

Causes and Effects of Nonparticipation in a Child Support Survey

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This study uses the child support payment behavior of divorced nonresident fathers as a case study to examine two topics: the causes of survey nonparticipation and the effects of nonparticipation on survey estimates. This analysis includes 893 fathers who filed for divorce in Wisconsin between 1986 and 1988. The results suggest that nonresponding fathers differ from responding fathers not only in the amount of child support paid but also in several other ways. Moreover, factors that predict whether fathers will be located differ from factors that predict whether located fathers will participate in the survey. Characteristics that are associated with mobility, such as home ownership, predict location but not participation. We find significant negative correlations between the errors in the location and payment equations, and between the participation and payment equations. But the exclusion of unlocated fathers and nonparticipating fathers does not substantially change either the direction or the magnitude of the effects of factors predicting child support payments.

Key words: Unit nonresponse; nonresponse errors; nonresident fathers; selection bias.

1. Introduction

Unit nonresponse is an important problem for researchers using survey data because survey estimates based on a nonrandom subset of a sample may be biased. The extent to which unit nonresponse introduces bias into survey-based estimates of means, for example, depends both on the proportion of the potential respondents who do not participate in the survey and on how different respondents are from nonrespondents (Groves 1989, p. 134). Surveys rarely achieve participation of all sample members, because research budgets are constrained, potential respondents are not always willing or able to be interviewed, and some research topics are sensitive. The reasons for nonparticipation may also be associated with differences between those who participate and those who do not. Thus, researchers frequently need to estimate how survey nonparticipants differ

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from participants, and to search for ways to adjust estimates for errors introduced by unit nonresponse.

Researchers encounter at least two difficulties in developing statistical methods to adjust for nonparticipation errors. First, information about survey nonparticipants that is needed to validate the adjustment methods is not usually available. For instance, researchers have used weighting schemes to adjust for nonparticipation errors in estimating sample means. The weighting schemes rely heavily on assumptions about how different groups of nonrespondents, if they were to respond, might resemble groups of respondents (Drew and Fuller 1980, 1981; Kalton 1983; Thomsen and Siring 1983; Potthoff, Manton, and Woodbury 1993). However, it is only when there is information about the characteristics of survey nonparticipants, that the accuracy of the assumptions behind the weighting schemes can be assessed (e.g., Lin and Schaeffer 1995). Second, even when researchers are able to obtain information about survey nonparticipants, the information is usually limited to social attributes (e.g., sex, age, education, or residence). Thus, the data that are usually available do not allow researchers to view nonparticipation as a dynamic process in which factors such as field efforts, characteristics of research subjects, and aspects of the study design all may affect potential respondents' decisions to participate in a survey (Groves and Couper 1995). It is even less common for researchers to be able to distinguish between factors that affect two types of survey nonparticipation: failure to locate potential respondents and failure to convince those who are located to participate in the interview. Yet the factors that predict location and participation conditional on location may differ (Groves and Couper 1998).

This study uses the child support payment behavior of divorced nonresident fathers as a case study to examine two topics: the causes of survey nonparticipation and the effects of nonparticipation on survey estimates. Two features distinguish this study from most other studies. First, this study uses a unique data set from court records and calling records in which we have information about survey participants as well as nonparticipants. Second, this study considers the process of survey participation as consisting of two distinct stages – first locating fathers and then interviewing located fathers. We explore factors that are associated with the processes of locating and participating, and examine the extent to which excluding unlocated fathers and fathers who refuse may bias survey estimates of factors that predict child support payments.

Three sets of research questions are addressed. First, how do fathers who do not participate differ from fathers who do? Specifically, how do unlocated fathers differ from located fathers? How do fathers who refuse differ from fathers who are interviewed? Second, what factors predict whether fathers will be located, and what factors predict whether located fathers will participate? The two outcomes are likely to respond to different sorts of field effort; and the personal characteristics of fathers who are difficult to locate may be different from the personal characteristics of fathers who are difficult to persuade. Finally, to what extent are estimates of factors that predict child support payments biased because they are based on a nonrandom subset of fathers who participate in the survey? Can the errors be corrected by incorporating the information about the difficulty of locating fathers and the reluctance of fathers to participate in the survey?

The results suggest that nonresponding fathers are very different from responding fathers not only in the amount of child support paid but also in several other ways.

Moreover, factors that predict whether fathers are located are different from factors that predict whether located fathers participate in the survey. The negative error correlation between the location equation and the payment equation and that between the participation equation and the payment equation are significantly different from zero. However, including the selection correction in the substantive equation does not substantially change either the direction or the magnitude of the effects of factors predicting child support payments.

This article is organized as follows. The next section discusses reasons why unit nonresponse is an important concern in child support studies that rely on the reports of interviewed fathers. The third section introduces the data and the sample. The fourth section shows the extent to which fathers who respond differ from those who do not. The fifth section presents the analysis of factors predicting whether fathers will be located and whether located fathers will participate. The sixth section examines the impact of sample selection bias on regression coefficients estimating the factors that predict child support payments in regression models. The final section summarizes the results and discusses the implications of the findings for future research.

2. Nonparticipation of Fathers Is an Important Concern in Child Support Studies

Among children in single-parent households in the United States, living with mothers is still the most frequent physical custody arrangement (Saluter 1997). Children who live with single mothers suffer economic disadvantages compared to children in two-parent households (McLanahan and Sandefur 1994). Financial contributions from nonresident fathers improve the economic security of such children (Garfinkel 1992). Therefore, concern about the economic security of children has motivated research on factors affecting the amount of support that nonresident fathers pay (e.g., Wright and Price 1986; Garfinkel and Oellerich 1989; Sonenstein and Calhoun 1990; Beller and Graham 1993; Peters, Argys, Maccoby, and Mnookin 1993). Recent attempts to reform the system for collecting child support further emphasize the importance of reporting fathers' own views of their "fatherhood." Such studies rely heavily on the reports of interviewed fathers, but the research tends to use highly selected samples because nonresident fathers have low rates of survey participation and because those who participate differ from those who do not (Schaeffer, Seltzer, and Klawitter 1991).

