

Mothers' Reports of Children's Family Formation Behavior

William G. Axinn, Arland Thornton, Li-Shou Yang,
Linda Young-DeMarco, and Yu Xie

The University of Michigan

In this article we explore methods for using mothers' interviews to gather data on their children's family formation experiences. These methods constitute a cost-efficient means of gathering data for models of family background that include both intergenerational and sibling influences. To judge the utility of these methods, we examine the quality of mothers' reports across a range of their children's family formation behaviors. The dimensions of reporting quality we analyze include completeness, precision, and accuracy of mothers' reports. We use unique data from personal interviews with mother-child pairs to test the accuracy of these mothers' reports. The results demonstrate that, with some behaviors, a flexible data collection approach can gather complete, precise, and accurate information on an entire sibling set by interviewing mothers. Our examination of data quality also suggests important limits on the use of this approach. The quality of mothers' reports depends on the subject matter, with mothers providing lower quality reports of their children's cohabitation behavior compared to their children's marital, childbearing, and divorce behavior. © 2002 Elsevier Science (USA)

Many social science studies have demonstrated important consequences of family background for a wide range of outcomes. Researchers have cataloged both intergenerational effects of parents on children and sibling effects of siblings on each other. The importance of these influences is so widely accepted that many studies go to great lengths to measure characteristics of multiple family members. An ideal study design for measuring family background would include measures from both parents and the complete set of siblings. Most studies, however, fall short of this goal because immense costs prohibit interviews with all family members. Yet it may be possible to reduce costs by asking one informant to provide information on multiple family members. In this article we examine the quality of the data mothers provide about their children's family

This research was supported by the National Institute of Child Health and Human Development (Grant U01 HD30928). We thank Cassie Johnstonbaugh for her assistance preparing the tables and references in the article and Scott Yabiku for his helpful comments on a previous draft.

Address correspondence and reprint requests to William G. Axinn, Population Studies Center, The University of Michigan, 426 Thompson Street, Ann Arbor, MI, 48106-1248.

formation behavior in order to determine the limits on mothers' abilities to provide accurate information on other family members. Our results provide important insight that may inform researchers in designing cost-effective methods of collecting comprehensive data on multiple family members.

Both parents and siblings influence the behavior of individuals. The documentation of intergenerational influences on behavior is extensive, ranging from parental effects on occupational attainment (Blau and Duncan, 1967; Sewell and Hauser, 1975) to intergenerational influences on marital and sexual behavior (Marini, 1978; Thornton and Camburn, 1987). The range of parental characteristics that may influence children is also broad, including parental economic circumstances, parents' marital histories, parental attitudes, and parenting behaviors (Axinn and Thornton, 1993; Axinn, Duncan, and Thornton, 1997; Baumrind, 1978; Blau and Duncan, 1967; Sewell and Hauser, 1975; Thornton, 1991). To capture these important intergenerational influences, several studies feature interviews with matched parent-child pairs. Examples of these studies include the National Survey of Families and Households (NSFH), the National Longitudinal Survey of Youth (NLSY), The National Educational Longitudinal Study (NELS), and the National Longitudinal Study of Adolescent Health (ADDHealth).

Recent evidence indicates that along with significant effects of parents, siblings can have important effects on an individual's behavior (Axinn, Clarkberg, and Thornton, 1994; Blake, 1989; Downey, 1995; Hogan and Kitagawa, 1985; Rodgers and Rowe, 1988; Rowe, Rodgers, Meseck-Bushey, and St. John, 1989). Research also suggests that data on siblings may be valuable for enriching behavioral models of the consequences of a wide range of unobserved factors (Geronimus and Korenman, 1992, 1993; Mare, 1994; Currie and Thomas, 1995). Therefore, data on multiple family members, including a complete sibling set, is likely to become increasingly desirable. To incorporate these important sibling effects some studies feature interviews with matched pairs of siblings. Examples of these studies include the NLSY, The Panel Study Income Dynamics (PSID), the Wisconsin Longitudinal Study (WLS), the (ADDHealth, and the General Social Survey's (GSS) Study of American Families. It is more rare for studies to include measures of an entire sibling set, but some studies, such as the 1993 Taiwanese Survey of Health and Living Status of the Elderly, have accomplished this.

Thus, the ideal study design in many instances would include measures from parents and measures from a complete sibling set. The costs of obtaining interviews with every family member are high and, as a result, most researchers make compromises. In fact, the costs of conducting individual interviews with large numbers of people have increased dramatically in recent decades, making costs a major obstacle to the initiation of new studies. Even as social scientists are refining their data collection methods to maximize data quality, we recognize that these quality improvements are expensive and data quality versus survey cost trade-offs are becoming an explicit aspect of research design (Groves, 1989). Research designs for the coming decades will undoubtedly feature efforts to

reduce costs while maintaining acceptable quality standards. One way to reduce costs is to ask one informant to report on multiple individuals, such as one sibling reporting on other siblings¹ or a parent reporting on all the children. The aim of the present article is to inform researchers of the compromises they may face in collecting comprehensive measures of family background from a single informant.

We explore techniques for using interviews with mothers to gather data on their adult children's family formation behavior. We explicitly test the quality of information mothers provide about their adult children. The dimensions of reporting quality we analyze include completeness, precision, and accuracy of mothers' reports. We examine the mothers' reports across a range of their children's family formation behaviors to assess which aspects of their children's behaviors mothers are able to report with the highest quality. We use unique data from interviews with mother-child pairs to analyze the quality of these mothers' reports. We examine whether it is possible to gather complete, precise, and accurate information on an entire sibling set by interviewing mothers. The results provide insights for designing cost-effective methods of measuring family background; the results also show the limitations of gathering data on multiple individuals with interviews from a single informant.

MOTHERS' REPORTS OF CHILDREN'S FAMILY FORMATION BEHAVIOR

We examine mothers' abilities to report on their children's experiences with cohabitation, marriage, childbearing, and divorce. In addition to the occurrences of these events, we explore mothers' abilities to report the timing of these events.

Mothers' abilities to report on their children's behavior depend on a variety of factors. As with all reporting tasks, a respondent's ability to provide complete and accurate responses depends on many things, including the cognitive difficulty of the task in question (Eisenhower, Mathiowetz, and Morganstein, 1991; Sudman, Bradburn, and Schwarz, 1996). Reporting on timing of events is generally considered a more cognitively demanding task than reporting on the mere occurrence of events (Eisenhower, Mathiowetz, and Morganstein, 1991; Means, Swan, Jobe, and Esposito, 1991). We expect the task to be particularly difficult in this case, because respondents are being asked to report on the timing of events in someone else's life. Thus, we expect mothers to encounter substantial difficulty in recalling the timing of their children's cohabitations, marriages, divorces, and childbirths.

To facilitate this task, we designed a data collection instrument that allows mothers a great deal of flexibility in providing their reports. Although our aim was to obtain the month and year of the family formation events for each of the

¹ For examples of this strategy (i.e., one sibling reporting on other siblings), see Hauser and Mare (1994).

mothers' children, we allowed mothers who were unable to provide this level of precision to tell us about the timing in whatever metric they could. We accepted timing in terms of years (no month provided), years of the child's age (e.g., age 19), and years before the date of the interview (e.g., 6 years ago). In fact, when mothers were unable to provide calendar years for the timing of an event (responded with "don't know"), we systematically probed using these alternative metrics. Our hypothesis is that allowing mothers to respond in alternative metrics increases the completeness of reporting of this timing information.

Of course, an informant's ability to report on another's behavior depends not only on the informant's cognitive recall ability. It also depends on whether the informant ever had access to the information. An informant's access to information is likely to depend on the subject matter. Mothers are likely to have more access to information about some aspects of their children's family formation behavior than others. For mothers and children, information flow regarding children's behavior may depend on the level of mothers' approval of these behaviors. We expect that children are less likely to tell their mothers about behaviors of which they feel their mothers are likely to disapprove. At the same time, children may be more likely to tell their mothers about behaviors of which they believe their mothers will approve.

This factor may produce important variations in mothers' abilities to report their children's family formation behaviors. Previous research shows that mothers are more likely than their children to endorse marriage and childbearing and mothers are less likely to endorse cohabitation (Thornton, 1989; Thornton and Young-DeMarco, 2001). Therefore, we expect children are more likely to tell their mothers about their marriage and childbearing than their cohabitation. This differential information flow should result in mothers' higher abilities to report the timing of their children's marriages and childbirths than their children's cohabitations. In fact, evidence indicates that mothers' desires for their children to marry and have grandchildren have strong positive effects on their children's marital and childbearing preferences and behavior (Axinn and Thornton, 1992; Axinn, Clarkberg, and Thornton, 1994; Barber and Axinn, 1998). This evidence corroborates the idea that children's marriages and childbearing experiences are a salient aspect of the relationship between mothers and children. Thus it is likely that mothers and children will share information about children's marriage and childbearing.

