.78*
West		0.54***		0.87
South		0.57***		0.83*
N	13007	12939	12255	12194
df	3	19	3	19
Log-pseudolikelihood	-2474.17	-2075.56	-5873.34	-5339.86

Table 3 Predicting the Number of Contacts-Censored Poisson and Multinomial Logistic Regression
(All effects are exponentiated—$e^{coefficient}$)

		Multinomial Logistic	
Independent Variables	Censored Poisson	1 compared to 0	Multiple compared to 1
Sex (Male=1)	0.98	0.92	0.83***
Age	0.99*	0.98	1.01
Age-Squared	1.00*	1.00	1.00
Race			
White	--	--	--
Black	0.89***	0.73*	0.63***
Hispanic	0.87***	0.95	0.35***
Other	0.72***	0.53*	0.44***
Educational Attainment	1.01	1.03	1.00
Marital Status			
Married	--	--	--
Cohabitating	1.03	1.66***	0.72*
Separated/Divorced	1.00	0.83	1.12
Widow(er)	1.10*	1.17	1.26*
Single	1.03	0.82	0.92
Urbanicity			
Urban	--	--	--
Suburban	1.01	1.21	1.20*
Rural	1.02	1.29	1.32*
Region			
North Central	--	--	--
East	0.91***	0.42***	1.09
West	0.98	0.68*	0.97
South	1.00	0.90	0.98
# Social Organizational	1.01***	1.05*	1.07*
# Living Parents	1.02*	0.99	1.25*
# Living Children	1.01*	0.99	1.14*
# Living Siblings	1.01*	1.03*	1.06*
# Times Married	0.99	1.04	0.92
From an Intact Family	0.97	0.82*	0.97
N	12894	12892	
df	22	44	
Log-pseudolikelihood	-9226.87	-9700.52	

*p<.05 **p<.001