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Marriage, Divorce, and Remarriage from Retrospective Data: A Multiregional Approach

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FOREWORD

The ways in which our society may have to adapt and respond to changes induced by energy shortages, environmental ceilings, and food insufficiencies has been the subject of much analysis and debate during the past decade. In all of this flurry of concern with perceived limits to growth, however, insufficient attention has been accorded to the effects of a variable that may overshadow all of the rest in importance: changing population dynamics and lifestyles, and their socioeconomic impacts.

Explosive population growth in the less developed countries and population stabilization in the more developed nations have created unprecedented social issues and problems. The future societal ramifications of changing age compositions, patterns of family formation and dissolution, movements from one region to another, health status and demands for care, and participation in the labor force will be profound.

In this paper, Tom Espenshade uses IIASA's multistate models and programs to analyze changing patterns of marriage and divorce in one of IIASA's member nations: the United States. His analysis shows that women in the US are increasingly either postponing marriage or avoiding it altogether, the average duration of marriages is decreasing despite increased longevity, and marital disruption by divorce has grown sharply in the past decade and a half. Similar patterns have been identified in other IIASA countries, and their consequences for future fertility levels and demands for services will be profound.

A list of related publications appears at the end of this paper.

Andrei Rogers
Chairman
Human Settlements
and Services Area

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ABSTRACT

This paper applies the framework of multiregional population analysis to marital status changes as revealed by longitudinal retrospective data on marital histories collected as part of the June 1975 Current Population Survey supplement. Four marital statuses are used: never married, presently married, divorced, and widowed. Marital status life tables are computed for three periods: 1960-1965, 1965-1970, and 1970-1975, and for each period differences between males and females and between whites and blacks are described. We examine the proportion of a life table cohort every marrying, the mean age at first marriage, the number of marriages per person marrying, the proportion of marriages ending in divorce, the average duration of a marriage (or a divorce or a widowhood), and the like.

CONTENTS

MARRIAGE, DIVORCE, AND REMARRIAGE FROM RETROSPECTIVE DATA: A MULTIREGIONAL APPROACH*

1. INTRODUCTION

Many phenomena in the social sciences have as their central feature the fact that individuals make transitions over their lifetimes from one discrete status to another. Geographic mobility is one such example. If we imagine the population of a country as comprising an interconnected system made up of separate states or regions, then commonly an individual will live in more than one state during his lifetime. Some individuals may never leave their state of birth, whereas others may return to it at a later age (DaVanzo 1980). Other aspects of human behavior that are formally analogous to physical moves between physical regions include transitions from one marital status to another, entry into and exit from the labor force, social and occupational mobility, changes in the living arrangements of children, and the completion or resumption of education.

Until recently, methods did not exist to capture simultaneously the full range of individuals' lifetime experiences as related to the number of possible transitions actually experienced

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and the amount of time spent in each state. Such formal demographic models as developed by Coale (1972) and Keyfitz (1968) lacked a spatial dimension, and life table processes, including multiple decrement life tables, failed to allow for re-entry into previously occupied statuses. Even the use of proportional hazards models that permit the researcher to introduce covariates into the life table analysis is limited to exits from a single state.

Work to remedy these deficiencies has been pioneered by Andrei Rogers who first introduced the multiregional life table (Rogers 1973a, b) and later generalized the results in single-region demography to include many regions simultaneously (Rogers 1975). Multiregional or increment-decrement life tables permit simultaneous entry into (increments) and exit from (decrements) the l_x column of multistate life tables. The distinctive feature of the increment-decrement approach is that age-specific gross flows in and out of categories are explicitly taken into account.

In the past several years, theoretical work on the construction of increment-decrement life tables has been advanced through further contributions by Andrei Rogers and his colleagues (see, for example, Rogers and Ledent 1976, 1977, Willekens and Rogers 1978, Rees 1979, Keyfitz 1979, Rogers 1980, 1981, and Willekens et al. 1982) and by Robert Schoen (1975, 1976, 1977, 1979) and Schoen and Land (1979). There is now growing agreement on the proper way to calculate life table transition probabilities, although the matrix formulation of the problem that Rogers recommends is simpler and permits greater flexibility in applications.

Techniques of multiregional population analysis were developed initially to model patterns of interregional migration within a country. As long as a closed population can be subdivided into regions and data are available to describe the gross (as opposed to net) flows of individuals from one region to another, multistate methods are appropriate. A major example of applied work using the multiregional framework can be found in the country reports of the Comparative Migration and Settlement (CMS) Study, carried out by the International Institute for Applied Systems Analysis (IIASA), in collaboration with scholars from each of

IIASA's 17 member countries. The aim of this project is a quantitative assessment of migration and population distribution patterns in member nations when a common analytic strategy is applied*.

However, from their early uses, multistate methods have been applied to such other areas as tables of working life showing movements in and out of the labor force (Smith 1980, Schoen and Woodrow 1979, Willekens 1980, Hoem and Fong 1976), marital status changes (Schoen and Nelson 1974, Schoen and Urton 1977, 1979, Krishnamoorthy 1979, Koesoebjono 1981, and Willekens et al. 1982), living arrangements of children (Hofferth 1982), the educational system (Stone 1971, 1975), social mobility (Illingworth 1976), and fertility (Koo and Suchindran 1978, Suchindran and Koo 1980, Suchindran et al. 1977).

Each of these uses of multiregional methods possesses certain common features. They are applicable to situations in which the central interest is in describing the patterns of individuals' transitions between and among mutually exclusive, discrete statuses and in which it is recognized that not all individuals will experience all possible transitions over their lifetimes. The methods themselves allow for re-entry into previously occupied statuses, for the possibility that not all statuses will be experienced by all individuals, and for the fact that the order in which alternative states are experienced varies across individuals. The flexibility of these methods in characterizing the heterogeneity of individual experience over time and as individuals age makes them particularly well-suited to a study of life course transitions.

The purpose of this paper is to apply the methods of multiregional demographic analysis to data on the self-reported marital histories of adult men and women in the United States with the

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*The techniques of multiregional demographic analysis that are used in these country reports and the associated computer programs are described in Willekens and Rogers (1978). The member nations include the Soviet Union, Canada, Czechoslovakia, France, German Democratic Republic, Japan, Federal Republic of Germany, Bulgaria, United States, Italy, Poland, United Kingdom, Austria, Hungary, Sweden, Finland, and the Netherlands.

aim of clarifying the lifetime experiences of Americans regarding marriage, marital disruption, and remarriage. As we have noted, the application of multistate methods to marital status changes is not new, nor even is their use with data from the United States. The contribution of this paper lies elsewhere. The advantages of the matrix-oriented formulas provided by Rogers (1975) and Willekens and Rogers (1978) is that both population-based and status-based life table measures may be computed*. These specific procedures have not been applied to US data. Second, the work by Schoen and Nelson (1974) and Krishnamoorthy (1979) uses census and vital statistics data. In our study we rely on self-reported event histories of the marital careers of men and women. These event histories present some special opportunities in the construction of occurrence-exposure transition rates. Finally, no multistate life table analysis of US data has examined differentials between whites and blacks in the incidence of marriage, divorce, and remarriage.

2. THE NATURE OF MARITAL STATUS TRANSITIONS

In the research discussed here, we have followed convention by distinguishing four marital status categories: never married, presently married, divorced, and widowed. Each marital status is viewed as a discrete "state" that an individual may occupy, and the event, for example of becoming married for the first time may be thought of as a move or a transition from the never married state to the presently married state. The full range of marital status transitions that we entertain is shown in Figure 1.

Transitions between the never married and presently married states are possible in one direction only. Persons who are presently married may become either divorced or widowed, and remarriages by divorced and widowed persons are possible. Note that no direct transitions between the widowed and divorced states are permitted. Death may occur at any age and in any marital status in which case individuals encounter a transition to the absorbing state "dead". Figure 1 is a moderately complex representation of

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*For the distinction between these two concepts, see Willekens et al. (1982) and the discussion to follow.