Of course, a mother's information about her child's family formation experiences depends not only on communication with the child. Mothers may have a great deal of direct observation of the timing of their children's family formation events. Mothers are often involved in the planning of weddings and frequently participate in the wedding ceremony itself. Also, mothers are often present for the births of their grandchildren. This personal involvement and participation may make these events particularly memorable for mothers. Furthermore, children's marriages and grandchildren's births are often celebrated annually, in the form of wedding anniversaries and birthday events, which are additional remind-

ers of the timing of these events. Thus we have many reasons to expect that mothers' knowledge of the timing of their children's marital and childbearing experiences will be of extremely high quality.

In fact, these events may be important events in the lives of mothers themselves—events that produce salient changes in mothers' own statuses, roles, and familial relations. A child's marriage transforms a mother into a mother-in-law. A child's childbirth makes a mother become a grandmother. Thus these events have a direct impact on mothers' lives and are therefore likely to be memorable.

We have less reason to expect that mothers' knowledge of the timing of their children's cohabiting experiences will be of extremely high quality. In general mothers do not participate directly in their children's cohabiting events, and children's cohabiting experiences do not alter mothers' roles as formally as do children's marriages or childbearing. In fact, if children hide these experiences from their mothers, their mothers' knowledge of cohabiting events may be particularly poor. Our expectations of the quality of mothers' information about their children's separation and divorce experiences are less clear, although the quality of mothers' knowledge of these events probably falls between their knowledge of marital and childbearing events and their knowledge of cohabiting events. Certainly mothers are less likely to participate directly in their children's separations than either their children's marriages or their children's childbearing experiences. Overall, cohabiting and separation events are likely to be less salient in our society than marital and childbearing events, and as a result reports of cohabitation and separation are likely to be of lower quality.

An informant's access to information about someone else is also likely to depend on the informant's relationship to that person and contact with that person. Mothers who have a close relationship with a particular child are more likely to have access to information about that child's life. On average mothers may have closer relationships with their daughters than with their sons (Rossi and Rossi, 1990; Thornton, Orbuch, and Axinn, 1995). As a result, it is crucial to investigate differences in mothers' abilities to report on sons' and daughters' behaviors. Mothers who have many children may be less likely to have high levels of contact with each child, so they may have less access to information about their children's behavior (Barber, Axinn, and Thornton, 1999). Mothers with many children may also face a more difficult cognitive task in reporting their children's behaviors than mothers with few children. Mothers with many children will have to recall the timing of many more events than mothers with few children. Thus, for all these reasons, we expect mothers with many children to provide lower quality reports of their children's behaviors than mothers with few children. On the other hand, if siblings report children's behavior to their mothers, mothers with many children may have more sources of information regarding each child's behavior. This process may increase the quality of reports from mothers with many children. We explore these possibilities by testing for the impact of family size on mothers' reporting quality.

The quality of mothers' knowledge of their children's behavior can be con-

sidered in at least three dimensions: completeness, precision, and accuracy. By completeness we refer to the extent of mothers' knowledge of their children's behavior: simply whether mothers know about their children's family formation experiences and the timing of those experiences. By precision we refer to the level of detail with which mothers are able to report on the timing of their children's experiences. By accuracy we refer to the extent to which mothers' reports of their children's behavior match children's own reports of the same behavior. Although there is likely to be error in both sources of this information, our measure of accuracy is the extent to which information from mothers matches what we would have if we interviewed only the children. All three dimensions—completeness, precision, and accuracy—are important in judging these informants' abilities to provide information that can substitute for individual interviews with all of those about whom they are reporting.

Finally, we expect an important asymmetry in the errors that characterize mothers reports of the timing of children's family formation behavior. Because information about the timing of children's family formation events is likely to flow from children to mothers, we expect mothers' reports of the timing of children's family formation events to be later than children's reports of the timing of the same events. Mothers may also report later events, such as a second cohabitation, as a first event of cohabitation because they were unaware of the first cohabitation. This will also produce an asymmetry in mother and child reports. This asymmetry is likely to be greatest for those family formation behaviors children least desire to report to their mothers, such as cohabitation.

DATA AND MEASURES

The data we use came from interviews with 831 mother-child pairs. These interviews, collected in 1993, constitute the eighth wave of a 31-year panel study of these mother-child pairs. A systematic sample of White mothers who had given birth to their first, second, or fourth child in 1961 in the Wayne, Oakland, or MacComb counties of southeastern Michigan were first interviewed in the spring of 1962. These mothers were reinterviewed in the fall of 1962, 1963, 1966, 1977, 1980, 1985, and most recently in 1993. The original interviews were conducted face-to-face, but all subsequent waves have been done over the telephone. The 1993 interviews averaged 29.3 min in length. The focal children, who were born in 1961, were interviewed, face-to-face, in 1980 (age 18), 1985 (age 23), and 1993 (age 31). Response rates have been high in this panel study (Freedman, Thornton, and Camburn, 1980; Thornton, Freedman, and Camburn, 1982), and by 1993 80% of the original mother-child pairs remained in the panel.

In 1993 the mothers reported on their children's experiences with marriage, nonmarital cohabitation, divorce, and childbearing. They were asked to report on all of their children 18 years of age and older, including both the focal child included in this study and each of that child's siblings. Questions about the focal

child asked whether the mother believed each event had occurred; if she believed it had, she reported when the event in question had *first* occurred. Mothers were asked to supply the month and year of this event. Those who answered that they did not know the month or year were asked if they knew the child's age at the time the event first occurred. Those who also did not know the child's age at the event were then asked if they knew how many years before the interview ("how many years ago") the event had occurred. For those mothers who were unable to give single-year responses, we accepted ranges. For those who knew the year but not the month, we probed for season and recorded as spring, summer, winter, or fall.

Mothers were then asked a parallel set of questions about each of their other children's experiences with marriage, nonmarital cohabitation, divorce, and childbearing.² We used the same probes as had been used to ask about the timing of the focal children's experiences so that mothers quickly learned the breadth of responses that were acceptable. Note that those with many children had a more tedious task to perform, as the sequence of questions becomes repetitive for the fourth, fifth, or sixth child.

The design of our questions about the focal children's siblings differed from the design of our questions about the focal children. The questions about focal children ask each specific question about a specific child. Our questioning about the focal children's siblings, however, asked once about the entire sibling set as follows: "Have any of these children ever been married?" and "Which of these children have been married?" Dates of family formation and dissolution experiences were asked separately for each sibling. The more specific form we used for focal children could have been repeated for all the focal children's siblings, but we chose the abbreviated form to make the questions as time efficient as possible.³

The 1985 and 1993 interviews with the focal children employed a life-history calendar to ascertain the occurrence and timing of their experiences with marriage, nonmarital cohabitation, childbearing, and divorce. Using the calendar, interviewers gathered monthly data on the timing of the children's family formation experiences. The life-history calendar is a reliable method for gathering retrospective data on the timing of family formation and dissolution events (Freedman et al., 1988; Caspi, Moffitt, Thornton, Freedman, Amell, Harrington, Smeijers, and Silva, 1996). Therefore we are confident that these interviews produced highly accurate measures of the timing of the children's experiences. We compare the children's life-history calendar measures with mothers' reports

² For copies of the question wording and format used to ascertain this information, please contact the authors.

³ If more time is available, researchers can organize these questions in a life-history calendar format. This alternative has the advantage of providing respondents (informants) with visual cues regarding the timing and sequencing of other life events that may be related to the information about which they are being asked (Freedman, Thornton, Camburn, Alwin, and Young-DeMarco, 1988; Axinn, Pearce, and Ghimire, 1999).

