ANALYSIS OF FERTILITY BY INCREMENT-DECREMENT LIFE TABLES

C.M. Suchindran, N.K. Namboodiri, and K.K. West, University of North Carolina

INTRODUCTION

What should be the explanandum in fertility research is a question that has attracted some attention in the literature recently. It cannot be said, however, that the question has been answered to the satisfaction of all. Many studies based on cross-sectional data continue to use as explananda summary measures that are proxies to a complete reproductive history. Examples are such measures as completed family size, and expected, desired, or ideal family size. Several writers have expressed the view that it is more logical to regard the reproduction process as a contingent sequence of events and that it is advisable to treat as explananda the probability and timing of each event in the sequence (see e.g., Mishler and Westoff, 1955; Namboodiri, 1972, 1974; and Ryder, 1975). In this view the occurrence of each event in the sequence is considered necessary but not sufficient for the occurrence of subsequent events. The arrival of the first baby, for example, is a prerequisite but not a guarantee for the conception of a second child. Once we recognize that it is fruitful to think of the reproductive process as a contingent sequence, it becomes interesting to ask: How does one describe the process in terms of meaningful fertility measures? In this paper we shall show that the reproductive process conceived as a contingent sequence can be conveniently described by means of an increment-decrement table. In the immediately following section we describe this procedure, using for illustration data from the 1965 U.S. National Fertility Study.

For technical expositions of the increment-decrement tables, reference may be made to Jordan (1967) and Schoen (1975), and for an application of the technique in the analysis of marriage history, see Schoen and Nelson (1974).

AN ILLUSTRATION

The data used in this section are, as stated already, from the 1965 U.S. National Fertility Study. Reference may be made to Ryder and Westoff (1971), for a detailed description of the sample design used in that study. In brief, the universe represented by the sample consisted of currently married women born since July 1, 1910, living, with their husbands, within coterminous United States, and able to participate in an English language interview.

For the present purpose, we shall use only a part of this sample. We shall confine attention to currently married women, with no history of marital dissolution and no premarital or multiple births. Our first analysis will be confined to women married at least 9 years.

The reproductive history of women in the subsample up to the fourth birth is summarized in Table 1. The tabulation was stopped with the fourth birth because the number of women with five or more births was too small to provide reliable information about the later phases of the reproductive process. (It would have been desirable to stratify these women by age at marriage or into birth cohorts and consider each stratum separately but the smallness of the sample size prevented us from doing this.)

To facilitate a formal description of the relationships between the figures in Table 1, let us introduce the following notation: Let

N_x^i = number of women at parity i at the completion of x years after marriage (e.g., $N_1^0 = 1{,}807$, in Table 1);

D_x^i = number of women who move from parity i to parity i+1 during the xth year after marriage (e.g., $D_2^0 = 1{,}807 - 1{,}033 = 774$, in Table 1);

and W_x^i = number of women who are reported to be at parity i and have been married for only x years as of the survey date (e.g., $W_9^0 = 6$ in Table 1).

It can be seen that the following relationship prevails between the figures in columns 2, 3 and 4 of Table 1:

$$N_x^0 = N_{x-1}^0 - D_{x-1}^0 - W_{x-1}^0$$

Thus, for x = 10, 199 = 213 - 8 - 6. In column 2, we thus see only decrements and no increments. (Had we incorporated marital disruption into the picture, the situation would have been different.) When we move to columns 5, 8 or 11, we see both increments and decrements. In column 5, the successive numbers are interrelated in the following manner:

$$N_x^1 = N_{x-1}^1 - D_{x-1}^1 + D_{x-1}^0 - W_{x-1}^1$$

Thus, for x = 10,

336 = 400 - 59 + 8 - 13.

Similarly, in column 8, we have

$$N_x^2 = N_{x-1}^2 - D_{x-1}^2 + D_{x-1}^1 - W_{x-1}^2$$

and so on.

The probability of moving from parity 0 to parity 1 (i.e., of having the first birth) in the xth year after marriage can be approximately calculated as

$$q_x^0 = \frac{D_x^0}{N_x^0 - \tfrac{1}{2}W_x^0}$$

and similarly the probability of moving from parity 1 to parity 2 (i.e., of having the second birth) in the xth year after marriage can be approximately obtained as

$$q_x^1 = \frac{D_x^1}{N_x^1 + \tfrac{1}{2}D_x^0 - \tfrac{1}{2}W_x^1}$$

and, in general,

$$q_x^i = \frac{D_x^i}{N_x^i + \tfrac{1}{2}D_x^{i-1} - \tfrac{1}{2}W_x^i} \qquad i \geq 1. \qquad (1)$$

The structure of these formulae can be easily understood when it is realized that what we are calculating is the frequency of occurrence of an ith birth per person-year of exposure. We assume that each of those who move into parity i-1 during a given year is exposed one-half year, on average, to the risk of having an ith birth. Similarly, we assume that each of those reported to be at parity i-1 at the date of the survey has been exposed one-half year, on average, to the risk of having an ith birth before the survey date.

