

*A Research Note on:*

*THE USE OF EVENT-HISTORY DATA IN MOBILITY STUDIES*

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*ABSTRACT*

*This paper examines residential mobility rates over the lifetime of households. The sample includes 404 households from the Omaha-Council Bluffs SMSA and from four, small, nonmetropolitan communities in Nebraska and Iowa.*

*The household history, beginning at the date of household formation, is divided into five-year segments. The mobility rate at each marriage cohort is analyzed for its relationship to previous and subsequent cohorts and number of previous moves. The results show that the older the household, the lower the mobility rate. Higher mobility rates are found within the early years of marriage. Mobility for each grouping of marriage cohorts does not change appreciably even if the number of previous moves increases. During any given period of time, where the mobility rate of young households is relatively low, the mobility rate of more established households is relatively high, and vice versa, resulting in a stable rate of mobility over forty years.*

*INTRODUCTION*

This paper examines residential mobility rates over the lifetime of a household starting at the date the household was formed. This study is an example of event-history data analysis. The primary purpose of this research is to test the hypotheses that residential mobility decreases over time. This study also hypothesizes that mobility is positively related to the number of previous moves a household has made. Insights into the overall mobility rates of the population and reasons why residential mobility has remained stable over the last 40 years are also discussed.

Since the data on residential mobility in the United States first became available in the 1940s, approximately one out of five individuals has moved each year. That the percentage of the population moving each year fluctuated in a narrow range of between 17 and 22 percent is amazing, considering the economic, political, and social changes that have taken place during the past 40 years. The fact that mobility has remained relatively constant gives rise to the idea that moving behavior is affected by factors relatively insensitive to the

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changes that have taken place in the United States (Rossi, 1980). Analyzing mobility over time unearths some conditions (age, household size, and education level) that influence mobility. Such analysis permits examination of external social and economic conditions that may affect mobility. Relatively constant mobility rates may be the result of a subtle complex set of compensating factors.

#### *THE USE OF LIFE-HISTORY DATA IN MOBILITY STUDIES*

There are many studies of factors that explain residential mobility. Only a few studies, however, utilize event-history data. Morrison (1967) suggests that to study residential mobility, the history of each individual household must be divided into short, temporal segments to generate a large number of observations for contingency table analysis. With this method, he analyzes migration patterns, using event-history data gathered from registration files in the Netherlands. Multiple regression with event-history data has been used by several researchers (Carey, 1979; Fredland, 1974; Morris, 1976) to analyze the relationships between residential mobility and a number of demographic and housing deficit variables. Speare, Golstein, and Frey (1974) use event-history data in multiple classification analysis to study residential mobility.

Gladhart (1973), using event-history data, divides household histories into one-year segments and uses probit analysis to explore the relationship between residential crowding and residential mobility. A similar procedure is used in constructing the data for this analysis.

#### *PROCEDURES*

The sample for this research included 404 households drawn from the Omaha-Council Bluffs SMSA and from four, small, nonmetropolitan communities in Nebraska and Iowa. Of all the households interviewed only the ones with a female head or wife of head who was or who had been married were included in this analysis.

The data were transformed into longitudinal yearly records of each household's life, beginning at the date the household was formed. Each year of the household's history became a single observation and each household contributed as many observations as the number of years the household had been in existence. For example, households that had lived together for five years contributed five observations to the data. Couples that had been married ten years added ten observations. In all, 9,208 yearly segments were contributed by the 404 households in the sample.

Residential mobility, as utilized in this analysis was a dichotomous variable that was coded 1 if a move occurred within a given yearly segment and 0 if no move occurred during the year. Therefore, if a household had been together for ten years, and had moved twice, two of the observations contributed by that household would be coded 1 (a move occurred) and eight would be coded 0 (no move occurred). By using this form of coding for the mobility variable, it was possible to combine the observations, add the scores of the mobility variable together and obtain the mean. The mean score would be the percentage of households moving within a given time period. By using this method of coding, mobility rates for various historical periods or the mobility of certain segments of the population were easily derived.