TABLE 1

Percentage Distribution of Level of Precision with Which Mothers are Able to Recall the Timing of Focal Child's Family Formation Events

Level of precision	Family formation event							
	Marriage		Cohabitation		Childbearing		Separation	
	%	Cumulative %	%	Cumulative %	%	Cumulative %	%	Cumulative %
Month and year	89.47	89.47	57.06	57.06	90.85	90.85	60.26	60.26
Year only	.76	90.23	10.66	67.72	.20	91.05	7.69	67.95
Age or years ago	7.63	97.86	26.51	94.23	8.15	99.20	25.00	92.95
Less precise	1.22	99.08	1.74	95.97	0.00	99.20	.64	93.59
Unable to provide any information	.92	100.00	4.03	100.00	.80	100.00	6.41	100.00
Total	100.00		100.00		100.00		100.00	
N		655		347		503		156

as a measure of the accuracy of mothers' reports. Although there is likely to be error in both sources, our measure of accuracy is the extent to which we received the same information from mothers as we did from the children themselves.⁴

RESULTS

Completeness and Precision

Table 1 presents distributions of mothers who are able to recall the timing of the focal child's family formation or dissolution event classified by the level of precision mothers are able to provide. Note that these data pertain only to those children for whom mothers reported the event had occurred, thus ignoring for the moment whether the mothers were accurate in their reports of the existence and timing of the event. Also note that although mothers are asked whether their child has ever experienced a divorce or permanent separation, they are then asked about the timing of their child's first physical separation, not the timing of the legal divorce.

Mothers' abilities to provide information on event timing to the month clearly depend on the type of event. Approximately 90% of the mothers are able to provide the year and month of their child's first marriage and first childbirth (row 1 of Table 1). On the other hand, only about 60% are able to provide the same information about the timing of their child's first cohabitation or first separation (row 1 of Table 1). Because children share less information about their cohabiting experiences, mothers are probably less likely to know precise information about their child's cohabitation experience than about births and marriage.

⁴ Note that the difference in measurement methods for mothers' and children's reports render our tests of accuracy of mothers' reports conservative. Had life-history calendar methods been used to measure mothers' reports as well, mothers' reports would likely be *more* accurate, reducing the observed discrepancies between mothers' and children's reports.

Mothers are also much more likely to have directly observed their children's marital and childbearing experiences. This direct observation, along with annual reminders in the form of wedding anniversaries and grandchildren's birthdays, helps to produce higher precision in mothers' reports of their children's marital and childbearing experiences.

Next we examine the impact of flexibility in the response alternatives on mothers' ability to provide information on the timing of events in their children's lives. Rows 2 and 3 of Table 1 present distributions of mothers who are able to time these events to the year. Here we allow mothers who are unable to provide the month and year to provide the year only (row 2), her child's age at the time of the event (row 3), or the number of years before the interview that the event took place (also row 3).

Allowing alternative metrics dramatically increases reporting completeness. Ninety-eight percent of mothers are able to provide the time of first marriage to the year, and 99% can do the same for the time of first childbirth (cumulative percentages in row 3). Even for cohabitation and separation, more than 90% of mothers are able to provide timing of these events to the year (cumulative percentages in row 3). Allowing flexibility in the response type, while sacrificing month-level precision, nearly completely compensates for the lower reporting quality in these subject areas.

In fact, among those mothers who reported their children having an experience, very few were able to provide no information about the timing of their children's first marriages, first cohabitations, first separations, or first childbirths. Row 5 of Table 1 presents the percentage of mothers who reported their child *had* the experience in question, but were able to provide *no* information about the timing of that event. As expected, the level of completeness depends on the subject matter. Mothers have less complete information about their children's cohabitation and separations than about their children's marriages and childbearing. Overall, though, the completeness is high. Approximately 95% of mothers have some timing information on the focal child's cohabitation and separation experiences, and more than 99% have timing information on the focal child's marital and childbearing experiences.

We found virtually no important differences in these outcomes by gender of the child. The percentage of mothers able to supply the month and year of their child's first marriage, cohabitation, childbirth, or separation is nearly identical for mothers of sons and mothers of daughters (not shown in tables). Likewise, the percentage able to provide no information about these event timings is also nearly identical for mothers of sons and mothers of daughters (not shown in tables). The one exception is information about separation. Only approximately 4% of mothers have no information about the timing on their daughters' first separations, 10% of mothers have no information about the timing of their sons' first separations (not shown in tables). Although this difference is substantial, the differences within each category of precision of reporting remain quite small, with the largest being 61% of mothers of daughters reporting a month and year

of first separation, but only 58% of mothers of sons reporting a month and year of first separation (not shown in tables). Overall, we find no strong evidence of important gender difference in mothers' completeness or accuracy of reporting on their children's family formation and dissolution behavior.

Of course, the objective of these questions was to gather data on the timing of events in the lives of the mothers' other, nonfocal children. The completeness and precision of reports on these nonfocal children follow the same patterns as among focal children (not shown in tables). Completeness and precision are both higher for mothers' reports of their nonfocal children's marriages and childbirths than for nonfocal children's cohabitations and separations. Allowing timing information in a variety of metrics also dramatically increases the percentage of reports across all family formation and dissolution events. As a result, the fraction of mothers who are able to provide any timing information on the family formation events of their nonfocal children is very similar to the fraction of mothers who could provide this information for their focal children. Approximately 99% of the mothers gave us timing information on their nonfocal children's first marriage and first birth, and about 95% could do the same for cohabitation and separation.

Accuracy

Next we turn to the accuracy of mothers' reports of their children's behavior. We compare focal children's reports of their own behavior (from personal interviews with the children) to the mothers' reports. Although there is likely to be error in both sources of information, the level of accuracy measures the extent to which we obtain the same information from mothers as we would have had we interviewed the children themselves.⁵ Table 2 presents the distribution of consistency between mothers' and their children's reports of the occurrence of the children's marriages, cohabitations, childbirths, and separations. Here we examine only the occurrence of the event and ignore the timing of the event. At the bottom of Table 2 we present the cumulative percentage of responses that match (both mother and child said the event occurred, or both said the event did not occur). Mothers' responses agree with their children's responses in 99% of the cases for marriage and in 98 percent of the cases for childbearing and separation. As predicted, the level of mothers' accuracy is somewhat lower for cohabitation. Mothers' responses about cohabitation are the same as their children's in only 84% of the mother-child pairs. We explore this phenomenon in detail under "Exploring the Errors in Mothers' Reports of Children's Cohabitations" below. We find similar outcomes by gender—mothers' accuracy in reporting on sons and on daughters are virtually the same (not shown in tables).

Table 3 shows the accuracy of mothers' reports of the timing of their children's

⁵ Of course, random error will create unreliability in any two independent measures of the same phenomenon. To the extent such unreliability is present in our measures from the children, our measure of accuracy underestimates the accuracy of mothers' reports.

TABLE 2
 Percentage Distribution of Consistency between Mother's and Focal Child's Report
 of the Child's Family Formation Events

	Family formation event			
	Marriage	Cohabitation	Childbearing	Separation
Mother and child agree event did not happen	23.3	46.1	40.3	75.0
Mother and child agree event did happen	76.1	38.3	58.2	23.2
Mother and child disagree about event	0.6	15.6	1.5	1.8
Total	100.0	100.0	100.0	100.0
<i>N</i>	815	814	814	620
Cumulative percentage with mother and child's reports of events matching	99.4	84.4	98.5	98.2

family formation experiences. Reporting on timing is a more difficult task than reporting on occurrence, so we expect lower levels of accuracy here. We are limited to examination of timing reports among those mothers who reported the event in question. We match these mothers' reports of the timing of events in their children's lives to the children's own reports of the timing of those events to ascertain the accuracy of the mothers' reports.⁶ Also, recall that the children's reports were gathered using a life-history calendar, and their responses were all precise to the month. Table 3 displays the distribution of mothers' reports of the timing of their child's first marriage, cohabitation, childbirth, or separation by the level of precision in the accuracy of those reports.

The majority of mothers (56.7%) who agree that their children had married are able to provide the timing of their children's first marriages accurately to the month. Another 15% of mothers are able to provide accurate timing of this event within 1 year—that is, with less than 12 months' difference from the children's own reports. A cumulative 93.8% of mothers are able to supply the date of their child's first marriage within 2 years' precision. Precision within 2 years includes mothers' reports of this event timing that are just 1 year different than their children's reports. For example, a mother might report her child's marriage occurred just 1 year (12 months) later than the child reports, generating a difference of less than 24 months, but more than 11 months. Given that we allowed mothers to give their responses in alternative metrics, such as years of the child's age or years before the interview, a 12- to 23-month difference in child's and mother's reports is quite likely. Yet nearly all mothers are able to provide the timing of their child's marriage accurately within two years precision.

⁶ For those mothers who reported the timing of their children's family formation events using a range of dates, we use the midpoint of the range for these comparisons.