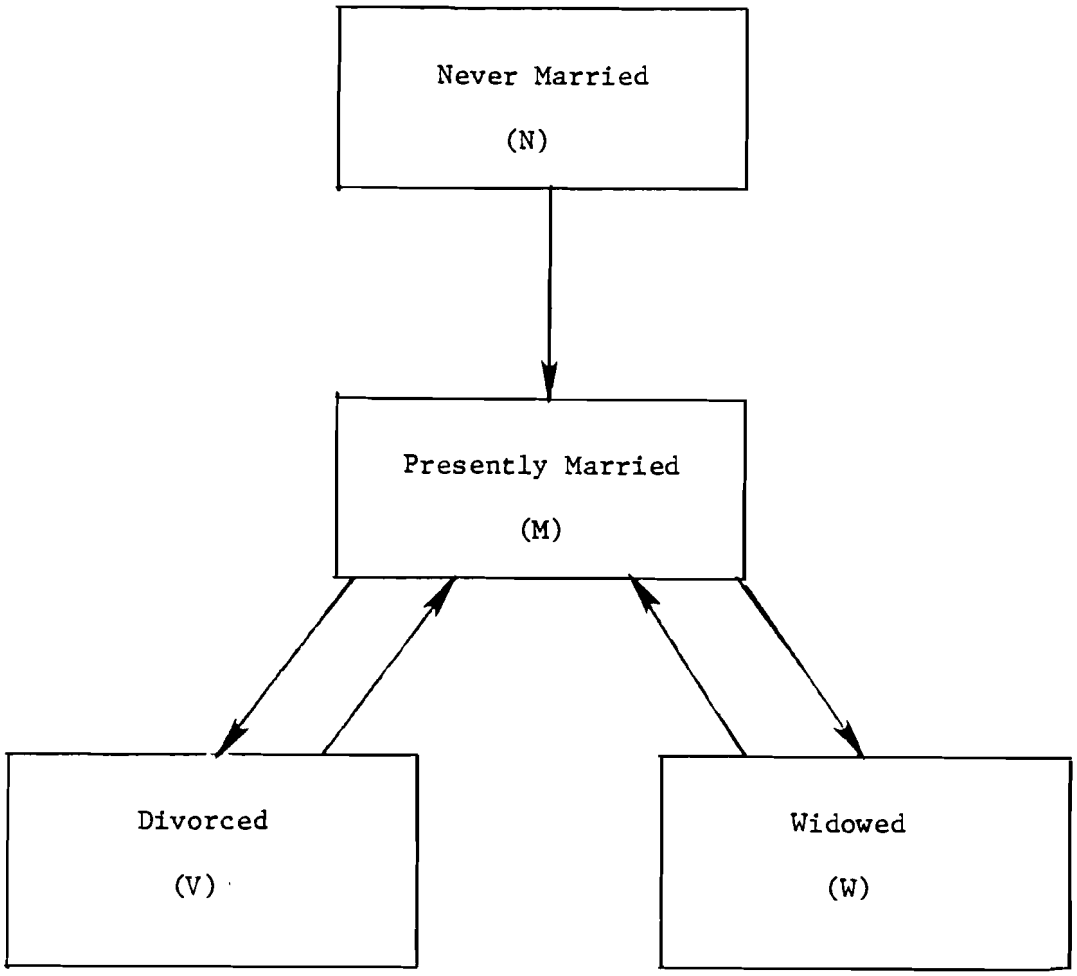

Figure 1. The nature of marital status transitions when four marital status categories are recognized.

the process by which the marital status composition of a population undergoes change. On a simpler level, we could distinguish between the never married and the ever married states. On the other hand, a more disaggregated configuration of marital patterns than that in Figure 1 would recognize separated persons as belonging to a distinct marital status group. And it may even prove useful to dinstinguish between individuals married for the first time and those in a second or higher order marriage.

One of the advantages in adopting a multiregional life table approach to marital status changes is that it allows us to summarize in a compact way the marital careers of men and women over their lifetimes. With this lifetime perspective, we are able to answer a number of important questions.

1. With respect to patterns of first marriage, what is the proportion of a cohort every marrying? What is the mean age at marriage?
2. Regarding the presently married state, what is the expected length of a marriage, and the number of marriages per person marrying?
3. How frequent is remarriage among the divorced population, and how does it contrast with that among the widowed population? How do average ages at remarriage compare for divorced and widowed persons?
4. What is the probability that a marriage will end in a divorce or a widowhood? What is the average age at widowhood and at divorce?
5. On the basis of current rates of mortality, marriage, divorce, remarriage and the like, what fraction of one's life can an individual expect to spend single, married, widowed, and divorced? How do these proportions vary between whites and blacks and between males and females?

3. DATA AND METHODS

3.1. Data

To implement the multiregional approach requires data on the transitions that individuals make over their lifetimes between and among alternative marital status categories. Such data have been collected periodically by the US Bureau of the Census as special supplements to the monthly Current Population Survey (CPS). In this paper we rely on information obtained from the marital and fertility history supplement to the June 1975 CPS.

The Current Population Survey deals mainly with labor force data and is the source of the monthly unemployment rate estimates for the US. Questions relating to labor force participation are asked about each household member 14 years or older*. In June 1975, supplemental questions relating to marital history were also asked of the same sample. In addition to their current marital status, persons were asked how many times they had been

*The CPS is limited to the civilian population of the US, excluding the relatively small number of inmates of institutions.

married, when they had married for the first time, whether that marriage had ended in widowhood or divorce, and when that marriage had ended (if it was no longer intact). And if they had remarried, individuals were asked when they had entered their latest marriage and when that marriage had ended (if it was no longer intact). All dates were recorded in terms of month and year, and this detail was used in deriving age at each event or the interval between events (US Bureau of the Census 1976). In the case of nonresponses, values were allocated to persons by substituting a value that was reported by a previously processed person of similar characteristics.

For the purpose of this analysis, persons who reported their current marital status as "separated" were considered to be in the presently married category. In addition, we excluded persons who said they had been married three or more times, since we preferred to work with continuous marital histories and since the June 1975 CPS asked only about an individual's first and most recent marriage. Our sample is not much affected if we restrict it to persons married fewer than three times. The US Bureau of the Census reports that of all men born between 1900 and 1959, 26.1 percent were single in 1975, 62.5 percent were married once, 9.8 percent twice, and 1.5 percent three or more times. The age of the respondent naturally affects this distribution. Less than 1 percent of men born in 1945 or later were married three or more times, in comparison with 3.4 percent of men born between 1900 and 1909. The statistics for women are nearly equivalent. Of those born between 1900 and 1959, 20.6 percent were single in 1975, 67.0 percent were married once, 10.8 percent married twice, and 1.7 percent had married three or more times. The maximum percentage of any birth cohort marrying three or more times (3.7 percent) was for the cohort of women born between 1900 and 1904 (US Bureau of the Census 1976). With this restriction, we are left with 98,806 cases in our sample.

3.2. Methods

The multiregional life table approach developed by Andrei Rogers relies on a Markov transition probability matrix to summarize the marital careers of cohorts of individuals. In a

Markov process, one necessary assumption is that rates of dying and of moving from one state to another depend only on age and the state in which the person is currently living (Krishnamoorthy 1979). The mathematics of Rogers's methodology as applied to marital status life tables have been fully described in a recent paper by Willekens et al. (1982). To perform the computations reported here, we have relied on a modification of the computer program reproduced in Willekens and Rogers (1978). The particular adaptation, termed LIFEINDEC, is designed to handle situations in which individuals are born in only one state and in which age intervals are of unequal width (Willekens 1979).

As in the ordinary single-state, single-decrement life table, the transition probabilities in a multiregional life table determine all other life table parameters. There are two approaches to computing these multistate transition probabilities, and which one is chosen usually depends upon the form of the available data. In the "transition" approach, an interstate passage is viewed as a change in state between two points in time. The data are in the form of survivorship proportions and are derived from the number of transitions (or movers). A typical application is to interregional migration, where data are often based on answers to the census question, "Where did you live n years ago?" By contrast, in the "movement approach" an interstate passage is an instantaneous event similar to a birth or a death, and the frequency of these events (moves) is measured by occurrence-exposure transition rates.

Our data on the marital event histories of men and women lend themselves to either computational procedure. But since the death data we need to accompany the information on marital status changes are in the form of death rates rather than survivorship proportions, we have adopted the "movement" perspective for the marital status transition rates as well. To be precise, each age-specific marital status transition rate or occurrence-exposure rate is computed just like any other demographic rate, namely, as the number of occurrences of an event (E) during a specified period of time to the population "at risk" of experiencing the event, divided by the number of person-years lived by the population "at risk" during the same period of time.

We need to calculate age-specific transition rates for each of the five possible transitions in Figure 1. These rates are then entered into the LIFEINDEC computer program. To give one example, assume the time period in question is 1970-1975 (specifically, 1 June 1970 to 31 May 1975) and that we are interested in the behavior of white females between exact age 20 and exact age 21. Then the age-specific transition rate of moving from the never married state (N) to the presently married state (M) is given by

$$ {}_{R}N^{M}_{20} = \frac{\text{the number of first marriages during the period 1970-1975 to never married white females between exact ages 20 and 21}}{\text{the number of person-years lived during the period 1970-1975 by never married white females between exact ages 20 and 21}} $$

The remaining four transition rates are defined in a similar fashion. The rate from married to divorced, for instance, contains the number of divorces in the numerator and the number of person-years lived by married persons in the denominator.

To give the reader some sense of the age pattern of the underlying data, we have graphed in Figure 2 the complete set of transition rates for each of the five possible transitions corresponding to white females in the period 1970-1975. Note that, with the exception of the transition to widowhood, most of the activity is concentrated in the age range 15 to 44.