A concern raised about the use of event-history data divided into one-year segments was that the observations were not independent. Because each house contributed more than one marriage-year segment to the data, the assumption of

independent observations, which is characteristic of most statistical procedures used in social research, would appear to have been violated. It was not a concern in this study, however, because the kind of analysis reported permits correct estimation (Allison, 1982). The use of such data is an established practice and the results of statistical analysis employing such data are considered credible (Allison, 1982).

Another concern in the analysis of life-history data is the problem of censored observations. Data collected in the form of event histories are most often right-censored data. That is, any event which occurs after the cut-off point of the life history collected from each household is unobserved. Figure 1 illustrates this problem. The period of observation lies between the two vertical lines at 0 and  $a$ . The dates at which an event, such as a residential move occurs during the event history, are indicated by the vertical lines between 0 and  $a$ , which are denoted by  $t_1$ . In this example, the event occurs a fourth time. However, since the last time an event occurred is after the period of observation ended, it is not observed. What is observed, however, is a period of time between  $t_3$  and  $a$  where an event does not occur. Thus, the data are said to be "censored" on the right.

Some researchers opt to treat censored observations as though an event occurred at the time of the last observation (Tuma and Hannan, 1978). In this study, censored observations were included in the analysis in the same form in which they were originally coded. That is, if a move occurred in the first marriage-year segment of a household, that observation was given a value of one. If, however, no move occurred by the last marriage-year segment of the household, the observation was coded zero.

#### *RESIDENTIAL MOBILITY OVER TIME*

Several previous studies include the premise that mobility varies over time. An important aspect in the number of mobility studies is the stage in the family life cycle (Chevan, 1971; Pickvance, 1973; Rossi, 1955). The life cycle hypothesis states that housing needs change systematically with the life cycle of the family. The act of moving is primarily a means of bringing housing needs and actual housing conditions into equilibrium. The importance of the life cycle concept for the study of mobility lies in the fact that the housing needs of the family are assumed to vary as it goes through the stages. Therefore, rates of residential mobility change over time within households because mobility behavior differs at different stage of the life cycle.

Another time-related variable used in studies of residential mobility is age. Some studies maintain that younger families are much more likely to move than are older ones (Carey, 1979; Duncan and Newman, 1975; Pickvance, 1973). In the development of a causal model of mobility, Crull (1979) includes age as an independent variable having a direct, statistically significant, negative relationship to mobility. The mobility of both home owners and renters decreases over time. With renters, it appears that mobility declines in a curvilinear fashion (Gladhart, 1973).

Length of residence is a time-related variable used to describe residential moving behavior in various research studies (Barrs, 1975; Gladhart, 1973; Morrison, 1967; Duncan and Newman, 1975; Speare et al., 1974). In general, length of residence appears to have a negative relationship with residential mobility. However, this relationship is an indirect one through housing satisfaction. The effect of length of residence on mobility differs between home owners and renters. With owners, length of residence has an indirect effect on

residential mobility through housing satisfaction (Barrs, 1975; Speare et al., 1974). However, with renters, duration of residence has a direct negative effect on mobility with no intervention of residential satisfaction (Speare et al., 1974).

#### *DEFINITIONS OF THE VARIABLES*

In this analysis, the time variable is the rank order of the yearly segments contributed by each household in the sample. For example, for a household that contributes ten yearly segments to the data, their first yearly segment is coded 1, their second yearly segment is coded 2, and their tenth yearly segment is coded 10. This time variable is then divided into five-year categories. The first five segments contributed by each household are put into the first category, the second five-year segments (marriage years 6-10) are put into the second category, and so on.

Marriage cohort is based on the year of marriage. The first marriage cohort includes all the yearly segments of households that were married between 1972 and 1976. The second marriage cohort has the segments from households who were married between 1967 and 1971.

The number-of-previous-moves variable is a measure of chronic mobility. Each yearly segment is coded with the total number of residential moves the household has made up to that point in time. The values for number of previous moves range from 0 to 22, with a mean value of 3.2.