2.1. Low survey participation rate

Past studies of child support have relied mainly on the reports of interviewed parents about the amount paid or received, and these studies tend to suffer from lower survey participation rates compared with surveys conducted in general population samples. For child support researchers, surveys with participation rates of approximately 60% are considered valuable sources of information about child support arrangements (Maccoby and Mnookin 1992). Probably partly because fathers are child support payers in most cases and failure to comply with child support obligations is labeled as "delinquency" and could be punished if a noncompliant father is caught, the participation rates of nonresident fathers are much lower than those of resident mothers (e.g., Cherlin, Griffith, and McCarthy 1983; Schaeffer, Seltzer, and Klawitter 1991; Seltzer and Brandreth 1995; Sorensen 1997). Moreover, in studies that use court-based samples, the instability of fathers' employment

may also affect both how difficult it is to locate fathers and the amount of child support they pay; this is because a father without a stable job is more likely to move and to be poor. Thus, achieved samples of fathers tend to be highly selected; resulting survey estimates of means and proportions of variables concerning legal agreements, visitation, child support payments, and conflict about children differ from the estimates obtained using achieved samples of mothers (Seltzer and Brandreth 1995).⁴

2.2. Nonresponding fathers differ from responding fathers

Using survey data may yield incorrect estimates of the factors that predict child support transfers because fathers who participate differ from those who do not in how much child support they owe and how much they pay. In an earlier study that used court records as a criterion for evaluating survey responses, Schaeffer, Seltzer, and Klawitter (1991) found that nonresponding fathers are less likely to have a child support order and less likely to pay support than responding fathers and that the average amount of support owed and paid is lower for nonrespondents than for respondents. These findings suggest that amounts of child support ordered and paid are associated with the likelihood of completing an interview.

Survey nonparticipants are a heterogeneous group. For instance, using court records as an external criterion, Lin and Schaeffer (1995) found that fathers who are not located owe and pay much less support than those who are located but refuse to be interviewed. Similarly, Braver, and Bay (1992) found that unlocated fathers are more likely to have mother-only legal custody than fathers who refuse. Unlocated fathers are also less likely to have specific visitation arrangements and to include medical expenses in their divorce decrees than fathers who refuse. These results suggest that unlocated fathers and fathers who refuse differ not only in their child support orders and payments but also in legal arrangements that may affect child support transfers.

Thus, when child support researchers examine the extent to which survey statistics that predict child support payments are biased because they are based on a nonrandom subset of fathers who participate in surveys, it is important to bear in mind that nonresponding fathers are themselves not a homogeneous group. Because we, like many researchers who study separated families, use a court-based sample in this study, fathers have to be located before they are interviewed. The inability to locate potential respondents and to interview fathers who are located are the two main sources of nonparticipation in this study. Thus, before we examine the extent to which the nonrandom sample of survey participants biases findings about sources of variation in child support payments, we explore the differences between survey nonparticipants and participants and examine whether the factors that predict location differ from factors that predict participation. Our analysis uses unique data in which we match court records, records of field effort in tracking and contacting possible survey participants, and survey reports about child support to examine the impact of sample selection bias on regression coefficients in estimating child support payments. The data and the sample are described in the following section.

⁴ Part of the difference between interviewed fathers' and mothers' reports may be due to response errors. This article focuses on how unit nonresponse biases estimates of factors predicting self-reported child support payments. For a review of how response errors affect fathers' and mothers' reports of child support, see Schaeffer (1994), Dykema (1996), and Schaeffer, Seltzer, and Dykema (1998).

3. Data and Sample

Three data sets are used for this analysis. The first data set is the Wisconsin court record database (CRD) which documents the content of child support arrangements for those cases that entered the court system between July 1986 and June 1988 from 20 Wisconsin counties through December 31, 1989. The CRD provides characteristics of both parents, such as parent's income, the number of children who were under age 19 and eligible for child support, marriage date, and the dates of the final judgment and temporary child support order. Moreover, the CRD records information on various aspects of the divorce process, including such characteristics as the date of filing for divorce, features of child support orders and property settlements, whether the Wisconsin uniform guideline was used to determine a child support order, the use of attorneys, and custody arrangements.

The second data set is Parent Survey 2 (PS2) which consists of telephone interviews with both resident and nonresident parents whose court cases were in the CRD. This survey was conducted by the Institute for Research on Poverty (IRP) at the University of Wisconsin-Madison in 1989 and used the previous year (1988) as the reference period for asking parents about their child support arrangements and obtaining information about the income, education, residence, and marital status of each parent. We use CRD information through December 31, 1988 to match the reference period in the survey question. All court cases in the sample had a temporary child support order before January 1, 1989, but did not necessarily have a final judgment before that date. If the parent's divorce was final before January 1, 1989, the court record information at the final judgment is used. This applies to 84% (754/893) of the cases. Information from the temporary order is used if the information at the final judgment is missing or if the parent's divorce was not finalized before January 1, 1989.

The last data set is the Calling Record (CS2), which documents all calls made to locate and interview potential survey participants in the PS2. This data set includes information about the source of each telephone number, the number of calls made to locate or interview parents, and the result of each call. Before the start of the survey, we obtained most parents' addresses or telephone numbers from court records; in addition we consulted files of the Department of Transportation, the Department of Revenue, Unemployment Compensation, Aid to Families with Dependent Children, the Division of Corrections, and the reports of sampled parents' ex-spouses. For those parents for whom we could not find any telephone number but had their addresses, we tried to locate their telephone numbers from Directory Assistance and wrote to the parent to request a telephone number. All available telephone numbers were called until a potential survey participant was contacted. Parents who were located but refused the interview were sent a letter to ask them to reconsider the decision, and the refusal cases were referred to three experienced interviewers for further attempts. After the second refusal, refusal conversion efforts stopped and a final refusal code was assigned to the case (for a detailed description of the field work, see Bartfeld 1991).

We analyze 893 of 924 divorced nonresident fathers whose children lived with their mothers more than half of the time that the two parents lived apart in 1988. We excluded 31 fathers for the following reasons: those parents who were reported overseas ($N = 5$), those who were reported deceased ($N = 3$), those who were not contacted because of

project errors ($N = 3$), and those for whom no telephone numbers were found ($N = 20$). Of 893 fathers in the sample, 677 were located (76%), and 514 participated in the survey (58%). The CRD and CS2 provide information for both survey participants and nonparticipants; the PS2 has information only from survey participants. The combination of court records, field effort data, and survey reports follows the design used by Lin and Schaeffer (1995) for a different field effort and sample.

4. Comparison between Responding Fathers and Nonresponding Fathers

We use information from the court records to examine the extent to which survey nonparticipants differ from survey participants. The comparison consists of two parts. First, we examine the extent to which the median and mean amounts of child support paid differ for respondents and nonrespondents; this descriptive analysis allows us to compare our sample to samples used in previous studies that also used court-based samples. Second, we make two comparisons – between located and unlocated fathers and between fathers who refuse and fathers who were interviewed – on several dimensions: field efforts to locate, field efforts to interview a located father, and three factors that may affect the location and participation processes.

The first two tables compare different groups of located and participating fathers. The characteristics of the underlying populations represented by these groups may not be normally distributed. Therefore, we use the Wilcoxon rank test for which normality is not required for these comparisons (Wonnacott and Wonnacott 1990).