In addition to marital status transition rates, we need death rates by age and by marital status in order to compute the increment-decrement life table transition probabilities. In our particular application, we require death rates by age, race, sex, and marital status since we want to examine differentials between males and females and between blacks and whites. Death rates in this degree of detail have been published for the United States only as recently as 1959-1961 (National Center for Health Statistics 1970a, b). To obtain death rates since 1959-1961, a process of indirect standardization was employed (Shryock and Siegel 1980: 421-422), whereby death rates for 1959-1961 are applied to populations disaggregated by age, race, sex, and marital status to compute the expected number of deaths in a particular age-race-sex

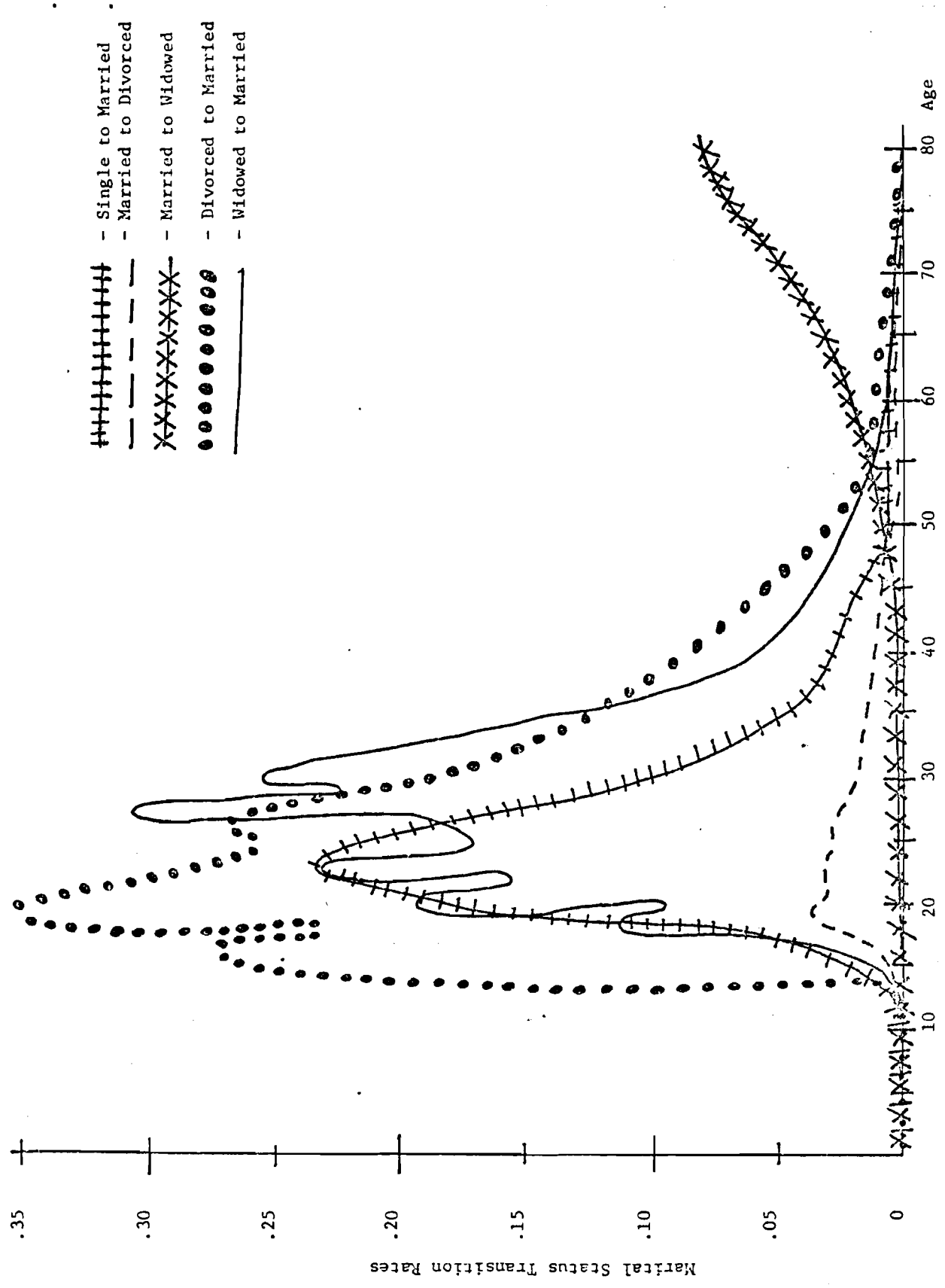

Figure 2. Marital status transition rates for white US females, 1970-1975.

category on the assumption that 1959-1961 death rates still hold in the later period. Then, based on the proportionate differences between the expected number and the actual number of deaths, death rates in the same age-race-sex category in 1959-1961 are given an equal proportionate adjustment.

Age-specific transition rates and death rates are then used to produce the multiregional life table transition probabilities using a procedure similar to that in the ordinary life table case. The matrix formula (Willekens and Rogers 1978) is:

$$P(x) = \left[I + \frac{5}{2} M(x)\right]^{-1} \left[I - \frac{5}{2} M(x)\right]$$

where $P(x)$ is the matrix of transition probabilities, $M(x)$ is the matrix of age-specific mortality and marital status transition rates, I is the identity matrix, and five-year ($n = 5$) age intervals are assumed. One matrix of survival probabilities is calculated for each exact age (0,5,10,...). The elements $p_{ij}(x)$ of $P(x)$ represent the probability that an individual in state i at exact age x will survive and be in state j at exact age $x + 5$. Since the probability of surviving and of dying must sum to unity, the probability of dying between exact age x and $x + 5$ can be found by subtraction. The complete set of transition probabilities for white US females for 1970-1975 is shown in Appendix Table A1. Note that the probabilities for each age sum to one.

4. RESULTS

Marital status life tables reflect in a compact way the implications of a given set of death rates and marital status transition rates by tracing out the lifetime experiences of a hypothetical birth cohort of individuals if these individuals are subject at each age to the risks of dying and of changing marital status that have been observed in an actual population. In this paper we discuss the results of marital status life tables calculated for three time periods: 1960-1965, 1965-1970, and 1970-1975. In addition, for each time period, separate life tables have been estimated for white females, black females, all females, white

males, black males, and all males. Tables 1, 2, and 3 are limited to white females in 1970-1975. They represent the types of life table parameters one may obtain with a multiregional approach and illustrate the greater flexibility in handling the data when the computations are cast in matrix form. Tables 4 and 5 compare the lifetime experiences of several US subpopulations with regard to the more interesting issues in family demography.

Table 1 is analogous to the l_x column of an ordinary life table. It shows the expected number of survivors to any exact age x and how the survivors would be distributed by marital status, given the underlying mortality and marital status transition rates, if 100,000 individuals began life together in the single (i.e., never married) state. In the June 1975 CPS very few persons reported marriages occurring prior to age 15. Moreover, given the favorable mortality experience of white females in the 1970-1975 period, an estimated 90 percent of an initial cohort would survive to age 55, when over 75 percent of the survivors would be married.

One interesting way to gauge the tempo of marital events in a life table cohort is to note the age at which the expected number of persons in each marital status reaches a maximum. For the single population this age is age 0, because persons are removed from the single category by death and first marriage, and re-entries to the single state are by assumption not possible. The greatest number of married persons is at age 35, of divorced persons at age 50, and of widowed persons at ages 75 and over. In the early stages of its life cycle a cohort becomes increasingly married. For white females in 1970-1975, for example, approximately 5 out of every 6 survivors to age 35 or 40 is in the presently married category. As the cohort continues to age, higher male mortality pushes more women into the widowed group, so that by age 75 nearly half the survivors in Table 1 are widowed.

Shown in Table 2 are measures of life expectancy at exact age x for persons who were in the single state at exact age 0. These figures are what Willekens et al. (1982) refer to as population-based measures, and they are computed as the total number of person-years remaining to be lived beyond age x in each marital status divided by the number of survivors to age x. Based on data for

Table 1. Expected number of survivors at exact age x in each status: white US females, 1970-1975.

	Initial status of cohort single				
Age	Total	Single	Married	Divorced	Widowed
0	100000.	100000.	0.	0.	0.
1	98592.	98592.	0.	0.	0.
5	98349.	98349.	0.	0.	0.
10	98203.	98203.	0.	0.	0.
15	98076.	97194.	882.	0.	0.
16	98030.	95334	2665.	25.	6.
17	97980.	91545.	6302.	116.	18.
18	97927.	94313.	13213.	363.	39.
19	97870.	74023.	22970.	804.	72.
20	97810.	62057.	34267.	1364.	122.
21	97749.	50796.	44778.	2023.	152.
22	97687.	40851.	53854.	2806.	176.
23	97625.	32470.	61278.	3687.	190.
24	97561.	25890.	66963.	4489.	219.
25	97495.	21101.	71070.	5055.	269.
26	97427	17581.	73995.	5549.	302.
27	97357.	14842.	76293.	5872.	350.
28	97285.	12822.	77905.	6210.	347.
29	97210.	11332.	79175.	6287.	416.
30	97133.	10175.	80071.	6409.	478.
35	96652.	7282.	81031.	7659.	679.
40	95930.	6233.	80036.	8266.	1395.
45	94834.	5454.	77884.	8728.	2767.
50	93155.	5086.	74025.	9111.	4933.
55	90660.	4725.	69019.	8933.	7984.
60	87076.	4355.	60991.	8644.	13086.
65	81993.	4058.	50413.	8009.	19514.
70	74728.	3621.	38555.	7162.	25389.
75	64494.	3142.	24497.	6149.	30706.

