Understanding the Causes, Relationships, and Consequences of the Undercount of Divorce in Surveys

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The Underreport of Divorce

In 1979, Samuel Preston and John McDonald reported that in estimating the proportion of marriages ending in divorce by 1970, the estimates using vital statistics data and the estimates using census data were dramatically different. In fact every year from 1919 until 1968 vital statistics data suggested higher proportions divorcing compared to census records. Even more troublesome was that the difference in the estimates ranged between 25% and 45% every year. Not surprisingly they stated that this discrepancy between the two data sources suggested serious questions as to the quality of data on the American family and divorce (Preston and McDonald 1979, p. 4).

After further investigation, Preston and McDonald (1979) suggested that although mortality and errors in vital registration may contribute to the error, the bulk of the discrepancy was to be found in the census estimates. In support of their argument they related that using a match of Census returns and individual's responses to the Current Population Survey, the Census Bureau (1975) found that the inconsistency ratio (or the ratio of the response variable over the total variance) was low for singles (between .02 and .03), and for married people (between .02 and .03) for both 1960 and 1970. However, the same inconsistency ratio was much higher, between .22 and .30, for divorce over the same time period. This suggested particularly high error for divorce reports even compared to other marital reports. Similarly, they point to Jacobson (1959) who reported that the census underestimated divorces by 20-29%. Also, in a study by the Census Bureau (1966) where 554 people who Vital Statistics recorded as divorced in March 1960 were matched to their April 1960 Census form only 75.5% reported being divorced, 9.6% reported being married, 5.4% reported being separated, 7.4% as single or widowed, 2.2% did not report any marital status and 0.6% did not respond to the survey. Using this evidence Preston and McDonald (1979) attribute people's failure to report the divorce in the census to the negative image of divorce.

One decade later McCarthy, Pendleton, and Cherlin (1989) argued that the underestimate of divorce was not just an issue of the census, but rather that it was an issue with survey data (compared to register data). More specifically, they were concerned with retrospective marital data collection. The comparison of the June 1980 CPS estimates and the Vital Statistic counts of the number of divorces from 1945-1978 supported past evidence that surveys underestimate divorce. Similarly, Bumpass and Raley (2003) used the 1980 and 1985 CPS to estimate the duration-specific proportion divorced in 1975. Again they found the CPS estimates were lower than the Vital Statistic measurements, but they only found the CPS to be about 8% lower. Interestingly, they also found that the underestimation increases with duration. Finally, it should be noted that recently Goldstein (1999) suggested that by using the CPS to calculate both the numerator (the number of divorces) and the denominator (the number of married women 15+, or married population), instead of just estimating the numerator, divorce rate estimates were actually closer to vital statistics. However, Goldstein's estimates still have a good deal of error, and they tend to overestimate divorce when compared to vital statistics.

Gender Differences in Reports

Along with documenting the underestimation of divorce, researchers also found that men more severely underestimated divorce than women (U.S. Bureau of the Census 1975; Preston and McDonald 1979; McCarthy, Pendleton, and Cherlin 1989). For example, when the Census Bureau (1975) found that the inconsistency ratio for divorcees was .30 in 1960 and .22 in 1970, they also found that the inconsistency ratio for males in 1960 was .37, while for females it was 0.23 (the respective estimates for 1970 are .24 and .19). McCarthy, Pendleton, and Cherlin (1989) found that men report 85% of the divorces women report. Even after controlling for men's higher mortality rates (which may result in fewer reports than women), men under reported divorce compared to women (McCarthy, Pendleton, and Cherlin 1989). The one important note is that McCarthy et al (1989) also found that for divorces that occurred in 1950 (as reported in the 1980 CPS) women actually underestimated divorce more than men. They suggested that this might be

due to divorced women who, after their former spouse dies, report themselves as widowed. Nevertheless, at least in divorces that occurred more recent to the interview (with 25 years) men appear to consistently underreport divorce compared to women.