#### *ANALYSIS*

Table 1 shows an analysis of mobility rates differentiated by time and marriage cohort. Looking down the columns of the table reveals the mobility rates of each marriage cohort for five-year periods throughout time. For example, the right hand column (column 9) gives the mobility rates of the cohorts married before 1937. The first entry at the top of the column gives the probability of moving for that cohort during the first five years of marriage. The second entry gives the probability of moving during the second five years of marriage.

For each marriage cohort, the mobility rate declines as time passes. For example, the 1952-56 marriage cohort (column 5) includes all households that were formed between the years of 1952 and 1956. During the first five years these households were together, they had a mobility rate of 0.35. In other words, a move occurred in 35 percent of the observations represented. In years 6-10, the mobility rate for marriage cohort number 5 dropped to 0.19. By years 11-15, the rate of mobility had declined to 0.06, or 6 percent. Each marriage cohort shows a similar pattern of a relatively high mobility rate during the first years of marriage. The mobility rate, however, declines steadily as time passes.

The mobility rates of each marriage cohort for specific five-year periods of marriage are shown in each row of Table 1. The first row shows the mobility rate of each cohort during the first years of marriage. For the first five years of marriage, mobility rates have increased since the Depression years. There are some fluctuations, but the general trend is toward higher mobility early in marriage. During later years of marriage, there is no apparent trend in the rate of mobility. It is conceivable that the more remote occurrences (e.g. the first five years of marriage of cohort number 9 occurred before 1937) are more likely to have been forgotten. Other data (Kim, 1987) indicate that mobility for purposes of switching from rent to own have been occurring earlier in marriage. An

interesting phenomenon can be seen by looking across the first row. For the first five years, the mobility rate for the first marriage cohort is 0.45. For marriage cohort number 2, the mobility rate is somewhat lower, 0.36. However the mobility rate is higher for marriage cohort number 3 (0.43). It drops to 0.27 for the fourth marriage cohort. This pattern of a higher mobility rate of one cohort followed by a lower rate for the next cohort and then a higher rate for the following cohort is especially interesting, given the fact that the overall mobility rate has remained relatively constant over the last forty years.

**Table 1. Mobility rates by time and marriage cohort (N=9208)**

Time (in 5-year segments)	Marriage cohort (categorized in 5-year intervals)									Years Included
	1 (72-76)	2 (67-71)	3 (62-66)	4 (57-61)	5 (52-56)	6 (47-51)	7 (42-46)	8 (37-41)	9 (<1937)	
1-5	.45 (157)	.36 (315)	.43 (215)	.27 (175)	.35 (185)	.29 (166)	.37 (200)	.32 (145)	.22 (405)	<1937
6-10		.20 (170)	.19 (215)	.14 (175)	.19 (185)	.20 (165)	.17 (200)	.23 (145)	.19 (405)	37-46
11-15			.10 (135)	.14 (175)	.06 (185)	.16 (165)	.17 (200)	.18 (145)	.14 (405)	42-51
16-20				.09 (104)	.07 (185)	.08 (165)	.11 (200)	.09 (145)	.12 (405)	47-56
21-25					.06 (102)	.09 (165)	.09 (200)	.06 (145)	.08 (405)	52-61
26-30						.09 (96)	.07 (200)	.07 (145)	.07 (405)	57-66
31-35							.03 (116)	.05 (145)	.06 (405)	62-71
36-40								.06 (80)	.05 (405)	67-76
41+									.05 (805)	72-76
Totals	.45 (157)	.31 (485)	.26 (565)	.17 (629)	.16 (842)	.16 (921)	.15 (1316)	.14 (1095)	.10 (4045)	

To understand the implications of the fluctuating mobility rate shown by rows in Table 1, it is necessary to examine mobility rates of specific calendar years that are aligned diagonally. These are the mobility rates for a 10-year time period associated with each marriage cohort. For example, marriage cohort number 2 includes all households that were formed in 1967-1971. During the first five years of marriage, these households had a mobility of 0.36. However, this mobility rate is actually measured over a ten-year calendar period. The first five years of a household formed in 1967 include the years 1967-1972. The

first five years of household formed in 1971 include the years 1971-1976. Therefore, the mobility rate of 0.36 is based on calendar year observations between 1967-1976.