1970-1975, the average cohort member at birth has a total life expectancy of 76.6 years, of which 24.3 years can be expected to be lived in the single state, 38.3 years in the married state, 4.8 years as divorced, and 9.2 years widowed. By the time the cohort reaches age 18, remaining life expectancy has been reduced to 60.2 years, but this reduction is due almost entirely to a corresponding reduction in time spent never married. At age 18, 11.6 percent of remaining cohort life expectancy will be lived in the single state in contrast to 31.8 percent at birth. On the other hand, even though the absolute number of years lived in the married state changes little between ages 0 and 18, as a percent of the

Table 2. Expectations of life by status at age 0: white US females, 1970-1975.

	Initial status of cohort single				
Age	Total	Single	Married	Divorced	Widowed
0	76.61667	24.33066	38.26437	4.82312	9.19855
1	76.70399	23.67107	38.81097	4.89202	9.32995
5	72.88829	19.72458	38.90669	4.90403	9.35296
10	67.99297	14.75027	38.96449	4.91137	9.36685
15	63.07306	9.78868	38.99265	4.91775	9.37902
16	62.10730	8.81126	38.99277	4.91992	9.38337
17	61.13841	7.86206	38.96669	4.92169	9.38799
18	60.17143	6.96844	38.88828	4.92192	9.39281
19	59.20619	6.16360	38.72607	4.91883	9.39772
20	58.24213	5.47174	38.45718	4.91076	9.40247
21	57.27843	4.89792	38.07704	4.89652	9.40698
22	56.31453	4.43194	37.59642	4.87492	9.41128
23	55.34995	4.05923	37.03061	4.84475	9.41538
24	54.38582	3.76279	36.39758	4.80602	9.41944
25	53.42213	3.52433	35.71423	4.76031	9.42329
26	52.45900	3.32827	24.99463	4.70921	9.42691
27	51.49640	3.16415	34.24799	4.65394	9.43035
28	50.53432	3.02432	33.48094	4.59530	9.43378
29	49.57285	2.90241	32.69878	4.53456	9.43712
30	48.61197	2.79402	31.90511	4.47282	9.44004
35	43.84138	2.35636	27.89677	4.13119	9.45708
40	39.15250	2.02188	23.90921	3.74723	9.47420
45	34.57625	1.73715	20.02255	3.34255	9.47401
50	30.15431	1.48558	16.30661	2.92405	9.43808
55	25.91531	1.25592	12.81085	2.50696	9.34161
60	21.87909	1.04693	9.60550	2.10552	9.12115
65	18.08046	0.85530	6.80425	1.72830	8.69261
70	14.59527	0.68153	4.48940	1.38880	8.03555
75	11.51455	0.52750	2.75766	1.09319	7.13620

total across all marital statuses, the figure rises from 49.9 to 64.6. Because most of the person-years women live in the widowed state are experienced when they become older, the fraction of total remaining life expectancy women can look forward to as a widow raises with age. For white females at age 65, this percentage is 48.1, and it increases to 62.0 percent at age 75.

One of the advantages of using Rogers's matrix form of computation for marital status life tables is that it permits one to derive status-based measures of life expectancy. Even though the underlying transition probabilities remain unchanged, it is possible with the matrix approach to consider a cohort starting

at any age and in any marital status. Some illustrations are given in Table 3*. For example, persons who are married at age 45 have on average 34.75 additional years remaining to be lived, of which 23.26 will be spent married, 1.40 divorced, and 10.09 widowed. Several points are noteworthy. First, marital status differentials in mortality are small enough, and there is sufficient interchange of individuals between marital statuses that, for most ages except the very oldest, total life expectancy at age x depends little on marital status at age x. At age 30, for instance, life expectancy varies from a low value of 48.0 years for single persons to a high of 48.7 years for married individuals.

However, the *distribution* of remaining life expectancy across marital status categories depends very much on one's marital status at age x. Table 3 thus reflects in another way the fact that, with the exception of becoming widowed, much of the change in marital status that white females in the US experienced in the period 1970-1975 was confined to ages under 45. Regardless of one's marital status at age 18, more person-years are likely to be lived in the married state than in any other state. In some sense, then, the married state acts like a magnet for young adults attracting people to it. Even those who have already rejected one marriage partner and who are divorced at age 18 have not rejected the institution of marriage, because over two-thirds of their remaining life expectancy of 60.1 years will be spent in the married state.

By age 45, on the other hand, the picture is strikingly different. At that age, persons are likely to spend the largest share of their remaining years in the marital status they have attained by age 45. If individuals have never married by age 45, it is unlikely that they will ever do so. If they are married, only one-third of their remaining years will be spent not married, and most of those will be spent widowed. And if they are widowed or divorced at age 45, they can look forward to most of their remaining years in the same marital status.

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*Willekens et al. (1982) point out that Schoen and Nelson (1974) and Krishnamoorthy (1979) have derived and discussed population-based measures of the duration of married life, but it is only in the context of a multiregional approach that status-based measures can be obtained.

Table 3. Expectations of life by status at age x: white US females, 1970-1975.

AGE	STATUS AT AGE X SINGLE				
***	**********				
	TOTAL	SINGLE	MARRIED	DIVORCED	WIDOWED
18	60.15685	8.09369	37.97504	4.78209	9.30605
19	59.17574	8.14922	37.13496	4.66371	9.22787
20	58.18672	8.62425	35.96336	4.49587	9.10324
21	57.19014	9.42518	34.54390	4.28905	8.93202
22	56.18459	10.59796	32.84619	4.03911	8.70138
23	55.16811	12.20448	30.82603	3.74171	8.39591
24	54.14212	14.17940	28.53935	3.40691	8.01648
25	53.11285	16.28381	26.17517	3.06234	7.59155
26	52.08302	18.44431	23.78986	2.71735	7.13152
27	51.04994	20.75510	21.30896	2.36374	6.62215
28	50.02191	22.94580	18.93735	2.03151	6.10726
29	49.00267	24.89853	16.76244	1.73104	5.61068
30	47.99161	26.67133	14.73858	1.45484	5.12688
35	43.11219	31.27455	7.96022	0.60238	3.27507
40	38.48973	31.11758	4.84111	0.27294	2.25613
45	34.02878	30.20490	2.41843	0.08187	1.32361
50	29.75920	27.20744	1.56929	0.03782	0.94466
55	25.62823	24.09978	0.91055	0.01664	0.60127
60	21.62074	20.93190	0.39226	0.00523	0.29131
65	17.83083	17.28023	0.30936	0.00365	0.23759
70	14.26124	14.06321	0.10817	0.00111	0.08875
75	11.03969	10.82732	0.11573	0.00120	0.09544

AGE	STATUS AT AGE X MARRIED				
***	**********				
	TOTAL	SINGLE	MARRIED	DIVORCED	WIDOWED
18	60.26611	0.0	44.64055	5.71095	9.91463
19	59.30690	0.0	43.78973	5.60676	9.91042
20	58.34593	0.0	42.93750	5.50060	9.90784
21	57.38319	0.0	42.07999	5.39356	9.90966
22	56.41933	0.0	41.23126	5.27321	9.91488
23	55.45445	0.0	40.38853	5.14443	9.92150
24	54.49059	0.0	39.55075	5.01088	9.92897
25	53.52704	0.0	38.70782	4.88302	9.93621
26	52.56485	0.0	37.87849	4.73870	9.94767
27	51.60385	0.0	37.05692	4.58662	9.96033
28	50.64366	0.0	36.23944	4.42869	9.97555
29	49.68350	0.0	35.40916	4.26894	9.93542
30	48.72479	0.0	34.59177	4.13734	9.99570
35	43.97090	0.0	30.63898	3.24860	10.08334
40	39.30357	0.0	26.85838	2.30655	10.13867
45	34.75293	0.0	23.26144	1.39745	10.09404
50	30.36157	0.0	19.79033	0.70580	9.86545
55	26.15976	0.0	16.34349	0.41064	9.40562
60	22.21524	0.0	13.36322	0.23700	8.61502
65	18.57779	0.0	10.78613	0.16422	7.62744
70	15.35919	0.0	8.53662	0.08063	6.74194
75	12.93958	0.0	7.06226	0.07312	5.80420

Table 3. Continued.