Understanding how the underestimate of divorce occurs, and what factors are related to the underestimate is critical for the continuing study of divorce. With vital statistics is no longer compiling national data, divorce rates must now be calculated using some form of survey-collected data (Bramlett and Mosher 2002). However, even if vital statistics remained fully functional, a larger issue concerning the underestimates remains. As Preston and McDonald (1979) suggested, one possible cause of the divorce underreport is that divorcees are not recording they are divorced on surveys. This would not be a problem if not responding tended to be randomly distributed among the divorced population, the only loss would be in sample size. However, the bigger issue is if they respond to the question, but provide the incorrect answer. For example if a divorcee reports themselves as married or single, then studies of factors predicting divorce may have model misspecification. In fact some variables that may be associated with divorce may not present themselves (or they may be greatly attenuated) because, although the researcher is expecting to compare the divorced to the non-divorced, in fact they are most likely comparing the divorced to the non-divorced and some divorced[1]. Similarly, in studies where marital status or marital history is important, the error of the divorce measurement may cause model misspecifications. The extent to which the underreporting of divorce may affect studies depends on the causes of underreporting divorce.

Survey Methodology

Survey methodology provides a framework from which to describe the causes of the divorce underreport. To borrow from fertility studies, survey methodology can provide "proximate determinants" of divorce reporting error. That is, any factor that affects underreporting divorce must affect the estimate through one of the survey methodology errors. Groves et al (2004; see figure 2.5) outlines nicely the stages a survey must pass through in order to arrive at a survey statistic. In fact, it is the transition from each stage to the next stage where error and bias enter into the estimate. Initially, the survey begins on two fronts: the measurement process and the representation process. The stages of measurement progress: from a construct, to a measure, to a response, and then to an edited response. Representation first begins with a target population, followed by the sampling frame, then the sample, the respondents, and the final stage is the post-survey adjustments. Finally the post-survey adjustment and the edited response combine to make the survey statistic. It is important to note that all survey statistics have some error; it is only when this error is systematic that the error becomes a bias that affects the results.

For divorce, measurement quality may decrease throughout the measurement process. For example, if the final statistic we want to estimate is the number of divorces in a year, and then the initial construct may be the number of divorces in a specific year. Next, as researchers, we design a measurement strategy, and in this case, we may ask respondents, "When did you separate?" The extent to which the construct and the measurement overlap is the measure's validity. In this case, the measure of "When did you separate?" may not be a valid measure of the construct of divorce. Similarly, the measurement error expresses how much overlap exists between the measurement and the respondent's response. One example of measurement error is if we are asking if someone divorced in 2004 and they respond yes, but in fact they divorced in 2003. Finally, the last error occurs when the response is modified during the processing stage. For example a researcher might determine that someone who recorded they were divorced two times in one year must have been a made an error and then recodes the response to only one divorce, when in truth the person divorced in January of the year, remarried a couple months later and then divorced in December.

[1] Although it is possible for people who are not divorced to report being divorced, the occurrence of this error is most likely very low (Preston and McDonald 1979).

Although there are only three intermediate factors affecting the measurement quality of a survey statistic there are actually several issues within each factor. Prior to discussing the intermediate factors separately, I argue that although processing errors do exist, they are not likely to cause the systematic bias against reporting divorce. For this to be true I assume that the processing error is randomly distributed across all cases. If this is not the case then some bias due to processing error exists. Later I outline how both validity and measurement error may lead to underestimates of divorce.

The other set of proximate determinants of statistic quality deal with the representation of the survey statistic. Again, assuming we want the number of divorces in a year as the survey statistic, our target population may be the married population of the United States in that year. Coverage error is due to the lack overlap between the sampling frame and the target population. In our example, a coverage error may occur if our study was a telephone survey and divorced people were less likely to have phones than people who remained married. Sampling error is one error specifically designed into the study. That is, because it is so costly to interview everyone, we typically draw a smaller set of individuals from the sampling frame. The sampling error then is based on the degree to which the sample correctly represents the sampling frame for a set of characteristics. Interestingly, the only error of representation that is attributable directly to the respondents is the nonresponse error. Nonresponse error occurs when not all the sampled individuals participate in the survey. Thus if divorced people are less likely to respond we have a systematic bias due to nonresponse. The final error again is due to the researcher. By using information about the target population, or nonresponse patterns, etc, researchers often attempt to account for other error using greater weights for those cases that are underrepresented in the data. Although the adjustments can help, they are also a source possible error.

Within the four errors of representation I will only focus on two: coverage error and nonresponse error. Although sampling error will induce error in the survey statistic, it is not expected to have differential effects by marital status, and thus cannot be the cause of the bias in divorce (Kish 1965). Similarly adjustment error may be inducing error and even bias into divorce statistics, but since adjustments are normally related to coverage error and nonresponse error, by understanding those we should reduce the effect of adjustment error on divorce. Following paragraphs describe in greater detail how coverage error and nonresponse error may cause bias in divorce reporting.