TABLE 3

Percentage Distribution of Precision in Accuracy of Mother's Report of Timing of Focal Child's Family Formation Events When Mother and Child Agree Event Has Occurred^a

Precision of accuracy in mother's report	Family formation event			
	Marriage	Cohabitation	Childbearing	Separation
Timing reports match to the month	56.7	5.7	73.6	6.0
Timing reports match within a year	15.0	33.4	7.7	50.0
Timing reports match within two years	22.1	22.5	13.9	23.7
Timing reports match with less than two year precision	6.2	38.4	4.8	20.3
Total	100.0	100.0	100.0	100.0
N	620	312	473	144

^a When mothers gave of range of times in their reports we used the midpoint of that range for the comparisons in this table.

Column 2 of Table 3 presents the same distribution of precision in accuracy of responses for mothers' reports of the timing of their children's first cohabitations. Far fewer mothers are able to provide high precision in their reports of their children's cohabiting experiences than of their children's first marriage experiences. Less than 10% match to the month and only 39.1% give reports that match their children's within 11 months. A cumulative 61.6% of mothers are able to provide this timing information within 2 years of the child's report. This represents the majority of mothers who agree that their children have experienced a cohabitation, but only 61.6% of mothers are able to do this for cohabitation compared to 93.8% for marriage.

This result is not surprising. Mothers provide less complete, less precise, and less accurate information about their children's cohabitations than they do for other family formation behaviors. These factors are combined in column 2 of Table 3, so that the low percentage providing highly precise accurate reports is produced in part by incomplete reports, imprecise reports, and inaccurate reports. As discussed above, the lower quality of mothers reports about their children's cohabitations is probably produced by mothers being less likely to observe these events directly and by children being less likely to share information about these events with their mothers. The cognitive tasks for mothers should be quite similar to the task of reporting on children's marital timing. But if these mothers were less likely to have direct, accurate information about cohabitations, it is not surprising they are less able to report these events accurately. We explore this issue in detail under "Exploring the Errors in Mothers' Reports of Children's Cohabitations."

Nonetheless, allowing mothers to provide information on the timing of their children's cohabitations in a variety of metrics improves their ability to report accurately. Only 5.7% of mothers are able to supply the date of their children's cohabitations to the month accurately. On the other hand, allowing all forms of

responses, nearly two-thirds of the mothers are able to provide accurate responses within 2 years precision. Of the mothers who agreed their children had cohabited, nearly three-quarters are able to provide accurate reports of timing within 3 years (not shown in tables).⁷

Table 3 also shows the same distribution for mother's reports of the timing of their children's first births. Fully 73.6% of the mothers who agree their children had a first birth are accurate about the timing of their children's first birth to the month. More than 95% are accurate within 2 years. Mothers are very likely to know about the timing of the births of their grandchildren, and they find these events to be quite memorable.

The final column of Table 3 presents the same distribution of precision in accurate responses for mothers' reports of the timing of their children's first separations. Recall that only mothers who said their children had been married were asked questions about their children's separations and that 75% of those mothers agree with their children that the children never experienced a separation. The majority (56%) of the mothers who agree that their children *have* experienced a separation are able to provide reports of the timing of that separation accurately within 11 months of their children's reports of that same event. In fact, among the mothers who agree their child's separation did take place, nearly 80% are able to provide the timing of that event within 2 years of the child's own report of the timing of that event. Mothers are not able to report on the timing of their children's separations with quite as much accuracy as their children's marriages and childbirths, but the level of accuracy is still much higher than mothers' reports of the timing of children's cohabitations.

Finally, there are some interesting gender differences in the precision of accuracy of mothers' reports on these family formation behaviors. With respect to all four family behaviors, mothers' reports are more likely to match their children's reports to the month among daughters than among sons (not shown in tables). With the exception of reports on separation, the magnitude of these differences is relatively small. For separation, however, nearly 9% of mothers of daughters provide reports accurate to the month, but less than 2% of mothers of sons provide reports this accurate (not shown in tables). Note that these differences should be interpreted with caution, as analyses of separation reports are based on a relatively small number of events. Nevertheless, it appears mothers' reports of daughters' behaviors are a bit more precisely accurate than mothers' reports of sons' behaviors, and this difference is largest for reports of separation.

⁷ Of course, because the duration of many cohabiting experiences is quite short (Thornton, 1988), a high discrepancy in the timing of mothers' reports may reflect mothers' reports of a different, second, cohabitation. However, there were not many multiple cohabitation experiences among this sample. Among those who had ever cohabited, the mean number of cohabitations was 1.47, and although 103 of them experienced 2 cohabitations, only 22 experienced 3, only 10 experienced 4, and only 4 experienced 5.

TABLE 4

Percentage Distribution of the Discrepancy between Mother's and Child's Report of the Timing of Child's Family Formation Events^a

Timing discrepancy between reports	Family formation event			
	Marriage	Cohabitation	Childbearing	Separation
Mother's report earlier	19.5	34.6	9.6	52.2
Timing reports match to the month	57.2	6.0	74.0	6.6
Mother's report later	23.3	59.5	16.4	41.2
Total	100.0	100.0	100.0	100.0
N	615	301	470	136

^a When mothers gave of range of times in their reports we used the midpoint of that range for the comparisons in this table.

Asymmetry in the Errors Characterizing Mothers' Reports

As discussed under Mothers' Reports of Children's Family Formation Behavior we expect an asymmetry in the errors that characterize mothers reports of the timing of their children's family formation experiences. Because some of the mothers do not observe their children's life transitions directly, they must learn of these transitions from the children or from other sources. For these mothers there is likely to be some lapse of time between the occurrence of the events and when they learn of the events. This may lead mothers to report the date of the occurrence of the event later than it actually occurred. Although we find errors in both directions, the discrepancies between mothers' and children's reports represent later reports by mothers more often for each of the behaviors, except for separation. Table 4 displays these discrepancies.

Although the majority of mothers' reports of the timing of their children's marriages and childbearing match their children's reports, a much smaller fraction of the mothers report the same cohabitation and separation timing as their children.⁸ For separation timing, mothers report an earlier timing a bit more often than they report a later timing. This difference is not large, but the direction of the difference is in a direction opposite to our prediction. Mothers' reports of their children's cohabitation timing, however, are much more likely to be later than children's reports. Less than 35% of the mothers report that the cohabitations started earlier than their children report, yet nearly 60% report that the cohabitations started later than their children report. Thus, mothers tend to report that their children's family formation events take place later than the children

⁸ Note that the life-history calendar measures of children's cohabitation and separations required both events to take place for a month or more, but the mothers' reports of cohabitation or separation may reflect events of shorter duration. This difference in measurement may create some level of mismatch between mothers' and children's reports because mothers may be reporting a different event. However, this difference is most likely to lead mothers to report *earlier* events than children, not *later* events.

TABLE 5
 Comparison of Mother's and Children's Report of Whether Child's Cohabitation Occurred
 (Percentages in Parentheses)^a

Mother's reports	Children's reports	
	Cohabitation occurred	Cohabitation did not occur
Cohabitation occurred	312 (76.1)	17 (4.2)
Cohabitation did not occur	85 (20.7)	375 (92.8)
Don't know if cohabitation occurred	13	12
Totals	410 (100.0)	404 (100.0)

^a When mothers gave a range of times in their reports we used the midpoint of that range for the comparisons in this table.

themselves report in every case except separation. The large asymmetry in mothers' reports of cohabitation timing is to be expected; among the family formation events examined here, mothers are least likely to observe this event directly, and children are least likely to report this experience to their mothers.⁹ Moreover, some cohabitations begin gradually, and it may even be difficult for the participants themselves to time the beginning to monthly precision. We find no substantial differences in these patterns by the gender of the child (not shown in tables).

Exploring the Errors in Mothers' Reports of Children's Cohabitations

Throughout this analysis we find mothers' reports of their children's cohabitation behavior to have the lowest quality among the reports to family formation behaviors. These findings are consistent with our prediction that mothers are less likely to observe cohabitation directly and that children are less likely to share information about cohabiting experiences. In fact, an examination of the distribution of mothers' and children's reports of the children's cohabitation behavior reveals that among more than a fifth of the children who report they have cohabited, their mothers report that they have not cohabited (see Table 5). Although the majority of mothers report their children's cohabiting experiences accurately (Table 2), the lack of information about children's cohabitations produces somewhat lower accuracy than for children's marriage and childbearing. Note that there are no differences in these patterns by the gender of the children (not shown in tables).