AGE	STATUS AT AGE X DIVORCED				
***	**********				
	TOTAL	SINGLE	MARRIED	DIVORCED	WIDOWED
18	60.12752	0.0	41.60663	9.03843	9.83248
19	59.15602	0.0	40.57874	8.76269	9.81462
20	58.17563	0.0	39.40399	8.93316	9.73849
21	57.19499	0.0	38.26595	9.17141	9.75766
22	56.20934	0.0	37.06918	9.42425	9.71592
23	55.22589	0.0	35.95235	9.60586	9.66771
24	54.23933	0.0	34.78259	9.85206	9.60469
25	53.25021	0.0	33.56239	10.16345	9.52438
26	52.25053	0.0	32.16519	10.67299	9.41237
27	51.24194	0.0	30.60326	11.37485	9.26385
28	50.23565	0.0	29.09265	12.04480	9.09823
29	49.22655	0.0	27.54993	12.77092	8.90572
30	48.21465	0.0	25.95749	13.57383	8.68334
35	43.23907	0.0	18.87241	17.07184	7.29483
40	38.38652	0.0	12.12320	20.85393	5.40939
45	33.75746	0.0	6.60635	23.72620	3.42491
50	29.40648	0.0	3.31488	24.09509	1.99651
55	25.33978	0.0	1.85268	22.23648	1.25063
60	21.52576	0.0	1.16251	19.51880	0.84445
65	17.93900	0.0	0.72807	16.64885	0.56207
70	14.65735	0.0	0.33348	14.05190	0.27197
75	11.84494	0.0	0.36917	11.17030	0.30547

AGE	STATUS AT AGE X WIDOWED				
***	**********				
	TOTAL	SINGLE	MARRIED	DIVORCED	WIDOWED
18	59.69963	0.0	38.80206	4.86726	16.03032
19	58.81424	0.0	38.28951	4.78980	15.73494
20	57.92845	0.0	37.89120	4.72708	15.31019
21	56.99542	0.0	37.02930	4.59942	15.37671
22	56.06841	0.0	36.34705	4.47630	15.24509
23	55.10735	0.0	35.29184	4.29954	15.51599
24	54.15163	0.0	34.34001	4.13762	15.67400
25	53.20226	0.0	33.52278	3.99589	15.68359
26	52.24792	0.0	32.68166	3.84851	15.71777
27	51.28847	0.0	31.81009	3.69673	15.78165
28	50.27621	0.0	30.13208	3.41194	16.73219
29	49.27779	0.0	29.76294	3.18103	17.33382
30	48.25073	0.0	27.03174	2.89149	18.32750
35	42.93808	0.0	16.22534	1.32089	25.39185
40	37.96024	0.0	9.71973	0.55472	27.68579
45	33.27979	0.0	5.88867	0.22559	27.16553
50	28.83182	0.0	3.22217	0.08279	25.52686
55	24.61725	0.0	1.57544	0.02960	23.01221
60	20.63333	0.0	0.73730	0.01102	19.88501
65	16.90311	0.0	0.36084	0.00369	16.53857
70	13.46533	0.0	0.14063	0.00146	13.32324
75	10.35660	0.0	0.07202	0.00064	10.28394

In his important study of historical patterns of marriage, marital dissolution, and remarriage in the US, Cherlin (1981) argues that an important task for the demographer is to shape the mass of statistical data on family life "into a coherent picture of the lifetime experiences of men and women" (p. 7). In its analysis of the marital history data from the June 1975 CPS, the US Bureau of the Census (1976, 1977) focuses attention on selected episodes in the marital careers of men and women, but there seems to be no convenient way that the Bureau of the Census has found of synthesizing this rich variety of experience into summaries of lifetime patterns. In Tables 4 and 5, we make a step in this direction by presenting comparative summary statistics on lifetime experiences of marriage, marital disruption, and remarriage.

Much recent attention has been focused on the propensity of young men and women in the US to refrain from entering into marriage as early as their older siblings or parents have done. The percent of never married females aged 20-24 increased, for example, from 35.8 in 1970 to 50.2 in 1980, and for men the corresponding figures are 54.7 and 68.6 (US Bureau of the Census 1981). Data shown in columns 1 and 2 of Table 4 confirm these trends. In the decade separating 1960-1965 and 1970-1975, females have exhibited an increasing tendency to postpone marriage and even to avoid it altogether. The statistics for black females are particularly noteworthy. For this group, the mean age at first marriage rose by almost 2.5 years to over 25 years, and the proportion of a life table cohort ever marrying fell from nearly 90 percent to less than 85. Data for males portray similar tendencies, but the effects are much less pronounced.

The average duration of a marriage (column 3) is computed by dividing the total number of person-years lived in the married state by the total number of marriages. Over the decade of observation, the average duration of a marriage decreased significantly in all race-sex groups. Based on individuals' self-reported behavior, the decline was greatest among black females (4.7 years) and least among black males (1.8 years). Black marriages tend to

Table 4. Summary measures of lifetime experiences of marriage, marital dissolution, and remarriage, by race and sex: United States, 1960-1975.

Population	(1) Proportion ever marrying	(2) Mean age at first marriage	(3) Average duration of a marriage (years)	(4) Marriages per person marrying	(5) Proportion of marriages ending in divorce	(6) Proportion of marriages ending in widowhood	(7) Mean age at divorce
White females							
1970-1975	0.927	22.05	30.01	1.38	0.304	0.467	33.02
1965-1970	0.944	21.72	32.11	1.29	0.219	0.549	33.34
1960-1965	0.941	21.55	33.83	1.24	0.187	0.559	31.77
Black females							
1970-1975	0.846	25.07	24.58	1.29	0.283	0.491	34.51
1965-1970	0.879	23.10	25.29	1.30	0.252	0.530	34.61
1960-1965	0.894	22.64	29.29	1.25	0.197	0.487	32.51
All females							
1970-1975	0.917	22.37	29.39	1.37	0.301	0.470	33.16
1965-1970	0.936	21.88	31.35	1.29	0.222	0.546	33.49
1960-1965	0.934	21.67	33.32	1.24	0.188	0.551	31.83
White males							
1970-1975	0.917	24.13	32.70	1.34	0.250	0.180	35.09
1965-1970	0.926	23.95	34.13	1.28	0.201	0.200	33.64
1960-1965	0.914	23.89	36.43	1.22	0.167	0.179	34.74
Black males							
1970-1975	0.869	26.01	28.45	1.32	0.267	0.193	37.34
1965-1970	0.884	24.84	28.24	1.32	0.244	0.220	33.44
1960-1965	0.864	25.89	30.26	1.27	0.206	0.168	32.65
All males							
1970-1975	0.911	24.31	32.27	1.34	0.251	0.180	35.28
1965-1970	0.920	24.04	33.50	1.29	0.205	0.201	33.61
1960-1965	0.908	24.08	35.78	1.22	0.171	0.177	34.45

Table 4. Continued.

Population	(8) Mean age at Widowhood	(9) Average duration of a divorce (years)	(10) Average duration of widowhood (years)	(11) Remarriages of divorced persons per divorce	(12) Remarriages of widowed persons per widowhood	(13) Mean age at remarriage from divorce	(14) Mean age at remarriage from widowhood
White females							
1970-1975	65.47	12.46	15.44	0.742	0.102	34.74	51.81
1965-1970	64.56	12.55	15.46	0.750	0.112	35.86	52.28
1960-1965	64.15	12.79	15.51	0.744	0.095	34.21	52.85
Black females							
1970-1975	60.07	17.13	18.67	0.667	0.079	40.62	45.15
1965-1970	58.78	15.12	17.44	0.679	0.111	38.78	47.92
1960-1965	59.42	14.10	17.02	0.760	0.100	39.88	42.33
All females							
1970-1975	64.85	12.96	15.72	0.735	0.102	35.35	51.20
1965-1970	63.97	12.86	15.61	0.741	0.113	36.20	51.80
1960-1965	63.68	12.98	15.56	0.746	0.095	34.95	51.75
White males							
1970-1975	68.66	5.76	7.03	0.833	0.251	36.63	59.74
1965-1970	68.03	6.47	7.35	0.835	0.266	36.18	60.65
1960-1965	68.18	7.68	7.35	0.784	0.264	36.96	60.89
Black males							
1970-1975	65.02	6.51	9.20	0.777	0.173	38.73	55.09
1965-1970	64.37	7.25	9.22	0.800	0.213	37.75	60.69
1960-1965	61.97	9.34	8.73	0.775	0.300	39.02	56.56
All males							
1970-1975	68.28	5.84	7.27	0.828	0.240	36.85	59.53
1965-1970	67.63	6.57	7.51	0.833	0.261	36.44	60.66
1960-1965	67.58	7.89	7.51	0.788	0.261	37.38	60.02

be of shorter duration than white marriages, partly because blacks marry later than whites and have shorter life expectancies. As we shall see, the smaller mean marital duration is also related to the increase in divorce. But column 4 indicates that divorce is not a terminal event, because well over one-quarter of all persons who marry later remarry. Remarriage is somewhat more common among whites than among blacks.