The q_x^i values calculated using the formulae just described are shown in Table 2. On the basis of these figures the reproductive history of a hypothetical cohort of 100,000 women has been constructed. This history is also reported in Table 2. Note that

l_x^i denotes the number of women of the original cohort (of 100,000) who reach parity i at the completion of x years after marriage,

d_x^i denotes the number of women who move from parity i to parity i+1 during the xth year after marriage,

and q_x^i denotes the conditional probability of moving from parity i to parity i+1 during the xth year after marriage.

It is easily seen that

$$d_x^i = q_x^i \, (l_x^i + \tfrac{1}{2} d_x^{i-1}) \qquad (2)$$

$$l_{x+1}^0 = l_x^0 - d_x^0, \text{ and}$$

$$l_{x+1}^i = l_x^i - d_x^i + d_x^{i-1}, \quad i=1, 2, \ldots . \qquad (3)$$

From Table 2 we can calculate a number of summary measures indicating the nature of the sequential process that reproduction is. A few of these measures are described below.

1. Parity Progression Ratio

The sum of the d_x^0 column in Table 2 represents the number of women in the original cohort (of 100,000) who ever move to parity 1. Similarly, the sum of the d_x^1 column represents the number of women who ever move from parity 1 to parity 2, and so on. From these column totals, we can calculate a sequence of parity progression ratios. Thus, for the progression from parity 0 to parity 1, we have

$$PP_{0,1} = \frac{\Sigma d_x^0}{100{,}000}$$

and for the progression from parity i to parity i+1 we have

$$PP_{i,i+1} = \frac{\Sigma d_x^i}{\Sigma d_x^{i-1}}, \quad i=1, 2, \ldots . \qquad (4)$$

The figures calculated in this fashion from Table 2 are: $PP_{0,1}$ = 93,897/100,000 = .9390; $PP_{1,2}$ = 84,113/93,897 = .8958; $PP_{2,3}$ = 58,689/84,113 = .6977; $PP_{3,4}$ = 37,161/58,689 = .6332. These figures indicate that almost 94 percent of the original (hypothetical) cohort bear at least one child; that among those who bear at least one child, 90 percent bear at least two children; that among those who bear at least two children, 70 percent go on to have at least three children; and that among those who attain parity three, 63 percent move on to parity four.

2. Mean Interval between Marriage and Successive Births

As stated already, the d_x^i column in Table 2 gives the numbers of women who make the transition from parity i to parity i+1 during the xth year after marriage. Assuming that these movements from parity 0 to parity 1 are evenly distributed within each year after marriage, we can calculate the mean interval between marriage and successive births from column 1 and 3 of Table 2 using the formula

$$AI_{0,i} = \frac{\sum_x (x + \tfrac{1}{2} d_x^{i-1})}{\sum_x d_x^{i-1}}, \quad i = 1, 2, \ldots \qquad (5)$$

The figures thus calculated from Table 2 are shown below: $AI_{0,1}$ = 2.40 years; $AI_{0,2}$ = 5.28 years; $AI_{0,3}$ = 8.03 years; and $AI_{0,4}$ = 10.47 years. It should be noted that the mean interval $AI_{0,1}$ represents the experience of all those who make the transition from parity 0 to parity 1, irrespective of what happens to them beyond parity 1. Some of these women may or may not make the transition to higher parities. Similarly, the mean interval $AI_{0,2}$ represents the experience of all those and only those who move from parity 1 to parity 2. Because of these changes in the bases, it is not strictly valid to interpret the difference

$$AI_{0,i+1} - AI_{0,i}$$

as an inter-birth interval. One way to avoid this difficulty is to include in Table 2 only women who had at least, say, 4 births; then the bases of $AI_{0,i}$ will be the same for i = 1, 2, 3, and 4.

3. Average Parity Attained within a Given Interval after Marriage

From Table 2, it is possible to calculate the average number of births occurring to the hypothetical cohort of 100,000 during any specific interval after marriage. Suppose, for example, we want to calculate the average number of births occurring during the first three years after marriage. This can be obtained by adding the numbers in the d_x^i columns for all i and for x = 0, 1, and 2, and dividing the sum thus obtained by l_0 (i.e., 100,000). The figure thus calculated from Table 2 is {(26,032 + 31,682 + 12,485) + (3,807 + 15,431) + 696}/100,000 = 0.9013. Note that the sum (26,032 + 31,682 + 12,485) represents the number of first births during the first three years after marriage, the sum (3,807 + 15,431), the number of second births during the same period, and 696, the number of third births during the period. A general formula for the purpose is

$$AP_{0,j} = (1/l_0) \sum_{x=0}^{x=j-1} \sum_{i=0} d_x^i \qquad (6)$$

where $AP_{0,j}$ stands for the average parity attained during the first j years after marriage. One can similarly calculate the average number of births occurring in any specific interval after marriage, e.g., between the fifth and tenth year after marriage.

4. Conditional Probability of Transition to Higher Parities

From Table 2, one can calculate conditional probabilities of the following types:

A. Given that a woman is at parity 0 when she completes 5 years after marriage (i.e., when she just starts her sixth year after marriage), what is the probability that she will bear her first child within the year? From Table 2, the required probability is easily seen to be 0.18063.