Table 1 addresses the issue of whether responding fathers differ from nonresponding fathers in the median and mean amounts of child support paid. As Schaeffer, Seltzer, and Klawitter (1991) found with earlier cohorts of Wisconsin court cases, estimates of the average amount of child support paid based on respondents (Row 2) are higher than those based on all fathers in the sample (Row 1). Respondents, on average, have higher amounts of child support paid than nonrespondents (Row 2 versus Row 3); the absolute difference is nearly 1,300 USD ($4,066 \text{ USD} - 2,798 \text{ USD} = 1,268 \text{ USD}$). The difference in medians is slightly higher, nearly 1,500 USD ($3,375 \text{ USD} - 1,899 \text{ USD} = 1,476 \text{ USD}$). Unlocated fathers (Row 4) and fathers who refuse (Row 5) are significantly different from each other, and both have lower median and mean amounts of child support paid than responding fathers (Row 2). The descriptive findings are generally consistent with those reported by Schaeffer, Seltzer, and Klawitter (1991) and Lin and Schaeffer (1995) that used earlier cohorts of court cases from Wisconsin.

Table 2 answers the question of whether unlocated fathers differ from located fathers and whether fathers who refuse differ from fathers who are interviewed on field efforts to locate or interview them and on three factors that predict the location and participation of nonresident fathers. *Field efforts to locate or interview fathers* include the following variables: whether the court record was the source of any of the telephone numbers called, the number of different telephone numbers called when trying to locate potential respondents, and the number of calls made to the last telephone number called. We chose the number of telephone numbers and the number of calls to represent field efforts for three reasons. First, there is a history of using similar variables that summarize field efforts to make ad hoc adjustments for survey nonparticipation (see Lin and Schaeffer 1995 for

Table 1. Median and mean amounts of child support paid in 1988 USD among all fathers, respondents, nonrespondents, unlocated fathers, and fathers who refuse

	Child support paid			
	Median	Mean	SD	N
All fathers	2,820	3,527	3,521	889 ^a
Respondents	3,375	4,066	3,666	511 ^a
Nonrespondents	1,899	2,798	3,177	378
Unlocated fathers	1,300	2,320	3,262	215 ^a
Fathers who refuse	2,800	3,430	2,954	163

Note. The null hypotheses that the medians of the distributions between respondents and nonrespondents, between respondents and unlocated fathers, and between unlocated fathers and fathers who refuse are the same are rejected at $p \leq 0.001$ level, respectively. The null hypothesis that the medians of the distribution between respondents and fathers who refuse are the same is rejected at $p \leq 0.05$ level.

^aBecause of missing information in court records, the numbers of all fathers, respondents, and unlocated fathers are less than 893, 514, and 216, respectively.

Source: Wisconsin Court Record Cohorts 7 and 8 (Extract 12).

a review). Secondly, because these calling variables are theoretically not part of the causal process that generates child support payments, we use them as instrumental variables to identify the selection equations in our model (see detailed explanation in Section 6). Finally, variables measuring field efforts are potentially readily available if they prove to be useful.

We also examine three factors that could affect the location and participation of non-resident fathers: (1) characteristics of the father and his family, (2) aspects of the divorce process, and (3) features of the specific study design. **Characteristics of the father and his family** include the incomes of the father and his ex-wife, the length of marriage, and whether at least one of the children was under age six. The **aspects of the divorce process** include whether child support was ordered, whether routine income withholding was used to collect support, the length of time from filing for divorce to finally ending the marriage, whether the nonresident father shared joint legal custody of children with the mother, and whether a house was involved in the property settlement. Finally, three **features of the specific study design** for which we control are: when parents entered the court system (July 1986 to June 1987 or July 1987 to June 1988), whether parents resided in pilot or control counties, and whether parents resided in an urban area.⁵

The comparison between unlocated fathers (Column 1) and located fathers (Column 2)

⁵ Three aspects of study design are particular to this sample: “cohorts” of cases, types of counties for implementing child support reforms, and sequential sample design. Cases that entered the court system between July 1, 1986 and June 30, 1987 and those that entered the court system between July 1, 1987 and June 30, 1988 are distinguished. Because parents are likely to move after they divorce, the longer the time cases have been in the child support system, the more difficult it is to locate them. Moreover, ten pilot counties were selected as an experimental group for implementing routine income withholding of child support before it became mandatory statewide. The other ten control counties with demographic characteristics similar to those of the pilot counties were chosen as a control group to evaluate the effect of child support reforms in Wisconsin. Finally, court cases were chronologically listed for sampling because the Wisconsin state government asked IRP to evaluate the effects of income withholding on child support payments as quickly as possible (Brown, Roan, and Marshall 1994). Due to the sequential sample design, parents who entered the court system late in the sample period might not have been interviewed before the survey period ended, particularly in large counties. Thus, in the multivariate analysis, we control for county size by identifying whether parents resided in an urban area where the rural population is less than one-third of the total population.

Table 2. Median, mean, and SD of selected variables for all fathers, located fathers, unlocated fathers, responding fathers, and fathers who refuse

Variables	1 Unlocated fathers		2 Located fathers		3 Fathers who refuse		4 Responding fathers		5 All fathers		Wilcoxon test						
	Median	Mean	SD	Median	Mean	SD	Median	Mean	SD	Median	Mean	SD	1 vs. 2	2 vs. 3	3 vs. 4		
Field efforts to locate or interview fathers																	
Court is source of phone number (1 = yes)													n.s.	n.s.	n.s.		
Number of phone numbers	2	2.44	1.42	1	1.84	1.16	2	2.16	1.41	1	1.74	1.05	1.98	1.26	***		
Number of calls	4	10.17	12.72	6	8.38	8.64	10	12.88	10.97	5	6.95	7.20	8.81	9.80	n.s.	***	
Characteristics of the father and his family																	
Father's income in 1988 (ln(dollar + \$1,500))	9.99	9.65	0.79	10.05	9.94	0.65	10.05	9.90	0.70	10.05	9.95	0.63	10.05	9.87	0.69	***	n.s.
Father's income in 1988 is imputed (1 = yes)		0.29			0.16			0.17			0.15		0.19		***	n.s.	
Mother's income in 1988 (ln(dollar + \$1,500))	9.40	9.29	0.59	9.55	9.42	0.63	9.55	9.41	0.61	9.55	9.43	0.64	9.52	9.39	0.63	***	n.s.
Mother's income in 1988 is imputed (1 = yes)		0.13			0.14			0.16			0.13		0.14		n.s.	n.s.	
Year of marriage	6.57	8.64	6.37	9.94	10.92	6.05	9.84	11.23	6.43	9.98	10.82	5.93	9.24	10.37	6.20	***	n.s.
Youngest child < 6 yrs old (1 = yes)		0.69			0.60			0.55			0.62		0.62		*	n.s.	
Aspects of the divorce process																	
Child support was ordered (1 = yes)		0.90			0.93			0.89			0.95		0.93		n.s.	**	
Use of routine income withholding (1 = yes)		0.74			0.79			0.78			0.79		0.77		n.s.	n.s.	
Year between petition and divorce dates	0.55	0.64	0.40	0.58	0.65	0.41	0.59	0.63	0.38	0.58	0.65	0.42	0.57	0.64	0.41	n.s.	n.s.
Joint legal custody (1 = yes)		0.20			0.33			0.28			0.35		0.30		***	n.s.	
House in property settlement (1 = yes)		0.36			0.64			0.64			0.64		0.57		***	n.s.	
Features of the specific study design																	
Case entered 7/1/87-6/30/88 (1 = yes)		0.46			0.49			0.46			0.50		0.48		n.s.	n.s.	
Parents resided in pilot county (1 = yes)		0.50			0.43			0.44			0.42		0.45		n.s.	n.s.	
Parents resided in urban county (1 = yes)		0.43			0.39			0.40			0.38		0.40		n.s.	n.s.	
N		216			677			163			514		893				