For each of these types of error there are factors that may be associated with that error. One of the largest factors is the sex of the person (Auriat 1993). It is well documented that, compared to women, men tend to recall and report marital histories, fertility and other family history events with greater error (Auriat 1993;McCarthy, Pendleton, and Cherlin 1989; Preston and McDonald 1979; Mott et al 2003). Thus, along with testing various hypotheses for which factors are important in different errors, I also hypothesize and examine how these factors may affect the gender difference in divorce reporting quality.

Data

In order to understand the source of report bias on divorce, I use data collected by researchers at the University of Wisconsin-Madison from the Life Events and Satisfaction Study in 1995. The state of Wisconsin provided access to divorce records and staff in the office of the State Registrar of Vital Statistics extracted a list of all divorce decrees[2] that occurred in 1989 and 1993 in Columbia, Dane, Rock and Sauk counties. From the sampling frame, for both of the

[2] The divorce decree certificate contains the full name, state, county of residence, birth dates of both the wife and the husband, the wife's maiden name, the date and location of marriage, the date of separation, the number of children under 18 in the family, who gained custody of the children and the date of divorce the female's name if changed, the name and office address of the lawyer who filed the petition, number of marriages, education and race of both partners. Although the divorce date and custodial assignments are recorded by the court clerk, and are assumed to be accurate, the other information about both spouses is provided by the person filing for the divorce petition. As a result, some personal information may be inaccurate, especially for the non-filing spouse.

years, 1,074 divorces (of about 2,400 divorces per year) were randomly selected. These divorces were randomly assigned to one of three modes: mail questionnaire, computer aided telephone interviewer (CATI), and computer aided personal interview (CAPI). To minimize the effect of questionnaire design, researchers wrote identical interview schedules for the telephone and personal interviews and placed both on computer. The mail questionnaire was modified so a person could complete the same survey questions without the aid of an interviewer. Researchers then randomly selected one respondent from each divorced couple. The study began in the fall of 1995 and ended in March of
1996.

Analysis

The analysis proceeds in three stages. First based on the framework of survey methodology I decompose the bias in the underestimation of divorce into four errors: validity, measurement error (due to both retrospective recall error and motivated misreporting), coverage error, and nonresponse (unit non-contact, unit refusal, item nonresponse). I do this by calculating the proportion to "succeed" in one error, conditional on passing previous errors. For example, conditional on responding to the survey what proportion respond to the marital questions.

The second stage of the analysis uses individual and couple level information to predict the different errors mentioned above. For example, the model of measurement error due to retrospective recall error examines the amount of error in months between the reported and official divorce dates by using a negative binomial regression. For most of the models of error logistic regression is used as the errors are actually binary outcomes (they did or did not refuse the survey, they did or did not respond to the marital history questions, etc). Again hypotheses based on the literature are tested on the different errors (i.e. the effect of having custody of the children on recall, the effect of a new spouse on reporting a previous divorce, etc). Particular emphasis is placed on the gender differences in error, and factors that may explain those differences.

The final stage of the analysis takes the information gained from the decomposition and simulates their effects in a survey study of divorce. Using duration specific probabilities of divorce from the National Study of Family Growth I impute enough marriages to compensate for the divorces already in the study. Then using the different errors I examine their effects on calculating divorce reports from survey data. Thus by adjusting the four errors analyzed in the first stage we can see the effect on unit nonresponse and retrospective recall (as well as other errors) on the estimation of year-specific divorce rates, individual event history models, and even the effects of error on factors predicting divorce (i.e. being divorced).

Results

Several results are already apparent. For example, issues of unit nonresponse and coverage errors explain much of the underestimation of divorce. However, nearly 10% of those divorcees who respond to the marital history questions do not record that they are divorced. Also, nearly 90% of those who reported being divorced are provide a divorce date within 6 months of their certificate divorce date, and 60% are correct to the month. As well, women's higher divorce date accuracy is significantly attenuated when child custody is included. Surprisingly few mode effects (between Mail, Telephone and Face-to-Face) are evident.

In the conclusion possible solutions to the divorce underestimation are discussed, especially weighting due to nonresponse. Also, other methods to reduce recall error are suggested. Suggestions as to handle coverage errors through multiple modes are briefly discussed. Limitations and future directions are also mentioned.