There is widespread agreement that marital disruption through divorce is becoming an increasingly common phenomenon in the US, but there has not developed a consensus on the best way to measure its incidence. Preston (1975) estimated that 44 percent of marriages would end in divorce, based on disruption rates prevailing in 1973. When the analysis is recast in terms of marriage cohorts, Preston and McDonald (1979) estimate that the proportion of marriages ending in divorce rose from about .05 for marriages contracted after the Civil War to about .12 at the turn of the century to nearly .25 at the start of World War II. These authors project that more than one-third of the marriages contracted in the first half of the 1960s will eventually be disrupted by divorce.

Both Schoen and Nelson (1974) and Krishnamoorthy (1979) have constructed marital status life tables for US females based on vital statistics and census data, and have estimated the probability that a marriage will end in divorce. Their estimates are .259 for 1960 (Schoen and Nelson) and .363 for 1970. Our estimates (column 5) also indicate that the incidence of divorce is increasing for all race-sex groups, but our measured levels are below those obtained from vital statistics data*.

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*There is evidence that divorce is underreported in the June 1975 CPS. We have compared the number of divorces registered by the US Vital Statistics System with the weighted number of divorces reported by men and women in the CPS data for each year between 1970 and 1974. For men, the self-reported number of divorces is approximately 55 percent as many as were recorded in vital statistics, and the corresponding figure for women is roughly 70 percent. There is evidently a geater reluctance to report divorces than marriages. Similar comparisons for the same period show that about 85-90 percent of marriages are reported for men and roughly 90-95 percent for women.

Paul Glick and Arthur Norton, in their analysis of the June 1975 CPS marital history data (US Bureau of the Census 1976), use a projection technique to estimate the proportion of first marriages of young adults that may end in divorce by the time these persons reach old age*. Their projections imply that about one-third of the married persons between 25 and 35 years old in 1975 may eventually end their first marriage in divorce, including those who have already done so. Moreover, they estimate that four-tenths of the persons in their late twenties and early thirties who had entered their second marriage (after their first marriage had ended in divorce) may expected to have their second marriage end in redivorce.

Marriages can terminate through divorce or with the death of either spouse. A comparison of the numbers in columns 5 and 6 shows that, for females, marriages are considerably more likely to end in widowhood than in divorce, whereas for men, at least for the most recent period, marriages have a higher risk of terminating in divorce than in the death of the spouse. This striking difference between men and women in the proportions of marriages ending in widowhood is largely due to higher male mortality.

Because becoming divorced is commonly the result of choices made voluntarily whereas becoming widowed is not, the average age at divorce is usually far lower than the average at widowhood. The data in columns 7 and 8 show that widowhood occurs roughly 30 to 25 years later than divorce. Black females are likely to experience divorce at a somewhat later mean age than white females, whereas for blacks generally, widowhood occurs at younger ages than it does for whites. In the latter instance, the phenomenon is largely attributable to higher mortality among blacks. Males endure shorter spells of divorce and widowhood than do females (columns 9 and 10). In addition, despite the fact that divorce occurs at any earlier age than widowhood, it tends not to last any longer. This finding is attributable to differentials between divorced and widowed persons in remarriage propensities.

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*For a full statement of this projection method, see Glick and Norton (1973).

The probabilities of remarriage following a divorce (column 11) suggest that current high rates of marital dissolution through divorce reflect a disenchantment with a particular marriage partner rather than a rejection of the institution of marriage itself. Black females have the lowest rates of remarriage following divorce, down to two-thirds in 1970-1975. By contrast 5 out of 6 divorced white males eventually remarry. Chances of remarrying after the death of a spouse are substantially smaller, especially for women for whom the probability is about 10 percent (column 12).

The mean age at remarriage following a divorce (column 13) is usually several years greater than the average age at divorce. But just the opposite is true in the case of widowhood. For females, especially, remarriage after widowhood occurs at comparatively young ages (column 14). In general, the mean age at remarriage after the death of a spouse is 10 or 15 years *less* than the mean age at widowhood. This paradox suggests that, even though the probability of remarriage is small for women, it is the youngest widows who are the most likely to remarry. This conclusion is confirmed by Figure 2 which shows that transition rates from widowed to married are highest between ages 25 and 30. The likelihood of an older widow becoming remarried is greatly lowered by the fact that higher male mortality reduces the supply of potential husbands of comparable age.

One of the most telling ways of revealing a population's experience of marriage, marital disruption, and remarriage is to disaggregate life expectancy at birth into the proportions expected to be lived in each marital status category. These decompositions, which reflect average individual experience, are shown in Table 5.

With the exception of black females, the average individual can at birth expect to spend the majority of their lifetime in the presently married state. For white males, this proportion reaches close to 60 percent. Nevertheless, the fraction of total lifetime spent married has been declining for all groups, and for black females in 1970-1975, it fell below the expected proportion spent never married.

Table 5. A decomposition of life expectancy at birth by time spent in each marital status category, by race and sex: United States, 1960-1975.

Population	Life expectancy at birth (in years)	Marital status*			
		Never married	Presently married	Divorced	Widowed
White females					
1970-1975	76.62	24.33	38.26	4.82	9.20
		(.318)	(.499)	(.063)	(.120)
1965-1970	75.68	22.81	39.16	3.35	10.36
		(.301)	(.517)	(.044)	(.137)
1960-1965	74.92	22.67	39.38	2.78	10.09
		(.303)	(.526)	(.037)	(.135)
Black females					
1970-1975	71.42	29.16	26.92	5.30	10.04
		(.408)	(.377)	(.074)	(.141)
1965-1970	69.07	25.27	28.88	4.36	10.56
		(.366)	(.418)	(.063)	(.153)
1960-1965	68.73	23.72	32.67	3.10	9.24
		(.345)	(.475)	(.045)	(.134)
All females					
1970-1975	75.90	24.90	36.85	4.89	9.26
		(.328)	(.486)	(.064)	(.122)
1965-1970	74.82	23.08	37.95	3.46	10.33
		(.308)	(.507)	(.046)	(.138)
1960-1965	74.07	22.80	38.53	2.81	9.92
		(.308)	(.520)	(.038)	(.134)
White males					
1970-1975	68.67	25.21	40.15	1.77	1.55
		(.367)	(.585)	(.026)	(.023)
1965-1970	68.22	24.38	40.55	1.54	1.75
		(.357)	(.594)	(.023)	(.026)
1960-1965	68.08	24.65	40.54	1.43	1.47
		(.362)	(.595)	(.021)	(.022)
Black males					
1970-1975	62.80	26.22	32.56	1.99	2.03
		(.417)	(.518)	(.032)	(.032)
1965-1970	61.70	24.36	32.92	2.06	2.36
		(.395)	(.533)	(.033)	(.038)
1960-1965	62.39	25.60	33.08	2.10	1.60
		(.410)	(.530)	(.034)	(.026)
All males					
1970-1975	67.89	25.28	39.23	1.78	1.59
		(.372)	(.578)	(.026)	(.023)
1965-1970	67.38	24.34	39.66	1.59	1.79
		(.361)	(.589)	(.024)	(.027)
1960-1965	67.34	24.71	39.67	1.49	1.47
		(.367)	(.589)	(.022)	(.022)

*Figures in parentheses refer to proportions of total life expectancy in each marital status category.

Because individuals are born into the never married category, it is not surprising to find that time spent never married is second in importance to time spent married. White females exhibit the lowest proportions in the never married state (about 0.3) because they marry soonest, have the largest fractions ever marrying, and display the highest life expectancies at birth. Black males spend the largest share of any race-sex group never married, partly because of their later age at first marriage and partly because they have the shortest life expectancy at birth.

Marital disruption, including both divorce and widowhood, accounts for a much smaller share of total lifetime. For all females in 1970-1975, the combined proportion was .186, and for all males, .049. Owing to the rise in the frequency of marital disruption from divorce, the proportions of total lifetime spent divorced have been growing for both men and women, but especially for women. However, the most evident differences are observed in the amount of time spent widowed. Females spend more total years widowed than men do for two reasons; females live longer, and the proportion of total lifetime spent widowed is about five or six times greater than for males.

5. DISCUSSION

In interpreting the results of our analysis, it is helpful to review the assumptions underlying the construction of a multiregional marital status life table. Because the computations are derived from a Markov transition probability matrix, it is necessary to assume that the transition probabilities depend only on age and one's current status and are independent of previous status or of time spent in the current status. Ledent (1981) has shown that this is not a tenable assumption in the instance of geographic migration. In the United States, at least, persons in region i at age x have a higher probability of moving to region j if they were born in region j than if they were not. This type of population heterogeneity can violate the Markovian assumption.

Another type of heterogeneity can be embodied in nuptiality data. Plateris (1979) has investigated the dependence of divorce on marital duration and has found that US marriages are most

likely to be disrupted by divorce within 2-4 years after marriage. Michael Hannan has even suggested that, in US data, the duration effect swamps the age effect, so that for newly married persons at both age 20 and age 40, the probability of a divorce within 2 years is about the same, but for persons aged 30, the probability of a divorce by age 35 is not the same for a person married one year and a person married five years*. In addition, Warren Sanderson has pointed out that a second type of heterogeneity can arise with regard to marriage order**, and, as we noted, Glick and Norton have estimated that second marriages have a higher probability of ending in divorce than first marriages (US Bureau of the Census 1976).