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Source: Wisconsin Court Record Cohorts 7 and 8 (Extract 12), Parent Survey 2 Calling Record.

shown in Table 2 suggests that the proportion of cases in which the court record was a source of telephone numbers called is similar for located and unlocated fathers. Not surprisingly, more telephone numbers are called for unlocated than for located fathers. However, the number of calls is not significantly different between located and unlocated fathers. (But note that the distribution of the number of calls is highly skewed, and the relationship between the number of calls and location appears reversed when means are examined.)

The results suggest that the average income of unlocated fathers is about 5,000 USD lower than the average income of located fathers ($[e^{9.94}-1, 500] - [e^{9.65}-1500] = 5,222$ USD). While income information is missing in court records for 29% of the unlocated fathers, only 16% of the located fathers do not have their income information recorded by the court. The former wives of the unlocated fathers have lower median and mean incomes than the ex-wives of located fathers, but the proportion of cases missing the ex-wife's income information in the court records is similar for unlocated and located fathers. The median length of marriage is just over three years longer for located than for unlocated fathers. And unlocated fathers are slightly more likely than located fathers to have a child under six years of age. The proportion of cases with a child support order or with routine income withholding to collect support, both of which are set by the court, is similar for unlocated fathers and located fathers. Also, the length of time from filing for divorce to finally ending the marriage is about the same for unlocated fathers and located fathers. About 33% of the located fathers shared legal custody with the mother, but only 20% of the unlocated fathers did so. Unlocated fathers are less likely than located fathers to have a house involved in the property settlement (36% versus 64%). Finally, the three aspects of the specific study design are similar for these two groups of fathers.

Table 2 also shows differences between fathers who refuse (Column 3) and fathers who are interviewed (Column 4). Fathers who refuse, on average, absorb more field efforts than fathers who are interviewed (i.e., more telephone numbers are called and more telephone calls are made to the telephone number at which the father was located). The results suggest that fathers who refuse are slightly less likely to have a child support order than fathers who are interviewed (89% versus 95%). This could occur if fathers without child support orders viewed surveys as an attempt to track them and obtain child support, and thus were reluctant to cooperate.

In sum, the descriptive results suggest that unlocated fathers are very different from located fathers not only in the amount of child support paid but also in the level of field effort applied, the characteristics of the father and his family, and aspects of the divorce process. Although fathers who refuse also differ in several respects from fathers who are interviewed, most of the differences between these two groups examined here are small.

5. Predicting Location and Participation of Located Fathers

The analysis in this section explores what factors predict the probability that a father was located and the probability that a located father participated in the survey. Two dependent variables are used for this analysis: whether potential respondents were located and whether located fathers participated in the survey. In this analysis, potential respondents

are classified as ‘‘located’’ if any of the following occurred: they agreed to participate in the survey and answered questions; they requested a specific day and time to do the interview but never completed the interview; they asked for more information before answering the survey but never completed the interview; they refused to do the interview; they were in jails, rehabilitation centers, or hospitals, and so could not be interviewed; or they finished only part of the interview. Located fathers are classified as ‘‘participating’’ if they completed the interview regardless of whether they answered the question sequence about child support payments.

We estimate two probit models independently – one for all fathers in the sample (‘‘location’’), the other for located fathers (‘‘participation’’). For the ‘‘location’’ equation, the dependent variable equals 1 if the father was located ($N = 677$) and 0 if the father was not ($N = 216$), and the full sample is used ($N = 893$). The independent variables in this equation predict the likelihood that a father could be located. For the ‘‘participation’’ equation, the dependent variable takes the value 1 if the father was a survey respondent ($N = 514$) and 0 if the father was located but did not complete the interview ($N = 163$); only those fathers who were located are included in the model ($N = 677$). The independent variables in this equation predict the likelihood that a located father participated in the survey. The same set of independent variables is used in the ‘‘location’’ equation and the ‘‘participation’’ equation. These variables are the same as those shown in Table 2 except that we add two squared terms for the variables measuring field efforts (i.e., number of telephone numbers and number of calls) in the model, because we suspect their effects are not linear. That is, there may be diminishing returns to increasing efforts to resolve different cases.

The estimated parameters for the probit models of whether fathers are located and whether located fathers participate in the survey are shown in Table 3. Net of other factors, fathers are more likely to be located if the court record was the source for at least one of the telephone numbers called. The number of telephone numbers called and the number of calls made have nonlinear effects on the probability of locating fathers. To help interpret the effect, we examined the predicted probability of locating fathers by the number of telephone numbers called and the number of calls made (figures not shown). Specifically, the predicted probability of locating fathers decreases as the number of telephone numbers called increases up to six telephone numbers; after that, the predicted probability increases if more telephone numbers are called. In contrast, making up to 15 more telephone calls at the last number called increases the likelihood that the father will be located; after 15 calls, efforts are unlikely to be fruitful. Fathers with higher incomes are more likely to be located, and fathers whose income is missing from the court records are less likely to be located. This may occur because fathers with unstable employment lack regular income and are more likely to move than fathers with stable employment. Finally, fathers whose property settlement involved a house are more likely to be located, and fathers who resided in an urban county are less likely to be located.

The second column of Table 3 shows that the source and the number of telephone numbers called do not predict the likelihood that located fathers will participate in the survey. But the number of calls made has a nonlinear effect on the probability of interviewing located fathers. As the number of calls increases fathers are more likely to refuse, but the predicted probability of obtaining located fathers’ participation remains steady

Table 3. Parameters for probit regression of whether divorced nonresident fathers are located and whether located fathers participate in the survey