The mobility rates listed along the diagonal lines in Table 1 reflect the mobility during the dates that are listed in the last column of the table. The longest diagonal line of mobility rates represents mobility that took place during 1972-1976. Because the data were collected in 1976, no moving behavior that occurred after the year is available for analysis. Therefore, marriage cohort number 1 is associated with observations during a five-year period rather than a ten-year period like all the subsequent marriage cohorts.

By comparing the mobility rates along the diagonal lines associated with 1972-1976 and 1967-1976, the phenomenon of fluctuating mobility rates between marriage cohorts can be used to explain the overall stability in residential mobility rates. In the years 1972-1976, marriage cohort number 1 had a relatively high mobility rate (0.45). In comparison, between 1967 and 1975, marriage cohort number 2 had a mobility rate of 0.36, significantly lower in value than that of marriage cohort number 1. However, between 1967 and 1976, marriage cohort number 4 had a mobility rate of 0.14. This rate is somewhat higher than the comparable mobility rate of 0.10 which is associated with marriage cohort number 3 in 1972-1976.

The pattern of mobility that emerges in Table 1 is that for any given calendar period, if the mobility rate for newly formed households is high, the mobility rate for longer established households will be lower than the previous mobility rates of long established households. If newly formed households have a low mobility rate as compared to the newly formed households in previous time periods, the rate of subsequent cohorts will be higher than similar cohorts in previous time periods.

The same pattern can be seen when comparing the mobility rates between 1962-1971 and 1957-1966. Between 1962 and 1971, newly formed households had a mobility rate of 0.43. In comparison, newly formed households had a mobility rate of 0.27 between the years 1957 and 1966. However, households that had been together for 11-15 years had a mobility rate of 0.06 in 1962-1971, but this same group had a mobility rate of 0.126 in 1957 through 1966. By taking an average measurement of the mobility rates along the diagonal lines in Table 1, an overall average-mobility rate for each calendar period is derived. Because of the fluctuations between subsequent marriage cohorts, the overall average mobility rate is about the same for each calendar period.

Mobility rates within each five-year category of the time variable and marriage cohort tabulated by the number of previous moves is the next step in the analysis (see Table 2). The older the household, the lower the mobility rate. When there are no previous moves, higher mobility rates are found in the most recent marriage cohorts. That is, the longer the household has been formed, the lower the mobility rate. The same pattern is evident when there has been only one previous move. With two previous moves, the mobility rate remains relatively stable for all the marriage cohorts. When there have been three or more previous moves, the mobility rate is much higher for the recent marriage cohorts and then drops sharply. For households that have moved the same number of times, the households that have been together longer have lower mobility rates.

Table 2. Mobility rates by marriage cohort and number of previous moves (N=9208)

	Marriage cohort (categorized in 5-year intervals)								
	1	2	3	4	5	6	7	8	9
	(72-76)	(67-71)	(62-66)	(57-61)	(52-56)	(47-51)	(42-46)	(37-41)	(<1937)
Number of Previous Moves									
0	.54 (85)	.31 (184)	.38 (107)	.20 (156)	.20 (175)	.21 (153)	.18 (211)	.17 (162)	.11 (746)
1	.41 (32)	.27 (120)	.30 (105)	.14 (154)	.18 (144)	.16 (164)	.21 (142)	.16 (128)	.10 (631)
2	.17 (29)	.25 (71)	.20 (122)	.14 (129)	.16 (140)	.13 (157)	.23 (125)	.24 (96)	.09 (603)
3	.50 (8)	.27 (44)	.20 (75)	.15 (61)	.08 (164)	.12 (114)	.10 (243)	.16 (114)	.10 (413)
4	1.00 (1)	.28 (32)	.26 (58)	.24 (38)	.27 (40)	.20 (70)	.13 (136)	.11 (154)	.10 (408)
5+	.50 (2)	.53 (34)	.19 (98)	.19 (91)	.13 (179)	.13 (263)	.13 (459)	.10 (441)	.11 (1180)
Totals	.45 (157)	.31 (485)	.26 (565)	.17 (629)	.15 (842)	.15 (921)	.15 (1316)	.14 (1095)	.10 (3981)

Within each cohort, there is not a distinct pattern as number of moves increases. Some rates increase (cohort 2) and some rates decrease (cohort 3), while some rates vacillate (cohorts 5 and 7).