To some extent, problems of population heterogeneity can be addressed by stratifying the population into relatively homogeneous groups. Thus, in our example, we produced separate marital status life tables by race and sex. The dependence of divorce on marriage order can be handled by creating more marital status categories, and in work we are now beginning with the marital history data collected in the June 1980 CPS, we are dividing the married category into persons married for the first time and those married two or more times.

Duration dependence is potentially more difficult to incorporate into a multiregional marital status life table. Ledent (1980) has suggested that this problem can also be handled by increasing the state space. In this instance it might require dividing the presently married category into subcategories that depended on marital duration. Alternatively, continuous-time models of marital behavior have been developed that incorporate duration dependence (Hannan et al.1977, Tuma et al. 1979). A challenge for researchers is to extend multistate demography to include this added feature.

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*Comment by Michael Hannan on an earlier version of this paper presented at IIASA, January 12, 1982.

**Comments on paper cited above.

APPENDIX

Table A1. Age- and marital-status-specific transition probabilities: white US females, 1970-1975.

	STATUS SINGLE					STATUS MARRIED				
AGE	DEATH	TRANSITION FROM SINGLE TO				AGE	DEATH	TRANSITION FROM MARRIED TO		
		SINGLE	MARRIED	DIVORCED	WIDOWED			SINGLE	MARRIED	DIVORCED	WIDOWED
0	0.014084	0.985916	C.0	0.0	0.0	0	0.0	C.0	1.000000	0.0	0.0
1	0.002460	0.997540	C.0	0.0	0.0	1	0.0	C.0	1.000000	0.0	0.0
5	0.001483	0.998517	0.0	0.0	0.0	5	0.0	0.0	1.000000	0.0	0.0
10	0.001298	0.998719	C.000984	0.0	0.0	10	0.0	C.0	1.000000	0.0	0.0
15	0.000465	0.980866	C.018509	0.000129	0.000031	15	0.000651	0.0	C.982239	0.013787	0.003324
16	0.000501	0.960259	C.038771	0.000419	0.000051	16	0.000631	0.0	C.975411	0.021347	0.002611
17	0.000533	0.920994	C.077310	0.001073	0.000085	17	0.000610	0.0	C.969854	0.027341	0.002156
18	0.000573	0.877953	C.119521	0.001814	0.000124	18	0.000590	C.0	C.967510	0.029858	0.002042
19	0.000616	C.838339	C.158647	0.002241	0.000157	19	0.000569	0.0	C.969656	0.027821	0.001954
20	0.000556	0.818549	C.178333	0.002347	0.000115	20	0.000550	0.0	C.972224	0.025956	0.001271
21	0.000698	C.804218	C.192355	0.002599	0.000089	21	0.000531	0.0	C.971917	0.026636	0.000916
22	0.000744	0.794835	C.201610	0.002723	0.000088	22	0.000513	0.0	C.971955	0.026634	0.000858
23	0.000801	0.797341	0.199169	0.002591	0.000099	23	0,000532	0.0	C.972819	0.025665	0.000984
24	0.000866	0.815035	C.181950	0.002097	0.000112	24	0.000550	C.0	C.975462	0.022772	0.001217
25	0.000935	C.833169	C.163900	0.001908	0.000087	25	0.000570	0.0	C.975354	0.022992	0.001043
26	0.001011	0.844235	C.152957	0.001556	0.000100	26	0,000591	0,0	C.976721	0.021401	0.001287
27	0.001094	C.863913	C.133569	0.001346	0.000078	27	0.000612	C.0	C.978259	0.019936	0.001153
28	0.001184	0.883744	C.114045	0.000925	0.000101	28	0.000634	0.0	C.981528	0.016078	0.001760
29	0.001282	0.897952	C.099374	0.000795	0.000097	29	0.000657	0.0	C.981650	0.015771	0.001922
30	0.007705	C.715667	C.267991	0.007767	0.000870	30	0.004287	0.0	C.933404	0.056036	0.006274
35	0.011752	0.855939	C.128464	0.003082	0.000764	35	0.006561	0.0	C.935484	0.046438	0.011517
40	0.016816	C.875025	C.104967	0.002074	0.001117	40	0.010217	0.0	C.931071	0.038158	0.020554
45	0.023404	0.932591	C.042642	0.000620	0.000742	45	0.016145	C.0	C.922429	0.027954	0.033472
50	0.031553	0.928859	C.038284	0.000267	0.000997	50	0.024741	0.0	C.912144	0.013339	0.049776
55	0.041910	0.921811	C.034523	0.000171	0.001585	55	0.036942	C.0	C.868044	0.009251	0.085762
60	0.059802	0.931835	C.007757	0.000023	0.000543	60	0.054428	C.0	C.813916	0.005386	0.126271
65	0.086511	C.892354	C.019270	0.000069	0.001796	65	0.082208	0.0	C.748541	0.006262	0.162988
70	0.131489	C.857632	C.000765	0.000001	0.000113	70	0.126685	0.0	C.629462	0.002495	0.241357
75	1.000000	C.0	C.0	0.0	0.0	75	1.000000	0.0	C.0	0.0	0.0

Table A1. Continued.

AGE	STATUS DIVORCED: DEATH	TRANSITION FROM DIVORCED TO: SINGLE	MARRIED	DIVORCED	WIDOWED
0	0.0	0.0	0.0	1.000000	0.0
1	0.0	0.0	0.0	1.000000	0.0
5	0.0	0.0	0.0	1.000000	0.0
10	0.0	0.0	0.0	1.000000	0.0
15	0.001284	0.0	0.0	0.998716	0.0
16	0.001216	0.0	0.234072	0.764402	0.000309
17	0.001234	0.0	0.202193	0.796352	0.000221
18	0.001210	0.0	0.296408	0.703080	0.000301
19	0.001213	0.0	0.303205	0.695232	0.000301
20	0.001231	0.0	0.274774	0.723817	0.000177
21	0.001241	0.0	0.266574	0.732061	0.000124
22	0.001262	0.0	0.235469	0.763167	0.000102
23	0.001307	0.0	0.230554	0.767924	0.000115
24	0.001353	0.0	0.224207	0.774302	0.000138
25	0.001395	0.0	0.232055	0.766427	0.000123
26	0.001441	0.0	0.230989	0.767420	0.000150
27	0.001502	0.0	0.203259	0.795030	0.000119
28	0.001559	0.0	0.189584	0.809539	0.000168
29	0.001617	0.0	0.179940	0.819269	0.000174
30	0.008558	0.0	0.508389	0.481304	0.001650
35	0.012605	0.0	0.400674	0.584336	0.002384
40	0.018140	0.0	0.294583	0.684142	0.003135
45	0.025933	0.0	0.177657	0.793375	0.003094
50	0.036357	0.0	0.089780	0.871526	0.002337
55	0.050670	0.0	0.051111	0.895372	0.002347
60	0.070402	0.0	0.038558	0.888355	0.002684
65	0.101629	0.0	0.039954	0.854649	0.003728
70	0.152563	0.0	0.002078	0.845051	0.000308
75	1.000000	0.0	0.0	0.0	0.0

AGE	STATUS WIDOWED: DEATH	TRANSITION FROM WIDOWED TO: SINGLE	MARRIED	DIVORCED	WIDOWED
0	0.0	0.0	0.0	0.0	1.000000
1	0.0	0.0	0.0	0.0	1.000000
5	0.0	0.0	0.0	0.0	1.000000
10	0.0	0.0	0.0	0.0	1.000000
15	0.003704	0.0	0.0	0.0	0.996296
16	0.003420	0.0	0.0	0.0	0.996580
17	0.003158	0.0	0.0	0.0	0.996842
18	0.002794	0.0	0.102658	0.001558	0.892990
19	0.002597	0.0	0.089217	0.001260	0.906925
20	0.002320	0.0	0.170263	0.002241	0.825176
21	0.002171	0.0	0.141112	0.001906	0.854812
22	0.001958	0.0	0.200564	0.002709	0.794769
23	0.001918	0.0	0.178023	0.002316	0.817743
24	0.001878	0.0	0.154833	0.001735	0.841504
25	0.001820	0.0	0.158237	0.001842	0.838101
26	0.001764	0.0	0.161908	0.001752	0.834676
27	0.001652	0.0	0.261914	0.002639	0.733794
28	0.001642	0.0	0.198459	0.001611	0.799249
29	0.001584	0.0	0.220345	0.001754	0.776317
30	0.007873	0.0	0.643550	0.018652	0.329925
35	0.011840	0.0	0.336050	0.008063	0.644046
40	0.017071	0.0	0.197765	0.003908	0.781256
45	0.024627	0.0	0.144015	0.002094	0.829264
50	0.034747	0.0	0.093295	0.000685	0.866272
55	0.048055	0.0	0.057567	0.000285	0.894094
60	0.068342	0.0	0.030878	0.000092	0.900689
65	0.100240	0.0	0.021573	0.000077	0.878110
70	0.148909	0.0	0.008271	0.000013	0.842808
75	1.000000	0.0	0.0	0.0	0.0

REFERENCES

Cherlin, A.J. (1981) *Marriage, Divorce, Remarriage.* Cambridge, Mass.: Harvard University Press.