We argued under Mothers' Reports of Children's Family Formation Behavior that children may not report cohabitations to their mothers because mothers tend

⁹ Once again, because the duration of many cohabitations is quite short (Thornton, 1988), mothers' later reports of first cohabitation may actually reflect reports of a second cohabitation or of less than 1 month duration. However, the number of young people with multiple cohabiting experiences are relatively small in these data (see footnote 7).

to have a less positive view of cohabitation than do their children (Thornton, 1989). We find some support for this reasoning in our data. During the 1993 interviews with the focal children, those children who had ever cohabited were asked if they told their mothers about their first cohabitation. The results indicate that fully 91% of cohabitators reported that they told their mothers of their cohabitation. This represents a high level of child to mother communication about a potentially sensitive topic. Nevertheless, the 9% who did not tell their mothers of their cohabitation is nearly one-half of the total fraction of mothers of cohabiting children who failed to report the child's cohabitation. Unfortunately, the data do not include measures of the timing of the children's first discussions with their mothers about the children's cohabiting experiences. Nonetheless, the evidence fails to support the idea that lack of communication accounts for most of the lower quality of mothers' reports of their children's cohabitations.

An alternative possibility is that mothers find it more difficult to recall their children's cohabiting experiences. This might occur because mothers are less likely to observe their children's cohabiting experiences directly or because there are few public reminders, such as anniversaries, of these experiences. Another possibility is that mothers who disapprove of cohabitation selectively forget their children's cohabiting experiences. Another explanation may be that mothers who disapprove of cohabitation may simply fail to report their children's cohabiting experiences to interviewers.

To explore these issues we test multivariate models of the discrepancies between mothers' and their children's reports of the children's cohabitation behavior, among the children who cohabited. Here the dependent variable is coded one (1) if the mother and child reports match and zero (0) if mothers report no cohabitation had occurred even though the child reports cohabitation had occurred (mother-child pairs in which the child had not cohabited are not included in this model). The independent variables we use in this model include the child's gender, the mother's total number of children, the mother's education, the mother's age, whether the mother had ever experienced a marital dissolution, the mother's attitude toward cohabitation (measured so that high scores reflect positive attitudes toward cohabitation), the focal child's view of the mother's attitude toward cohabitation (also measured so that high scores reflect positive attitudes toward cohabitation), and the mother's report of the quality of her relationship with the child (measured so high scores reflect more positive relationships). Results from logistic regression estimates of this multivariate model are displayed in Table 6. The logistic coefficients are transformed so that a coefficient of 1.00 represents no effect, a coefficient of less than 1.00 represents a negative effect (reducing the odds mother and child's reports match), and a coefficient of greater than 1.00 represents a positive effect (increasing the odds mother and child's reports match).

Only three of these predictors had a significant impact on the discrepancy in reports, controlling for the other predictors (Table 6). The first is the mother's age. Older mothers are significantly less likely to provide reports that match their

TABLE 6

Logistic Regression Estimates of Mothers' Characteristics Predicting Mothers' Reports of Cohabitation Experience among Children Who Cohabited (*t* Ratio in Parentheses)

	Mother and child's report match
Child is male	.99 (.04)
Mother's total number of children	1.01 (.17)
Mother's years of education completed	1.07 (1.00)
Mother's age	.94* (2.27)
Mother ever experienced marital dissolution	.85 (.67)
Mother's attitude toward cohabitation (high scores = positive attitude)	1.19* (2.90)
Child's view of mother's attitude toward cohabitation (high scores = positive attitude)	1.61* (2.48)
Mother's relationship with child (high scores = positive relationship)	.83 (.88)
<i>N</i>	404
χ^2	28.04*
df	8

* $p < .05$.

children's reports. The reason for this result is not obvious. We also find that mothers who have positive attitudes toward cohabitation are significantly more likely to provide reports of their children's cohabiting experiences that match the children's own reports. Here it seems likely that mothers who feel positively toward cohabitation are more apt to know and tell interviewers about their children's cohabiting experiences. We also find that mothers of children who believe their mothers have more positive attitudes toward cohabitation are significantly more likely to provide reports of their children's cohabiting experiences that match the children's own reports. In this case it appears likely that children are more likely to discuss the cohabiting experience with their mothers if the children believe their mothers have more positive attitudes toward cohabitation. In both cases, either due to the mothers actual attitude, or due to the child's perception of that attitude, positive attitudes toward cohabitation appear to increase the chances mothers report those experiences accurately.

So, in this multivariate model, in which we control for mothers' total number of children, education, experiences with marital dissolution, and the quality of the relationships they have with their children, we find mothers' attitudes toward cohabitation and children's views of those attitudes each have a significant effect on reporting discrepancies while other factors do not. This contrast points toward mechanisms internal to the mothers' and their children's views, such as a reluctance to share this information with interviewers or reluctance of children to share this information with their mothers, rather than the cognitive difficulty of the task. Thus, it may be mothers' attitudes toward the behavior in question that determine the quality of their reports of their children's behavior across many different behavioral domains.

Note that counter to our hypothesis, we find no significant impact of mothers' total number of children. We predicted that mothers with many children face a more difficult cognitive task and therefore are likely to provide lower quality reports. We also predicted that siblings of the focal child may provide an additional source of information to mothers with many children, thereby improving the quality of their reports. It may be that both these opposing forces are at work and that they compensate for each other enough to produce no overall effect of family size on reporting quality. Alternatively, neither mechanism may be at work.

Comparing Models Based on Mothers' Reports and Those Based on Children's Reports

Next we compare results generated from children's own reports with results obtained from mothers' reports of their children's behavior. This comparison proceeds in two steps. In the first step we compare the univariate distributions of measures of the children's family formation experiences obtained from the children with those obtained from their mothers. We have chosen the monthly baseline hazard of the event as our measure. We compare hazard rates obtained from maternal and child reports for first marriage, first cohabitation, first childbirth, and first separation. In the second step we compare two sets of multivariate models of the children's family formation experiences. One set of models is estimated using reports from the children, and the second set of models is estimated using reports from the mothers. The multivariate models use the hazard of each of the four family formation events as the dependent variable.

Figure 1 provides a comparison of two curves depicting the hazards of the children's first marriages (rates are events per months of exposure). One of the curves is based on data from the mothers, the other is based on data from the children themselves. These two curves are nearly identical in both their levels and their shapes. This indicates that the information we obtain from mothers on the hazard of their children's first marriages is virtually the same as the information we obtain from the children themselves.

Figure 2 provides the same comparison for monthly hazards of the children's first cohabitation. Here we find again that the two curves are quite similar, although the curve based on mothers' reports is slightly lower and lagged slightly behind the curve based on children's reports. This result is a product of the lower levels of reporting and the asymmetry in the reporting discrepancies: mothers tend to report less cohabitation than their children and they tend to report the timing of their children's first cohabitations as somewhat later. Nevertheless, the hazard curve based on maternal reports is similar to the shape of the curve based on the children's reports.

We also find the correspondence between the hazard curves based on mothers' and children's reports to be high for childbearing (Fig. 3) and separation (Fig. 4). The similarity of the first birth hazard rates using mothers' and children's reports

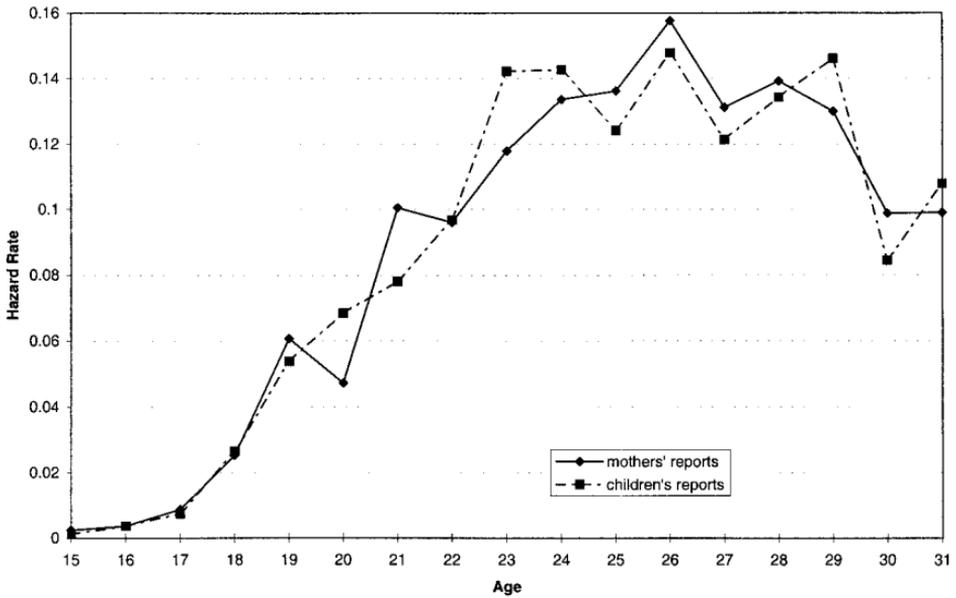


FIG. 1. Comparison of hazard rates for the children's first marriages from mothers' and children's reports.