Higher mobility rates are found within the earlier years of marriage (see Table 3). The rates drop off sharply after about ten years and remain at a fairly stable low rate from then on. There is a noticeable increase in mobility as the number of previous moves increases, especially during the earlier years of marriage. When there are no previous moves, the mobility rate in the first five years of marriage is 0.30. This figure increases to 0.39 for households with two or more previous moves and 0.44 for households with four previous moves.

When mobility is tabulated by number of previous moves while controlling on time and on marriage cohort (see Table 4), the highest mobility rates are found in the years soon after the household was formed. For this comparison, both marriage cohort and the time variable are categorized into ten-year groupings. The first ten-year time category has the highest overall mobility rate of 0.33. This group includes all the observations from the households that were formed in the years 1967-1976. The first ten-year time category for each marriage cohort has the highest mobility rate of all the time segment categories included in

each marriage cohort. The second ten-year time category associated with each marriage cohort shows an appreciable drop in mobility in all cases. Mobility rates either increase or remain stable as the number of previous moves increases.

Table 3. Mobility rates by time and number of previous moves  
(N=9208)

Number of Previous Moves	Time (categorized in five-year intervals)								
	1	2	3	4	5	6	7	8	9
	(1-5)	(6-10)	(11-15)	(16-20)	(21-25)	(26-30)	(31-35)	(36-40)	(40+)
0	.30 (1093)	.12 (294)	.06 (175)	.07 (118)	.01 (77)	.03 (63)	.02 (57)	.07 (44)	.07 (58)
1	.36 (458)	.15 (390)	.09 (229)	.07 (174)	.07 (113)	.06 (71)	.04 (49)	.03 (37)	.00 (99)
2	.39 (236)	.17 (327)	.12 (265)	.08 (167)	.08 (135)	.04 (108)	.05 (83)	.03 (58)	.03 (93)
3	.39 (108)	.22 (245)	.10 (214)	.07 (204)	.06 (167)	.05 (126)	.05 (65)	.00 (56)	.04 (51)
4	.44 (43)	.25 (173)	.20 (142)	.13 (119)	.07 (114)	.04 (103)	.04 (108)	.06 (78)	.11 (57)
5+	.42 (24)	.29 (231)	.21 (385)	.13 (419)	.09 (406)	.10 (365)	.07 (294)	.07 (202)	.06 (421)
Totals	.33 (1962)	.19 (1660)	.14 (1410)	.10 (1210)	.07 (1012)	.07 (836)	.05 (656)	.05 (475)	.05 (779)

### CONCLUSIONS

The results of this analysis indicate that residential mobility declines as time passes in each household. In general, recently formed households have a higher mobility rate than do longer established households. As the number of previous moves increase, so does the overall mobility rate. However, young chronic movers tend to have a higher mobility rate than do older chronic movers.

The overall stability of the mobility rate over the last forty years has caused some researchers to conclude that there is little reason to investigate mobility at the household level. The results of this descriptive analysis reveal that even though residential mobility has remained relatively constant over the last forty years, the same household types are not moving in the predictive pattern assumed from previous research studies.