Coale, A.J. (1972) *The Growth and Structure of Human Populations.* Princeton: Princeton University Press.

DaVanzo, J. (1980) *Repeat Migration in the United States: Who Moves Back and Who Moves On?* WP-80-158. Laxenburg, Austria: International Institute for Applied Systems Analysis.

Glick, P.C., and A.J. Norton (1973) Perspectives on the Recent Upturn in Divorce and Remarriage. *Demography* 10(3):301-314.

Hannan, M.T., N.B. Tuma, and I.P. Groeneveld (1977) Income and Marital Events: Evidence from an Income-Maintenance Exerpiment. *American Journal of Sociology* 82(May):1186-1211.

Hoem, J.M., and M. Fong (1976) *A Markov Chain Model of Working Life Tables: A New Method for the Construction of Tables of Working Life.* Working Paper 2. Copenhagen: University of Copenhagen, Laboratory of Actuarial Mathematics.

Hofferth, S.L. (1982) *Children's Family Experience to Age 18: A Cohort Life Table Analysis.* Presented at the Annual Meetings of the Population Association of America, San Diego, California.

Illingworth, D.R. (1976) *Testing Some New Concepts and Estimation Methods in Population Accounting and Related Fields.* Unpublished Ph.D. dissertation. Leeds: University of Leeds, School of Geography.

Keyfitz, N. (1968) *Introduction to the Mathematics of Population.* Reading, Mass.: Addison-Wesley.

Keyfitz, N. (1979) Multidimensionality in Population Analysis. In: *Sociological Methodology 1980*, edited by K.F. Schuessler. Washington, D.C.: Jossey-Bass.

Koesoebjono, S. (1981) *Nuptiality Tables for the Female Population of the Netherlands, 1978: An Application of Multidimensional Demography.* Working Paper 20. Voorburg, Netherlands: Inter-university Demographic Institute.

Koo, H.P., and C.M. Suchindran (1978) *Relationships Among Fertility Marital Dissolution, and Remarriage.* Final Report to NICHD.

Krishnamoorthy, S. (1979) Classical Approach to Increment-Decrement Life Tables: An Application to the Study of the Marital Status of United States Females, 1970. *Mathematical Biosciences* 44:139-154.

Ledent, J. (1980) *Constructing Multiregional Life Tables Using Place-of-Birth-Specific Migration Data.* WP-80-96. Laxenburg, Austria: International Institute for Applied Systems Analysis.

Ledent, J. (1981) Constructing Multiregional Life Tables Using Place-of-Birth-Specific Migration Data. Pages 35-50 in *Advances in Multiregional Demography*, edited by A. Rogers. RR-81-6. Laxenburg, Austria: International Institute for Applied Systems Analysis.

National Center for Health Statistics (1970a) Mortality from Selected Causes by Marital Status, United States - Part A. *Vital and Health Statistics*, Series 20(8a). Washington, D.C.: US Department of Health, Education, and Welfare.

National Center for Health Statistics (1970b) Mortality from Selected Causes by Marital Status, United States - Part B. *Vital and Health Statistics*, Series 20(8b). Washington, D.C.: US Department of Health, Education, and Welfare.

Plateris, A.A. (1979) Divorces by Marriage Cohort. *Vital and Health Statistics*, Series 21, Data from the National Vital Statistics System, Data on natality, marriage and divorce 34. Washington, D.C.: Department of Health, Education, and Welfare publication (PHS) 79-1912.

Preston, S.H. (1975) Estimating the Proportion of American Marriages that End in Divorce. *Sociological Methods and Research* 3(4):435-460.

Preston, S.H., and J. McDonald (1979) The Incidence of Divorce Within Cohorts of American Marriages Contracted Since the Civil War. *Demography* 16(1):1-25.

Rees, P.H. (1979) *Multistate Demographic Accounts: Measurement and Estimation Procedures.* Paper presented at the 1979 meetings of the Population Association of America.

Rogers, A. (1973a) The Mathematics of Multi-Regional Demographic Growth. *Environment and Planning* 5:3-29.

Rogers, A. (1973b) The Multi-Regional Life Table. *Journal of Mathematical Sociology* 3:127-137.

Rogers, A. (1975) *Introduction to Multi-Regional Mathematical Demography*. New York: John Wiley.

Rogers, A. (Ed.)(1980) Essays in Multistate Mathematical Demography. *Environment and Planning A*. 12(5):485-622.

Rogers, A. (Ed.)(1981) *Advances in Multiregional Demography*. RR-81-6. Laxenburg, Austria: International Institute for Applied Systems Analysis.

Rogers, A., and J. Ledent (1976) Increment-Decrement Life Tables: A Comment. *Demography* 13:287-290.

Rogers, A., and J. Ledent (1977) Rejoinder. *Demography* 14:593.

Schoen, R. (1975) Constructing Increment-Decrement Life Tables. *Demography* 12:313-324.

Schoen, R. (1976) Reply to Rogers and Ledent. *Demography* 13:291.

Schoen, R. (1977) Further Reactions to Rogers' and Ledent's Comment. *Demography* 14:591-592.

Schoen, R. (1979) Calculating Increment-Decrement Life Tables by Estimating Mean Durations at Transfer from Observed Rates. *Matematical Biosciences* 47:255-269.

Schoen, R., and K.C. Land (1979) A General Algorithm for Estimating a Markov-Generated Increment-Decrement Life Table with Applications to Marital Status Patterns. *Journal of the American Statistical Association* 74:761-776.

Schoen, R., and V.E. Nelson (1974) Marriage, Divorce, and Mortality: A Life Table Analysis. *Demography* 11:267-290.

Schoen, R., and W.L. Urton (1977) Marriage, Divorce and Mortality: The Swedish Experience. Pages 311-332 in *Proceedings of the General Conference of the International Union for the Scientific Study of Population* 1. Mexico City.

Schoen, R., and L.U. Urton (1979) *Marital Status Life Tables for Sweden: Years 1911-1973 and Cohorts Born 1885-89 to 1940-44*. Urval 10. Stockholm: National Central Bureau of Statistics.

Schoen, R., and K. Woodrow (1979) Increment-Decrement Working Life Tables for the United States, 1972. *Program in Applied Social Statistics* 7908. Illinois: University of Illinois, Department of Sociology.

Shryock, H.S., and J.S. Siegel (1980) *The Methods and Materials of Demography*. Fourth printing (rev.). Washington, D.C.: US Government Printing Office.

Smith, S. (1980) *Tables of Working Life for the United States, 1977: Substantive and Methodological Implications*. Paper presented at the 1980 meetings of the Population Association of America.

Stone, R. (1971) *Demographic Accounting and Model Building*. Paris: OECD.

Stone, R. (1975) Towards a System of Social and Demographic Statistics. *Studies in Methods* Series F(18). New York: United Nations, Department of Economics and Social Affairs, Statistical Office.

Suchindran, C.M., and H.P. Koo (1980) *Divorce, Remarriage, and Fertility*. Paper presented at the 1980 meetings of the Population Association of America.

Suchindran, C.M., N.K. Namboodiri, and K. West (1977) Analysis of Fertility by Increment-Decrement Life Tables. *Proceedings of the American Statistical Association, Social Statistics Section* 431-436.

Tuma, N.B., M.T. Hannan, and L.P. Groeneveld (1979) Dynamic Analysis of Event Histories. *American Journal of Sociology* 84 (4):820-854.

US Bureau of the Census (1976) Number, Timing, and Duration of Marriages and Divorces in the United States: June 1975. *Current Population Reports*, Series P-20(297). Washington, D.C.: US Government Printing Office.

US Bureau of the Census (1977) Marriage, Divorce, Widowhood, and Remarriage by Family Characteristics: June 1975. *Current Population Reports*, Series P-20(312). Washington, D.C.: US Government Printing Office.

US Bureau of the Census (1981) Martial Status and Living Arrangements: March 1980. *Current Population Reports*, Series P-20 (365). Washington, D.C.: US Government Printing Office.

Willekens, F. (1979) *Computer Program for Increment-Decrement (Multistate) Life Table Analysis: A User's Manual to LIFEINDEC*. WP-79-102. Laxenburg, Austria: International Institute for Applied Systems Analysis.

Willekens, F. (1980) Multistate Analysis: Tables of Working Life. *Environment and Planning A* 12:563-588.

Willekens, F., and A. Rogers (1978) *Spatial Population Analysis: Methods and Computer Programs*. RR-78-18. Laxenburg, Austria: International Institute for Applied Systems Analysis.

Willekens, F., I. Shah, J.M. Shah, and P. Ramachandran (1982) Multi-state Analysis of Marital Status Life Tables: Theory and Application. *Population Studies* 36(1):129-144.

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