Independent variables	1 Location	2 Participation	3 Differences
Intercept	-2.93 (1.06)**	.23 (1.22)	–
Field efforts to locate or interview fathers			
Court is source of phone number (1 = yes)	.24 (.12)*	.22 (.14)	n.s.
Number of phone numbers	-.44 (.12)***	-.20 (.14)	n.s.
Square of number of phone numbers (/10)	.40 (.17)*	.06 (.22)	n.s.
Number of calls (/10)	.38 (.13)**	-.73 (.16)***	***
Square of number of calls (/1000)	-1.26 (.32)***	.82 (.40)*	***
Characteristics of the father and his family			
Father's income in 1988 (ln(dollar + \$1,500))	.24 (.08)**	.02 (.09)	n.s.
Father's income in 1988 is imputed (1 = yes)	-.55 (.14)***	.15 (.18)	**
Mother's income in 1988 (ln(dollar + \$1,500))	.15 (.08)	.04 (.09)	n.s.
Mother's income in 1988 is imputed (1 = yes)	.12 (.16)	-.23 (.18)	n.s.
Year of marriage (/10)	.19 (.12)	.05 (.14)	n.s.
Youngest child < 6 years old (1 = yes)	.13 (.14)	.27 (.16)	n.s.
Aspects of the divorce process			
Child support was ordered (1 = yes)	.03 (.20)	.45 (.23)*	n.s.
Use of routine income withholding (1 = yes)	.02 (.13)	-.11 (.15)	n.s.
Year between petition and divorce dates	-.02 (.14)	.05 (.16)	n.s.
Joint legal custody (1 = yes)	.21 (.12)	.22 (.13)	n.s.
House in property settlement (1 = yes)	.41 (.11)***	-.04 (.13)	**
Features of the specific study design			
Case entered 7/1/87–6/30/88 (1 = yes)	-.01 (.11)	.10 (.12)	n.s.
Parents resided in pilot county (1 = yes)	-.05 (.10)	-.03 (.12)	n.s.
Parents resided in urban county (1 = yes)	-.32 (.11)**	-.08 (.12)	n.s.
<i>N</i>	893	677	
Log-likelihood	-416.75	-330.03	

Note. Cell entries are probit coefficients. Standard errors are in parentheses.

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$ (two-tailed).

Source: Wisconsin Court Record Cohorts 7 and 8 (Extract 12), Parent Survey 2 Calling Record.

(between .35 and .50) after 23 calls (figure not shown). The only variable other than field efforts that significantly predicts participation is whether or not the father had a child support order. Fathers without a child support order are less likely to participate in the survey, perhaps because these fathers are more likely to perceive the survey as part of an attempt to establish a support order, the first step in enforcing child support obligations.

To test whether or not the independent variables have different effects on locating fathers and obtaining fathers' cooperation for the interview, we estimate a continuation-ratio probit regression, which is similar to the continuation-ratio logistic regression (Agresti 1990, pp. 319–321). We use a continuation-ratio probit regression because the sample in the "participation" equation is a subset of the sample in the "location" equation and because the dependent variable used in the "location" equation differs from that used in the "participation" equation.

Traditionally, when we test whether the slopes of the independent variables are different between two groups of samples, say blacks and whites, we pool black and white samples together and create an intercept dummy (black versus whites) and a set of interaction terms between the intercept dummy and all of the independent variables. The coefficients for the interaction terms represent the differences between blacks and whites in the effects of the independent variables. If the coefficients of the interaction terms are statistically different from zero, it means that the independent variables have significantly different effects on the dependent variable for blacks than for whites.

The continuation-ratio probit regression is based on similar reasoning but operates somewhat differently (for the application of the continuation-ratio logistic regression to another example, see Seltzer and Bianchi 1988). We first duplicate 677 located fathers and combine them with the full sample ($N = 893$). This results in 1,570 cases (i.e., $677 + 893$) in the pooled data file. Then we create an intercept dummy to indicate whether the case is duplicated and create interaction terms between the dummy variable and all of the independent variables in the model. For the full sample (893 fathers), the dependent variable is the same as the dependent variable in the "location" equation (i.e., 1 if the father is located and 0 if the father is unlocated); for the duplicate cases, the dependent variable is the same as the dependent variable in the "participation" equation (i.e., 1 if the father is a survey respondent and 0 if the father refuses). Then the coefficients of the interaction terms equal the differences of the independent variables in predicting location and participation. If the coefficients of the interaction terms are significant, this indicates that the independent variables have different effects on the location and participation processes. We performed this estimation using the software package HOTZTRAN (Avery and Hotz 1985 Version 2; Avery and Hotz 1998 unpublished version of October 1998).

By examining interaction terms using pooled data, we find that number of calls has a positive association with location but a negative association with participation. This result suggests that repeated calls may increase the likelihood that a selected father is confirmed at a number, but may not help achieve high survey participation. We also find that whether a father's income was missing from the court's records and whether a house was involved in the property settlement predict whether a father is located, but not whether a located father is interviewed. Because our data are necessarily restricted and the models therefore somewhat crude, these differences can only suggest some of the ways that the processes

of locating and persuading actually differ. However, together with the full list of predictors for each model, they suggest that factors that are associated with mobility predict the likelihood that fathers will be located, but not the likelihood that they will be persuaded to participate. Thus, courts may be more likely to have information about a father's telephone number and income if the father is steadily employed and such fathers may move less often than fathers without stable employment; fathers with property that was involved in a divorce settlement may leave records in state administrative agencies. Such fathers may thus be easier to locate than other fathers. But factors such as employment and property ownership do not directly affect a father's willingness to participate in a survey.

In sum, we find that factors predicting the likelihood that fathers will be located differ from factors predicting that located fathers will participate in the survey. In the next section, we further examine to what degree using a nonrandom subset of fathers who participated in the survey biases the estimates of factors predicting child support payments.

6. Correcting for Nonparticipation in Predicting Child Support Payments

To examine the extent to which using a nonrandom subset of samples biases survey estimates, researchers have used Heckman's two-stage procedure (1976, 1979). The procedure involves estimating two equations – one selection equation and one substantive equation. Values of the dependent variable for the substantive equation are observed only if the values of the dependent variable for the selection equation are above or below some threshold. Using this adjustment method, researchers estimate the selection equation using a probit model and obtain the risk of not being observed in the dependent variable of the substantive equation. The risk is then included in the substantive equation as another independent variable to correct for sample selection bias (for an application of this method, see Berk 1983).

The procedure used here is a variation of Heckman's two-stage procedure. It differs from the traditional approach by including two selection equations instead of only one and by estimating the equations simultaneously instead of using a multistage estimation procedure. We use two selection equations to correct for nonparticipation that may cause biases in estimates that predict child support for two reasons. First, there may be unmeasured factors that affect both whether fathers are located and payments (e.g., employment instability) and factors that affect both whether fathers refuse and payments (e.g., fear of child support enforcement). Secondly, the analysis conducted in the previous section shows that factors predicting location differ somewhat from factors predicting participation. The use of two selection equations allows differences between two main groups of survey nonparticipants in this sample. To correct sample selection bias in estimating factors that predict child support payments, we simultaneously estimate two selection equations (one for location and the other for participation) and one substantive equation (Maddala 1983, pp. 278–283). The first selection equation predicts the likelihood that fathers could be located and the second selection equation predicts the likelihood that located fathers would participate in the survey. Because only located fathers can refuse the interview, the two selection processes are sequential. The substantive equation predicts child support payments. The specifications of the three-equation model are explained below in detail. We use a maximum likelihood estimation procedure for statistical efficiency.