is remarkably high. This result reinforces what we have found throughout the analysis—mothers seem to have extremely high-quality information about the timing of their children's childbearing. The similarity in hazards of separation

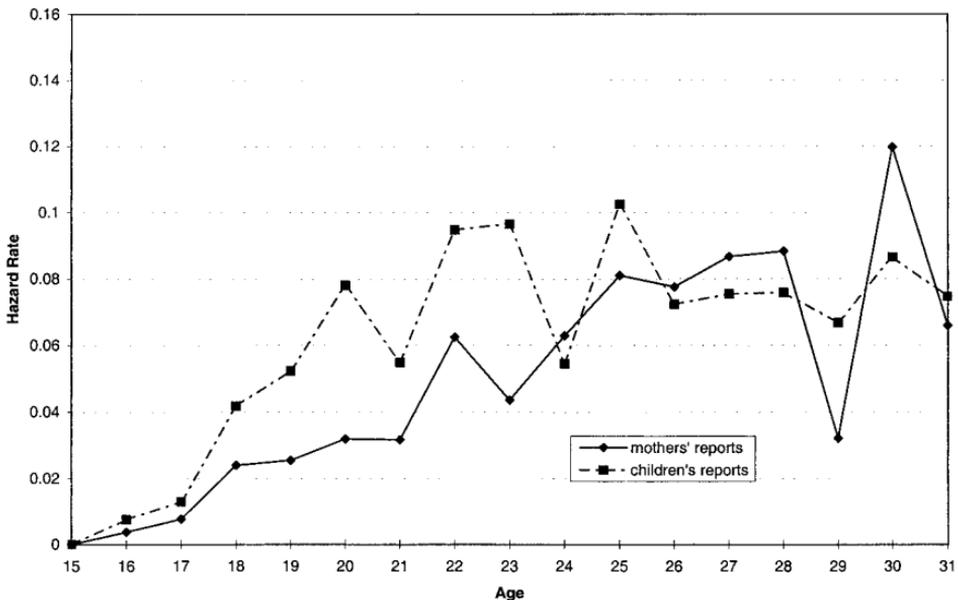


FIG. 2. Comparison of hazard rates for the children's first cohabitations from mothers' and children's reports (treating marriage as a competing risk).

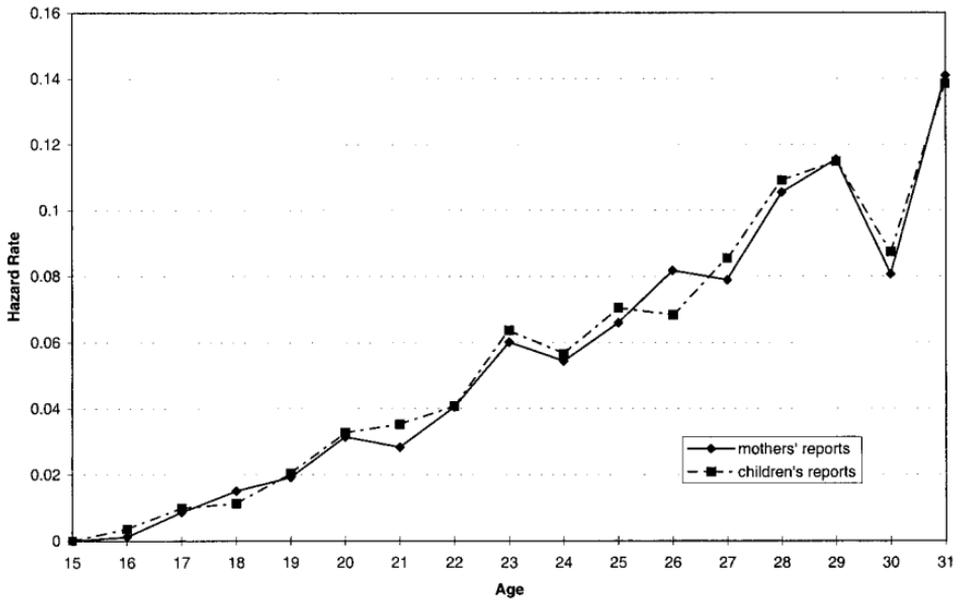


FIG. 3. Comparison of hazard rates for the children's first childbirths from mothers' and children's reports.

based on mothers and children's reports is striking. Overall these results demonstrate the close correspondence between the data obtained directly from the children and the data obtained from those children's mothers.

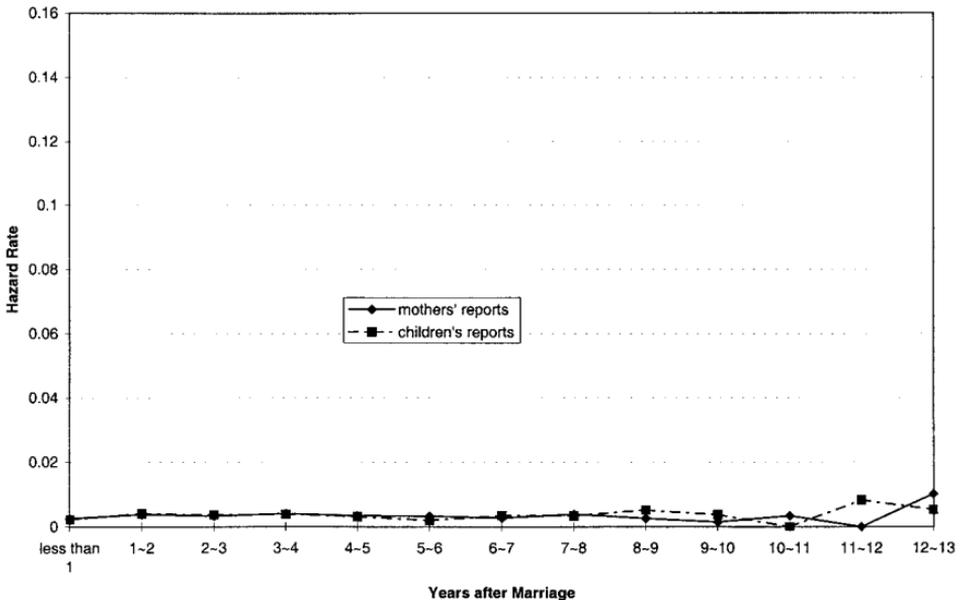


FIG. 4. Comparison of hazard rates for the children's first marital separations from mothers' and children's reports.

TABLE 7

Comparison of Coefficients Estimated from Continuous Time Hazard Models Using Mother's Report of Child's Family Formation Event Timing to Coefficients Estimated from Continuous Time Hazard Models Using Child's Report of Child's Family Formation Event Timing (*t* Ratios in Parentheses)^a

Independent variables	Marriage		Cohabitation		Childbearing		Separation	
	Mother's report	Child's report						
Father's education	.98 (.83)	.97 (1.01)	1.00 (.05)	1.00 (.02)	.96* (1.68)	.96* (1.89)	.99 (.21)	1.01 (.35)
Mother's education	.91* (3.34)	.93* (2.33)	.99 (.32)	.96 (1.35)	.92* (2.92)	.92* (3.01)	.96 (.75)	.99 (.26)
Mother's age at marriage	.99 (.81)	.99 (.81)	.95* (2.16)	.97* (1.66)	.98 (1.37)	.97* (1.67)	.96 (1.25)	.98 (.78)
Mother's premarital pregnancy	1.23 (1.53)	1.21 (1.30)	1.37* (2.03)	1.38* (2.42)	1.08 (.63)	1.07 (.56)	1.42* (1.82)	1.48* (2.09)
Mother catholic	.93 (.73)	1.00 (.01)	.82 (1.54)	.81* (1.97)	1.02 (.17)	1.00 (.01)	.83 (1.12)	.76 (1.61)
Mother's marital disruption	.92 (.66)	.76 (1.67)	1.35* (2.15)	1.91* (5.46)	.88 (.10)	.87 (1.14)	1.62* (2.62)	1.51* (2.29)
Child female	1.78* (5.66)	1.68* (4.62)	1.03 (.22)	1.05 (.44)	1.34* (3.11)	1.31* (2.96)	1.27 (1.36)	1.15 (.82)
χ^2	60	45	23	55	40	43	21	17
df	7	7	7	7	7	7	7	7

^a When mothers gave a range of times in their reports we used the midpoint of that range for the comparisons in this table.