Younger households generally move more frequently than do older households. However, in a given time period, where the mobility rate of young households is

relatively lower, the mobility rate of more established households is relatively higher. This results in a stable rate of mobility for over 40 years (U.S. Bureau of the Census, 1974). In other words, it appears that more established households

Table 4. Mobility rates by marriage cohort, number of previous moves, and time (N=9208)

Time*	Marriage Cohort								
	1967-1976				1957-1966				
	1947-1956		1927-1936		1907-1916		1887-1936		
	(1-10)	(11-20)	(21-30)	(31-40)	(1-10)	(11-20)	(21-30)	(31-40)	(41+)
Number of Previous Moves									
0	.39 (269)	.31 (229)	.03 (34)	.24 (254)	.09 (65)	.11 (9)			
1	.30 (152)	.26 (195)	.05 (64)	.26 (163)	.06 (103)	.09 (42)			
2	.23 (100)	.24 (152)	.06 (99)	.24 (109)	.09 (127)	.31 (61)			
3	.31 (52)	.23 (83)	.09 (53)	.26 (76)	.04 (126)	.04 (76)			
4	.30 (33)	.31 (58)	.16 (38)	.33 (42)	.23 (43)	.04 (25)			
5+	.53 (36)	.17 (63)	.20 (126)	.29 (56)	.12 (236)	.09 (150)			
Totals	.33 (1642)	.26 (1780)	.11 (414)	.26 (700)	.09 (700)	.08 (363)			
Marriage Cohort									
1937-1946					Before 1937				
	(1-10)	(11-20)	(21-30)	(31-40)	(1-10)	(11-20)	(21-30)	(31-40)	(41+)
Number of Previous Moves									
0	.24 (244)	.07 (71)	.05 (41)	.06 (17)	.17 (391)	.06 (123)	.00 (90)	.03 (84)	.07 (58)
1	.31 (122)	.13 (69)	.02 (59)	.10 (20)	.19 (216)	.08 (167)	.08 (83)	.01 (66)	.00 (99)
2	.13 (101)	.23 (56)	.06 (34)	.03 (30)	.24 (101)	.11 (150)	.05 (148)	.05 (111)	.03 (193)
3	.25 (100)	.09 (123)	.05 (109)	.00 (25)	.38 (42)	.12 (116)	.07 (108)	.03 (96)	.04 (51)
4	.22 (55)	.14 (106)	.07 (81)	.04 (48)	.32 (28)	.19 (74)	.05 (111)	.05 (138)	.10 (57)
5+	.26 (68)	.15 (265)	.09 (366)	.05 (201)	.37 (32)	.23 (180)	.12 (270)	.09 (315)	.06 (447)
Totals	.27 (690)	.13 (690)	.07 (690)	.05 (341)	.21 (810)	.13 (810)	.07 (810)	.06 (810)	.05 (805)

\*In ten-year intervals

become more mobile as younger households become less, and vice versa. This "compensating" mobility behavior lends support to the idea that mobility research should be conducted at the household level to fully understand why people move.

The results of this research imply that there are externalities which affect moving behavior and will either increase or decrease the probability that certain segments of the population will move. Further research is necessary to discover these external predictors of residential mobility.

Recent census data reveal, for the first time since 1940, a significant decline in residential mobility. Both sociological and economic reasons have been given to explain this phenomenon. First, an increase in the number of home owners in the United States has stabilized the population in terms of moving behavior. Second, increases in the cost of homes and in mortgage interest has reduced the local mobility rate. Third, and perhaps most important, is the decline in the percentage of young households in the population with the passing of the Baby Boom children into later stages of the life cycle. These later stages are characterized by lower mobility rates. The present data do not show a decline in cohort-percent specific rates of mobility. These recent census findings, as well as the results of this analysis, further substantiate the premise that mobility is explained not only by certain demographic conditions of the household. Mobility is also explained by the effect of certain social and economic events that influence housing satisfaction and by housing policy that either encourages or prohibits families to move.

As policy makers work toward alleviating housing problems, an important consideration should be the recognition that individual households are affected by a number of conditions and events that cause them to be either satisfied or dissatisfied with their housing. Dissatisfaction in housing leads individuals and families to take action to rectify the situation that produces the dissatisfaction. Frequently, this action is a residential move. Future housing policy must reflect housing needs based upon both internal and external conditions and events. Then, it must provide housing that adequately meets these needs.

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