6.1. Selection equations

The dependent variables for two selection equations are the same variables used for the analysis described in the previous section. That is, for the ‘‘location’’ equation, the dependent variable takes the value 1 if the father is located and 0 if he is unlocated; for the ‘‘participation’’ equation, the dependent variable equals 1 if the father is a survey respondent and 0 if he refuses the interview. The independent variables include field efforts to locate or interview fathers, characteristics of the father and his family, aspects of the divorce process, and features of the study design particular to this sample. The model can be specified as follows where the subscript 1 indicates the location outcome and the subscript 2 indicates the participation outcome.

$$\begin{aligned} Y_{1i}^* &= Z_{1i}\alpha_1 + v_{1i} \\ Y_{1i} &= 1 \quad \text{if } Y_{1i}^* > 0 \quad (\text{if the father is located}) \\ Y_{1i} &= 0 \quad \text{if } Y_{1i}^* \leq 0 \end{aligned} \tag{1}$$

where, for the i th observation, Y_{1i}^* is an unobserved continuous latent variable, Y_{1i} is the observed variable, Z_{1i} is a vector of values on the independent variables, α_1 is a vector of coefficients, and v_{1i} is the error. We observe $Y_{1i} = 1$ if $Y_{1i}^* > 0$ and $Y_{1i} = 0$ if $Y_{1i}^* \leq 0$.

$$\begin{aligned} Y_{2i}^* &= Z_{2i}\alpha_2 + v_{2i} \\ Y_{2i} &= 1 \quad \text{if } Y_{2i}^* > 0 \quad (\text{if the located father participates in the survey}) \\ Y_{2i} &= 0 \quad \text{if } Y_{2i}^* \leq 0 \end{aligned} \tag{2}$$

where, for the i th observation, Y_{2i}^* is an unobserved continuous latent variable, Y_{2i} is the observed variable, Z_{2i} is a vector of values on the independent variables, α_2 is a vector of coefficients, and v_{2i} is the error. We observe $Y_{2i} = 1$ if $Y_{2i}^* > 0$ and $Y_{2i} = 0$ if $Y_{2i}^* \leq 0$. Because the decision of participation is conditional on location, Model 2 is defined over only the subset of observations for which $Y_{1i}^* > 0$.

6.2. Substantive equation

Instead of using child support payments recorded in the CRD as the dependent variable in the substantive equation, we use the amount of support paid reported by interviewed fathers in the PS2 as the dependent variable. We use this procedure because most studies of child support rely on parents’ self-reports and the purpose of this analysis is to demonstrate the possible bias in estimates that predict child support payments if we do not have external information about the payments. Of 514 fathers who completed the interview, 480 fathers answered questions about child support payments. For those fathers who did not report the amount of child support paid, information from the CRD is imputed. Because the distribution of fathers’ reports of child support paid is positively skewed, we use the natural logarithm of the amount of support paid. We added a constant, 1,500 USD, to all values so that values of 0 payments will be defined with the log transformation. Because the observed child support payments are truncated – that is, the amount of support paid is never less than 0 and 7% of interviewed fathers reported paying zero amount of support, a tobit model rather than an ordinary least squares regression is used. Because we added 1,500 USD before taking the natural logarithm, the lower limit is 7.31 ($= \ln(1,500)$) instead of 0.

Independent variables in the substantive equation include: characteristics of the father and his family, aspects of the divorce process, and features of the specific study design. Most of the characteristics of the father and his family are from the father's self-reports, such as each parent's income and education, whether each parent was remarried or cohabiting, and whether both parents lived in Wisconsin. We also include the following family characteristics from court records: the length of the marriage and the number of children under age 19. Aspects of the divorce process for which we controlled are: whether the Wisconsin uniform guideline was used to decide the child support order, whether both parents had attorneys, whether routine income withholding was used to collect support, whether the nonresident father shared joint legal custody of children with the mother, whether a house was involved in the property settlement, and whether the parents' divorce was final before January 1, 1989. Finally, we also control for three features of the study design: when parents entered the court system (July 1986 to June 1987 or July 1987 to June 1988), whether parents resided in pilot or control counties, and whether parents resided in an urban area when they entered the court system.

When estimating the substantive equation with the sample selection correction, we do not include the amount of support owed, because in Wisconsin the amount of support owed largely depends on the nonresident parent's gross income and the number of children. To reduce the collinearity problem among the child support order, nonresident father's income, and the number of children, we keep only the latter two variables in the substantive equation and use a dummy variable to indicate whether or not the father reported the amount of support owed in the PS2.

To achieve identification without reliance on an assumed distribution of the errors, there must be at least one variable included in the selection equation that is excluded from the substantive equation (Achen 1986, p. 38). The source of telephone numbers called, the number of telephone numbers called when trying to locate potential respondents, and the number of calls made to the last telephone number called presumably are part of the process determining whether or not fathers are located or participate in the survey but do not directly affect child support payments. Therefore, we include these three variables in the two selection equations, but not in the substantive equation, to identify the model. The model for the substantive equation can be specified as follows:

$$\begin{aligned}
 Y_i^* &= X_i\beta + \varepsilon_i \\
 Y_i &= Y_i^* \quad \text{if } Y_i^* > 7.31 \quad (7.31 = \ln(1,500)) \\
 Y_i &= 7.31 \quad \text{if } Y_i^* \leq 7.31
 \end{aligned}
 \tag{3}$$

where, for the i th observation, Y_i^* is an unobserved continuous latent variable, Y_i is the observed variable, X_i is a vector of values on the independent variables, β is a vector of coefficients, and ε_i is the error. Y_i is observed only when Y_{1i}^* (Model 1) and Y_{2i}^* (Model 2) are larger than zero. The errors, v_{1i} , v_{2i} , and ε_i , have a trivariate normal distribution.

If we estimate child support payments only for those parents whose support payments are observed, the estimation will produce inconsistent estimates of β . To obtain consistent estimates we simultaneously estimate the two selection equations and the substantive equation (Breen 1996). This is a maximum likelihood procedure that produces more efficient estimates than multistage estimation. We use the software package HOTZTRAN for estimation.