* $p < .05$ (one-tailed test).

Now we compare estimates from multivariate hazards models of children's family formation experiences. Estimates of multivariate models of these family formation processes is a typical use of this type of event timing data. We estimate a pair of hazard models for each domain of children's family formation behavior—first marriage, first premarital cohabitation, first child birth, and first marital separation. First marriage and first cohabitation are treated as competing risks, so that the analysis of cohabitation is censored at the time a respondent marries and the analysis of marriage is censored at the time the respondent cohabits (for an explanation of this treatment see Axinn and Thornton, 1993). For ease of comparison, we use the same set of independent variables in each of our models. These variables are father's education, mother's education, mother's age at marriage, mother's premarital pregnancy, if mother is Catholic, if mother experienced a marital disruption, and the child's gender. Previous research indicates these aspects of family background are likely to influence the domains of family formation studied here (Barber, 2001; Morgan and Rindfuss, 1985; Rindfuss, Morgan, and Swicegood, 1988; Thornton, 1991). Our measures of these independent variables came from the interviews with the mothers in our study. In each pair of models, the dependent variable in the first model is based on reports from the mothers, and the dependent variable in the second model is based on reports from the children.

Table 7 displays the results of our estimates of the multivariate models. All of these models are estimated using Cox proportional hazards methods. The coef-

ficients displayed in Table 7 are multiplicative, so a coefficient of 1.00 represents no effect on the hazard, a coefficient of less than 1.00 represents a negative effect, and a coefficient of more than 1.00 represents a positive effect. First examine the coefficients in the first two columns of Table 7. These coefficients represent the effects of family characteristics on the hazard of the child's entry into marriage, treating cohabitation as a competing risk. Although there are minor differences in the coefficients from the two models, the two sets are similar. Just as important, the model based on mothers' reports generates the same substantive conclusions as the model based on children's reports. In both cases, mother's education significantly delays marriage and female children marry significantly more quickly than male children (see Table 7). Thus our estimates using mother's reports of their children's marriage timing lead us to the same conclusions as we would reach having interviewed the children themselves.

Now examine the third and fourth columns of Table 7. These coefficients represent the effects of family background on the hazard of the child's entry into cohabitation, treating marriage as a competing risk. Once again, although there are minor differences in the coefficients from the two models, the two sets are extremely similar. This is impressive given our previous analysis indicating that mothers' reports of their children's cohabitation behavior are of the lowest quality among the domains we examine. In one case, even though the coefficients are very similar, the two models lead us to different conclusions about the statistical significance of the effect. Children of Catholic mothers have a statistically significant lower hazard of cohabitation in the model based on children's reports, though this effect is not significant in the model based on mothers' reports. In every other case, however, the model based on mothers' reports generates the same estimate of direction and statistical significance as the model based on children's reports. In both data sources, children of mothers who married late have lower rates of cohabitation, those with mothers who had a premarital pregnancy have higher rates of cohabitation, and those with mothers who experienced a marital dissolution have higher rates of cohabitation (see Table 7). Each of these findings is consistent with previous research (Thornton, 1991). Thus even in our models of cohabitation, our estimates using mothers' reports of their children's behavior lead us to nearly the same conclusions as we would reach having interviewed the children themselves.

Next, look at the fifth and sixth columns of Table 7. These coefficients represent the effects of family background on the hazard of the child's first childbirth. For the third time, even though there are some minor differences in the coefficients from the two models, the two sets are remarkably similar. This is hardly surprising, given that our analysis shows that mothers provide extremely high-quality reports of the timing of their children's experiences with childbearing. However, once again, in one case, even though the coefficients are very similar, the two models give different estimates of statistical significance. Children of mothers who married late have a significantly lower hazard of childbearing in the model based on children's reports, though this effect is not

significant in the model based on mothers' reports. In every other case, however, the model based on mothers' reports generates exactly the same estimates of direction and statistical significance of effects as the model based on children's reports. In both models, children with highly educated fathers have a lower hazard of childbearing, children with highly educated mothers have a lower hazard of childbearing, and female children have a higher hazard of childbearing (see Table 7).

Finally, examine the last two columns in Table 7. These coefficients represent the effects of family background on the hazard of the child's first marital separation. For the fourth time, although there are some minor differences in the coefficients from the two models, the two sets of coefficients are quite similar. Furthermore, just as with our models of marriage timing, the model based on mothers' reports generates the same substantive conclusions as the model based on children's reports. In both models, children of mothers who experienced a premarital pregnancy or a marital disruption have a significantly higher hazard of separation (see Table 7). Thus our estimates using mothers' reports of their children's marital separation timing lead us to the same conclusions as we would reach having interviewed the children themselves.

We also test for statistically significant differences in each pair of models. To accomplish this test we first constrain the coefficients for the model based on the mothers' reports to those generated from the corresponding model based on the children's reports. We then compare the constrained model with the unconstrained model, with both based on mothers' reports. The deterioration in goodness-of-fit of the constrained model as compared to that of the unconstrained model yields a χ^2 test with 7 degrees of freedom. This comparison yields a χ^2 statistic of 3.35 for marriage, 7.23 for cohabitation, 0.25 for childbearing and 2.12 for separation (each with 7 degrees of freedom). Because this test assumes the coefficients from the model generated from the children's reports to be free from sampling error, the test is conservative in the direction of overstating the differences. However, none of the comparisons are statistically significant by this conservative test.

Overall this comparison demonstrates the similarities between estimates based on mothers' reports of the children's family formation behaviors and estimates based on the children's own reports. Although not all coefficients match exactly, in general, they are extremely similar. In two cases the differences in data sources lead us to different conclusions about statistical significance, but in all the remaining cases (26) we arrive at the same substantive conclusions using the two data sources. Furthermore, we find no significant differences in estimated parameters between models based on mothers' reports and those based on children's reports. The choice to use mothers' reports of their children's behaviors involves sacrificing some level of data quality, but the savings of data collection costs may be substantial.

CONCLUSION

Mothers' reports of their children's family formation experiences are characterized by high levels of completeness, precision, and accuracy, particularly in the domains of marriage and childbearing. Also, models based on mothers' reports generate nearly the same results as those based on the children's reports. Mothers appear to know a great deal about their children's family formation, and they appear to recall accurately what they know. This means mother's reports of their children's family formation behavior may provide an adequate substitute for children's own reports of their behavior in many circumstances.

This information about the high quality of mothers' reports of their children's family formation provides a valuable tool in designing more cost efficient measures of family background. Interviews with mothers can provide the information about both mother and child needed to estimate intergenerational models. Interviews with mothers can provide data about all their children — data that can be used to construct measures of an entire sibling set. In fact, our analysis indicates that mothers provide high-quality reports on all their children's family formation behavior (that is, reports characterized by high levels of completeness and precision). Thus mothers' reports of their children's family formation behavior could be used to model both intergenerational and sibling effects on family formation processes.

Of course, mothers' reports are not a perfect substitute for data obtained directly from children themselves. Mothers report their children's marital and childbearing behavior with greater completeness and precision than their children's cohabitation and marital separation behavior. These differences are probably a product of the fact that mothers are more likely to observe, participate in, and be reminded of their children's marital and childbearing experiences than they are their children's cohabitation and marital separation experiences. Our analysis shows that mothers' reports of their children's cohabitation behavior are less accurate than their reports of their children's other family formation behaviors. This may be because mothers who disapprove of cohabitation are less likely to tell interviewers about their children's cohabitations. Or, it may be that children who believe their mothers disapprove of cohabitation are less likely to tell their mothers about those experiences. Our findings suggest researchers should use mothers' reports of their children's behavior with caution, as the quality of those reports is quite likely to vary across substantive domains.

Nonetheless even in the case of cohabitation, mothers reports are relatively high in quality. By allowing mothers to report the timing of their children's cohabitations and separations in alternative metrics, such as the child's age or the number of years ago the event occurred, the level of completeness and precision in mothers' reports of these behaviors nearly matches mothers' reports of children's marital and childbearing behavior. In fact, flexibility in the reporting metric is an important principle in the design of questions aimed at generating complete reporting of the timing of children's family formation behaviors from

mothers. Furthermore, mothers' reports of their children's cohabitation behavior generate nearly the same results from empirical models as children's own reports of cohabitation behavior. The reduced precision has only small effects on the parameter estimates generated by hazard rate models.