Table 4. Effects on $\ln(\text{child support paid} + 1,500 \text{ USD})$ of whether divorced nonresident fathers are located and whether located fathers participate in the survey

Independent variables	1	2	3	4
	Location	Participation	Child support paid (corrected)	Child support paid (uncorrected)
Intercept	-2.81 (.75)***	-.38 (.74)	3.36 (.30)***	2.84 (.44)***
Field efforts to locate or interview fathers				
Court is source of phone number (1 = yes)	.21 (.08)*	.16 (.08)*	–	–
Number of phone numbers	-.36 (.09)***	-.11 (.09)	–	–
Square of number of phone numbers (/10)	.30 (.12)*	-.07 (.15)	–	–
Number of calls (/10)	.38 (.09)***	-.61 (.10)***	–	–
Square of number of calls (/1000)	-1.24 (.20)***	.63 (.28)*	–	–
Characteristics of the father and his family				
Father's income in 1988 ($\ln(\text{dollar} + \$1,500)$)	.23 (.05)***	.08 (.06)	–	–
Father's income in 1988 is imputed (1 = yes)	-.48 (.10)***	.16 (.10)	–	–
Father's self-report income in 1988 ($\ln(\text{dollar} + \$1,500)$)	–	–	.46 (.02)***	.48 (.04)***
Father's self-report income in 1988 is imputed (1 = yes)	–	–	.11 (.04)**	.09 (.07)
Father was a college graduate or higher (1 = yes)	–	–	.15 (.04)***	.13 (.07)
Father was remarried or living with a partner (1 = yes)	–	–	.02 (.03)	.02 (.05)
Mother's income in 1988 ($\ln(\text{dollar} + \$1,500)$)	.13 (.06)*	.03 (.05)	–	–
Mother's income in 1988 is imputed (1 = yes)	.14 (.11)	-.18 (.11)	–	–
Mother's self-report income in 1988 ($\ln(\text{dollar} + \$1,500)$)	–	–	-.03 (.01)*	-.03 (.02)
Mother's self-report income in 1988 is imputed (1 = yes)	–	–	-.05 (.03)	-.06 (.04)
Mother was a college graduate or higher (1 = yes)	–	–	-.08 (.05)	-.06 (.07)
Mother was remarried or living with a partner (1 = yes)	–	–	-.08 (.03)**	-.08 (.04)
Year of marriage (/10)	.19 (.08)*	.05 (.08)	.02 (.02)	.02 (.04)
Youngest child < 6 years old (1 = yes)	.13 (.10)	.24 (.09)*	–	–
Number of children under age 19	–	–	.49 (.06)***	.50 (.09)***
Square of number of children under age 19 (/10)	–	–	-.69 (.12)***	-.70 (.19)***
Both parents lived in Wisconsin (1 = yes)	–	–	.09 (.03)**	.09 (.06)

<i>Aspects of the divorce process</i>				
Child support was ordered (1 = yes)	.11 (.14)	.50 (.14)***	–	–
Use of routine income withholding (1 = yes)	–.08 (.09)	–.17 (.08)*	.20 (.03)***	.23 (.05)***
Year between petition and divorce dates	–.04 (.10)	.05 (.09)	–	–
Joint legal custody (1 = yes)	.18 (.09)*	.18 (.07)*	–.01 (.03)	.04 (.04)
House in property settlement (1 = yes)	.38 (.08)***	–.06 (.08)	–.05 (.03)	–.02 (.05)
Amount of child support ordered is missing (1 = yes)	–	–	–.23 (.05)***	–.28 (.10)**
Use of Wisconsin guideline (1 = yes)	–	–	.15 (.03)***	.17 (.04)***
Both parents had attorneys (1 = yes)	–	–	.11 (.03)***	.11 (.04)*
Final judgment before 1/1/89 (1 = yes)	–	–	.04 (.03)	.05 (.06)
<i>Features of the specific study design</i>				
Case entered 7/1/87–6/30/88 (1 = yes)	.02 (.08)	.10 (.07)	–.01 (.03)	–.00 (.04)
Parents resided in pilot county (1 = yes)	–.05 (.07)	–.02 (.07)	–.04 (.03)	–.05 (.04)
Parents resided in urban county (1 = yes)	–.30 (.08)***	–.10 (.07)	.13 (.03)***	.12 (.04)**
<i>Sigma</i>	–	–	.50 (.02)***	.45 (.02)***
<i>Correlation of errors</i>				
Location and Participation	–	–.04 (.18)	–	–
Location and Payments	–	–	–.76 (.08)***	–
Participation and Payments	–	–	–.78 (.06)***	–
<i>N</i>	893	677	514	514
Log likelihood		–2162.30		–337.97

Note. Parameters for location and participation are probit coefficients. Parameters for child support paid are tobit coefficients. Columns 1 to 3 are estimated simultaneously. See text for explanation. Standard errors are in parentheses.

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$ (two-tailed).

Source: Wisconsin Court Record Cohorts 7 and 8 (Extract 12), Parent Survey 2, Parent Survey 2 Calling Record.

Table 4 shows whether taking account of locating and participation affects estimates of the factors predicting child support payments. Parameters for location and participation are probit coefficients and parameters for child support payments are tobit coefficients. We report both the adjusted and unadjusted coefficients for the effects of the father's case characteristics on payments. Standard errors are in parentheses. The results of the two selection equations are similar to those reported in the previous section except that several variables that are of borderline significance in Table 3 reach statistical significance at the .05 level in Table 4. This occurs because simultaneously estimating three equations is more efficient (i.e., gives standard errors that are smaller) than estimating the single equation.

The insignificant correlation coefficient between the location equation and the participation equation suggests that there are no unobserved variables that affect both the process of locating fathers and the process of interviewing located fathers. Note, however, that the correlation between the errors for the location equation and the payment equation and that between the errors for the participation equation and the payment equation reach statistical significance.⁶ This suggests that the exclusion of unlocated fathers and nonparticipating fathers could bias estimates of factors predicting child support payments. However, including the selection correction in the substantive equation does not substantially change either the direction or the magnitude of the estimates. Although the standard errors in the corrected equation are smaller than those in the uncorrected equation and thus some variables that are not significant in the uncorrected equation become significant in the corrected equation, the magnitudes of the uncorrected tobit coefficients are very close to those of the tobit coefficients corrected for nonparticipation bias. Moreover, the signs of the coefficients are the same in the corrected equation and the uncorrected equation. Our finding that the differences between the corrected and uncorrected estimates are small is consistent with findings from other studies using a similar analytic strategy. For instance, Berk (1983) and Teachman (1991) found significant effects of the inverse Mill's ratios in their substantive equations, but there were no substantial differences between the corrected and uncorrected estimates in the models.⁷

To examine the extent to which sample means are corrected by taking into account

⁶ The signs and pattern of statistical significance for the coefficients (with two minor exceptions) and for the correlations between errors are the same when we estimate the payments equation as a linear regression instead of a tobit regression.

⁷ We tried to estimate the model using one selection equation only, in which we distinguished between fathers who participated in the survey and those who did not (that is, combining unlocated fathers with fathers who refused to participate). Despite extensive effort, we were not able to specify a model that would converge either using the software package HOTZTRAN (Avery and Hotz 1985 version 2; Avery and Hotz 1998 unpublished version of October 1998) or LIMDEP (Greene 1995 version 7.0). We experimented by excluding fathers who reported that they paid no child support (37 cases). When we excluded these cases, we were able to obtain convergence for both the model using a single selection equation and the two-selection equation model analogous to that summarized in Table 4. Note that the child support equation is estimated as a linear regression when nonpayers are excluded. As noted above, the substantive conclusions for the full sample are the same whether payments are estimated in a tobit or linear regression.

For the model estimated with one selection equation, the correlation between the participation and payment equations is statistically insignificant. Results for the model with two selection equations also show that the correlations between errors in the location and the payment equations and between the participation and payment equations are not statistically significant when the nonpayers are dropped. (Results available on request.)

the probabilities of location and participation, we use these probabilities to adjust the means of the CRD variables for located fathers and fathers who are interviewed.⁸ The results are shown in Table 5. After taking into account the probability of location, the differences between located fathers and all fathers in the effort to locate fathers, father's income, and house ownership largely disappear. When the conditional probability of participating in the survey is taken into account, the differences between fathers who are interviewed and the full sample in the effort to obtain father's participation and house ownership also disappear. The results suggest that taking into account the probability of location and participation corrects the estimates when they are based on a nonrandom subset of the sample.

7. Summary and Discussion

This study uses the child support payment behavior of divorced nonresident fathers as a case study to examine the causes of survey nonparticipation and the effects of nonparticipation on survey estimates. We find that unlocated and located fathers differ in the average amount of child support paid and with respect to characteristics of the father, his family, and aspects of the divorce process. Although fathers who refuse and those who participate differ in levels of child support payments and whether or not they have a child support order, other differences between these groups are very small. In addition, indicators of the level of field effort expended predict which fathers were located and, among those who were located, which were interviewed.

Our results also suggest that the process of locating fathers may be different from the process of interviewing located fathers. The information from the court records that predicts who will be located is different from the information that predicts who, among those located, will be interviewed. Specifically, a father is likely to be located for a telephone interview if the court has a record of his telephone number. And because more different telephone numbers are tried in attempts to locate fathers who are difficult to find, this indicator of effort predicts who will ultimately remain unlocated. It is a plausible argument that the factors that predict whether a father will be located are associated with how mobile he is. Not surprisingly, these factors do not predict whether a located father will be interviewed. Instead, the predictors of participation include a rough indicator of how much field effort a father "absorbed" and the presence of a court order for child support. These two factors may identify fathers who are more agreeable to being interviewed in general or who are less threatened by being interviewed about child support.

Considering these models suggests two further issues for future research about adjusting for nonparticipation, using either adjustments for selection or weighting schemes. The first is that even the relatively rich court data available for this list sample can support only

⁸ We first examined the equation predicting location and the equation predicting participation separately using probit models and obtained the predicted probabilities of being located and participation for each case included in the equations. Then the means of CRD variables for located fathers are weighted using the inverse probability of being located divided by the sum of the weights; and the means of CRD variables for father respondents are weighted using the inverse probability of participating (conditional on being located) divided by the sum of the weights. That is, cases with a higher probability of being located or participating are given a smaller weight. Finally, the standard deviations of the probability-weighted means are adjusted by weighting the individual squared deviations from the means (for details, see Deaton 1997, pp. 46–48.)

Table 5. Mean and SD of selected variables for all fathers, located fathers, and responding fathers (before and after correction)

Variables	1 All fathers		2 Located fathers		3 Located fathers (corrected)		4 Responding fathers		5 Responding fathers (corrected)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Field efforts to locate or interview fathers										
Court is source of phone number (1 = yes)	0.76		0.77		0.76		0.78		0.76	
Number of phone numbers	1.98	1.26	1.84	1.16	2.06	1.49	1.74	1.05	2.02	1.36
Number of calls	8.81	9.80	8.38	8.64	8.87	9.08	6.95	7.20	9.43	9.78
Characteristics of the father and his family										
Father's income in 1988 (ln(dollar + \$1,500))	9.87	0.69	9.94	0.65	9.86	0.72	9.95	0.63	9.82	0.80
Father's income in 1988 is imputed (1 = yes)	0.19		0.16		0.19		0.15		0.18	
Mother's income in 1988 (ln(dollar + \$1,500))	9.39	0.63	9.42	0.63	9.39	0.63	9.43	0.64	9.37	0.66
Mother's income in 1988 is imputed (1 = yes)	0.14		0.14		0.14		0.13		0.13	
Year of marriage	10.37	6.20	10.92	6.05	10.35	5.99	10.82	5.93	10.38	5.89
Youngest child < 6 years old (1 = yes)	0.62		0.60		0.62		0.62		0.63	
Aspects of the divorce process										
Child support was ordered (1 = yes)	0.93		0.93		0.93		0.95		0.91	
Use of routine income withholding (1 = yes)	0.77		0.79		0.78		0.79		0.77	
Year between petition and divorce dates	0.64	0.41	0.65	0.41	0.64	0.41	0.65	0.42	0.65	0.41
Joint legal custody (1 = yes)	0.30		0.33		0.29		0.35		0.29	
House in property settlement (1 = yes)	0.57		0.64		0.57		0.64		0.59	
Features of the specific study design										
Case entered 7/1/87–6/30/88 (1 = yes)	0.48		0.49		0.48		0.50		0.47	
Parents resided in pilot county (1 = yes)	0.45		0.43		0.44		0.42		0.45	
Parents resided in urban county (1 = yes)	0.40		0.39		0.40		0.38		0.40	
<i>N</i>	893		677		677		514		514	

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$.

Source: Wisconsin Court Record Cohorts 7 and 8 (Extract 12), Parent Survey 2 Calling Record.

rather rudimentary and somewhat artificial “models” of location and participation; most sample frames offer far less information about nonparticipants. This is one motivation for our extending past explorations of the usefulness of indicators of levels of effort, which can be collected routinely and relatively cheaply. The second issue is that although no theory would suggest that field efforts have a causal influence on whether fathers make child support payments, one could argue that some latent variable, for example commitment to children, results in fathers being less mobile (and, hence, easier for the court or survey organizations to locate), more willing to talk about child support (and, hence, easier to persuade to be interviewed), and more likely to actually pay child support. Such complications underline the importance of theory in understanding survey participation and the results of survey analyses.

Finally, we find significant correlations between the errors in the location and payment equations, and between the participation and payment equations. But the exclusion of unlocated fathers and nonparticipating fathers does not substantially change either the direction or the magnitude of the effects of factors predicting child support payments. This finding is somewhat reassuring to researchers who rely on surveys that use court-based samples to study child-support behaviors after divorce. The generalizability of our study, however, is limited in three ways. First, the procedure we use to adjust for sample selection bias is only one of the many methods that are currently available (see Winship and Mare 1992 for a review of different techniques). This procedure is based on strong assumptions about error distributions (Manski 1995) and has been shown recently to be effective for correction when selection bias is severe (Stolzenberg and Relles 1997). Second, like many studies of separated or divorced families, the sample for this study includes only fathers who had a very recent separation or divorce. Because the resources of recently separated or divorced fathers, their relationships with children and ex-wives, and their patterns of paying child support may be very different from those of fathers who have been separated or divorced for a long time, the generalizability of this study is limited to families separated for a short period. Finally, the sample for this analysis does not include nonmarital fathers, for whom additional selection processes must be modeled. Court-based samples of nonmarital fathers are highly selective because they include only fathers for whom paternity was legally established. Future research should examine sample selection processes for families separated for longer periods and for nonmarital fathers.

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