Our analysis also provides insights into the more general issue of informant reports on other people's behaviors. Our results are consistent with the conclusion that in some situations informants may be able to provide highly complete and accurate data regarding the behavior of others. Of course, this is likely to depend on the relationship between informants and the persons about whom they are reporting. On average, mothers enjoy relatively positive, close relationships with their children (Rossi and Rossi, 1990; Thornton, Orbuch, and Axinn, 1995). Yet even in this dyad, the quality of mothers' reports depends on the subject matter being reported. Mothers provide somewhat lower quality reports of behaviors of which they disapprove—in our case nonmarital cohabitation. This phenomenon is likely to characterize the quality of any informant's reports of some other person's behavior. More research on mother-child pairs, across a bigger range of subject matter, will be needed to determine exactly how mothers' reporting quality varies by subject matter. Research on reporting quality in other informant-individual pairs may elicit different patterns of reporting quality, but we can be relatively sure that reporting quality will vary by subject matter. Furthermore, the highest levels of quality are likely to be found for subjects that the two individuals in question are highly motivated to discuss and subjects of which the informant approves. Childbearing is an example of such a subject matter in our examination of mother-child pairs.

Our results regarding flexibility in the reporting metric are also likely to pertain to the quality of data from other informant-individual pairs. We find that allowing mothers to report on the timing of their children's family formation experiences in several different alternative metrics increases the quality of their reports. This is likely to be true for any informant reports of another person's behavior and therefore a useful design feature to add to such data collection efforts.

REFERENCES

- Axinn, W. G., Clarkberg, M. E., and Thornton, A. (1994). "Family influences on family size preferences," *Demography* **31**(1), 65-79.
- Axinn, W. G., Duncan, G., and Thornton, A. (1997). "The effect of parental income, wealth, and attitudes on children's completed schooling and self-esteem," in *Growing Up Poor* (J. Brookes-Gum and Gr. Duncan Eds.), Sage, New York.
- Axinn, W. G., Pearce, L. D., and Ghimire, D. J. (1999). "Innovations in life history calendar applications," *Social Science Research* **28**, 243-264.
- Axinn, W. G., and Thornton, A. (1993). "Mothers, children, and cohabitation: The intergenerational influences of attitudes and behavior," *American Sociological Review* **58**, 233-246.
- Axinn, W. G., and Thornton, A. (1992). "The influence of parental resources on the timing of the transition to marriage," *Social Science Research* **21**, 261-285.

- Barber, J. S. (2001). "The intergenerational transmission of age at first birth among married and unmarried men and women," *Social Science Research* **30**, 219–247.
- Barber, J. S., and Axinn, W. G. (1998). "The impact of parental pressure for grandchildren on young people's entry into cohabitation and marriage," *Population Studies* **52**, 129–144.
- Barber, J. S., Axinn, W. G., and Thornton, A. (1999). "The influence of unwanted childbearing on mother–child relationships," *Journal of Health and Social Behavior* **40**(3), 231–257.
- Baumrind, D. (1978). "Parental disciplinary patterns and social competence in children," *Youth and Society* **9**, 239–276.
- Blake, J. (1989). *Family Size and Achievement*, Univ of California Press, Berkeley.
- Blau, P. M., and Duncan, O. D. (1967) *The American Occupational Structure*, Wiley, New York.
- Caspi, A., Moffit, T. E., Thornton, A., Freedman, D., Amell, J. W., Honalee, H., Smeijers, J., and Silva, P. A. (1996). "The life history calendar: A research and clinical assessment method for collecting retrospective event history data," *International Journal of Methods in Psychiatric Research* **6**, 101–114.
- Currie, J., and Thomas, D. (1995). "Does Head Start make a difference?," *American Economic Review* **85**(3), 341–364.
- Downey, D. B. (1995). "When bigger is not better: Family size, parental resources, and children's educational performance," *American Sociological Review* **60**, 746–761.
- Eisenhower, D., Mathiowetz, N. A., and Morganstein, D. (1991). "Recall error: Sources and bias reduction techniques," in *Measurement Errors in Surveys* (P. P. Biemer, R. M. Groves, L. E. Lyberg, N. A. Mathiowetz, and S. Sudman, Eds.), Wiley New York.
- Freedman, D., Thornton, A., and Camburn, D. (1980). "Maintaining response rates in longitudinal studies," *Sociological Methods and Research* **9**, 87–98.
- Freedman, D. S., Thornton, A., Camburn, D., Alwin, D., and Young-DeMarco, L. (1988). "The life history calendar: A technique for collecting retrospective data," in *Sociological Methodology* (C. C. Clogg, Ed.), pp. 37–68, Jossey-Bass, San Francisco, CA.
- Geronimus, A. T., and Korenman, S. (1993). "The socioeconomic costs of teenage childbearing: Evidence and interpretation," *Demography* **30**(2), 281–290.
- Geronimus, A. T., and Korenman, S. (1992). "The socioeconomic consequences of teen childbearing reconsidered," *Quarterly Journal of Economics* **CVII**, 1187–1214.
- Groves, R. M. (1989). *Survey Errors and Survey Costs*, Wiley, New York.
- Hauser, R. M., and Mare, R. D. (1994). *Study of American Families* [computer file], Data and Program Library Service [distributor], University of Wisconsin—Madison.
- Hogan, D., and Kitagawa, E. (1985). "The impact of social status, family structure, and neighborhood on the fertility of Black adolescents," *American Journal of Sociology* **90**, 825–855.
- Mare, R. D. (1994). "Discrete-time bivariate hazards with unobserved heterogeneity: A partially observed contingency table approach," in *Sociological Methodology* (P. V. Marsden, Ed.), pp. 341–383, Blackwell Publishers, Oxford, U.K.
- Marini, M. M. (1978). "The transition to adulthood: Sex differences in educational attainment and age at marriage," *American Sociological Review* **43**, 483–507.
- Means, B., Swan, G. E., Jobe, J. B., and Esposito, J. L. (1991). "An alternative approach to obtaining personal history data," in *Measurement Errors in Surveys* (Paul P. Biemer, R. M. Groves, L. E. Lyberg, N. A. Mathiowetz, and S. Sudman, Eds.), Wiley, New York.
- Morgan, S. P., and Rindfuss, R. R. (1985). "Marital disruption: Structural and temporal dimensions," *American Journal of Sociology* **90**(5), 1055–1077.
- Rindfuss, R., Morgan, S. P., and Swicegood, G. (1988). *First Births in America: Changes in the Timing of Parenthood*, Univ. of California Press, Berkeley.
- Rodgers, J. L., and Rowe, D. C. (1988). "Influence of siblings on adolescent sexual behavior," *Developmental Psychology* **24**, 722–728.
- Rossi, A. S., and Rossi, P. H. (1990). *Of Human Bonding*, de Gruyter, New York.
- Rowe, D. C., Rodgers, J. L., Meseck-Bushey, S., and St. John, C. (1989). "Sexual behavior and

- nonsexual deviance: A sibling study of their relationship," *Developmental Psychology* **25**, 61–69.
- Sewell, W. H., and Hauser, R. M. (1975). *Education, Occupation, and Earnings: Achievement in the Early Career*, Academic Press, New York.
- Sudman, S., Bradburn, N., and Schwarz, N. (1996). *Thinking about Answers: The Application of Cognitive Processes to Survey Methodology*, Jossey-Bass, San Francisco, CA.
- Thornton, A. (1988). "Cohabitation and marriage in the 1980s," *Demography* **25**, 497–508.
- Thornton, A. (1989). "Changing attitudes toward family issues in the United States," *Journal of Marriage and the Family* **51**, 873–893.
- Thornton, A. (1991). "The influence of the marital history of parents on the marital and cohabitational experiences of children," *American Journal of Sociology* **96**, 868–894.
- Thornton, A., and Camburn, D. (1987). "The influence of the family on pre-marital sexual attitudes and behavior," *Demography* **18**, 681–694.
- Thornton, A., Freedman, D. S., and Camburn, D. (1982). "Obtaining respondent cooperation in family panel studies," *Sociological Methods and Research* **11**, 33–51.
- Thornton, A., Orbach, T. L., and Axinn, W. G. (1995). "Parent-child relationships during the transition to adulthood," *Journal of Family Issues* **16**(5), 538–564.
- Thornton, A., and Young-DeMarco, L. (2001). "Four decades of trends in attitudes toward family issues in the United States: The 1960s through the 1990s", *Journal of Marriage and the Family* **63**(4), 1009–1037.