B. Given that a woman has just reached her sixth year after marriage and is still childless, what is the probability that she will bear her first child sometime during the next 5 years? From the l_x^0 column of Table 2, we notice that 15,639 women reached the sixth year after marriage and are still childless. After 5 more years their number decreases to 8,390. Hence, the required probability is simply obtained as

$$\frac{15,637 - 8,387}{15,637} = 0.4636$$

which means that just less than 50 percent of these 15,637 women are likely to bear at least one child within the next five years.

Recall that in preparing Tables 1 and 2, birth events were related to the x variable, duration of marriage. One can use instead of duration of marriage the wife's age. This is illustrated in Tables 3 and 4. Table 3 pertains to all white women in the 1965 NSF sample who had no history of marital dissolution and no experience of premarital or multiple births. Note particularly that unlike in Table 1, where only women who had been married 9 or more years by the survey date were included, no parallel restriction with respect to age was imposed in the construction of Tables 3 and 4.

From Table 4 one can calculate a number of summary measures of the kind mentioned earlier. But summary measures taken singly or in combination do not portray the details of the information contained in the q_x^i sequences. So it is natural to ask: If summary measures tend to sacrifice information, why not work with the q_x^i sequences themselves displayed in tabular form? There are two major difficulties in doing this. First, the q_x^i sequences contain too many numbers to digest, and this is the reason, in the first place, why one tries to get summary measures. Second, and more important, the q_x^i sequences show a good deal of irregularities (see Figures 1 to 4). This problem becomes more serious when interest centers in comparative analysis of q_x^i values for population subgroups (e.g., religious and socio-economic classes), for in such situations, due to small numbers, sampling errors associated with the observed q_x^i values will be large. (Another reason for irregularities in the q_x^i sequences may be measurement errors.)

Demographers are familiar with several procedures for removing irregularities in observed rates and estimated risks. Among these are (1) curve fitting, and (2) grouping. Application of these two techniques in the present case are briefly discussed below.

Curve fitting: The Hadwiger function (see below) was found to give better fit to the q_x^i sequences (in Table 4) than some of the other (e.g., beta and gamma) functions often used in this type of exercises. In the present case the Hadwiger function has the form

$$q_x^i = \frac{RH}{2T\sqrt{\pi}} \left(\frac{T}{x-i}\right)^{3/2} \exp\left[-H^2\left(\frac{T}{x-i} + \frac{x-i}{T} - 2\right)\right]$$

where i stands for parity, x for age, and R, H, and T are parameters to be estimated (e.g., using methods for fitting nonlinear regression). The estimated values of R, H, and T for the data in Table 4 are shown below. It would have been nice if we could give meaningful physical interpretations to these parameter estimates. Unfortunately we have not been able to do this.

Grouping: This technique involves aggregating persons (women in the present case) and events (births or withdrawals) on the x variable (e.g., into age groups x to x + n) and then recovering from the information available for the aggregated data estimates of q_x^i values for single years. The data presented in Table 3 are reproduced in the aggregated form in Table 5.

Karup-King multipliers were applied to the numbers in columns of Table 5 to obtain the numbers of persons at pivotal ages 15, 20, 25, . . ., as well as withdrawals and births at these ages. From these pivotal numbers, q_{15}^i, q_{20}^i, . . . were calculated using formula (1). Karup-King multipliers were then applied to these pivotal q values to obtain q_x^i for all x. This procedure is now being examined for its robustness as different criteria for aggregation and different pivotal ages are used.

So far our attention in this paper has been devoted to constructing complete increment-decrement life tables. For many purposes, however, abridged life tables would be sufficient. To construct abridged life tables we proceed like this. From aggregated data shown in Table 5, we calculate ${}_5q_x^i$ values according to the following formula:

$${}_5q_x^i = \frac{{}_5D_x^i}{{}_5N_x^i + a_x^{i-1}\,{}_5D_x^{i-1} - \tfrac{1}{2}\,{}_5W_x^i} \qquad (8)$$

where ${}_5D_x^i$ = number of ith parity births in the age groups (x, x+5), ${}_5N_x^i$ = number of women remaining at the ith parity at the beginning of the 5-year interval (x, x+5), ${}_5W_x^i$ = number of women in the age group (x, x+5) who are withdrawn (from observation) when they are at parity i, and a = average fraction of the interval (x, x+5) spent at ith parity by women before moving to parity i+1. How a varies by age and parity remains to be investigated. One set of estimates of a obtained from the 1965 NSF are reported in Table 6. Table 6 contains estimated ${}_5q_x^i$ values obtained using these a's. In constructing Table 6 we found it more appropriate to use instead of (8) a modified version of Greville's formula (see Shryock and Siegel, 1972, pp. 444) for age group 15-19.

References

Jordan, C.W. (1967). Life Contingencies. The Society of Actuaries. Chicago, Illinois.

Mishler, G. and Westoff, C.F. (1955). A Proposal for Research on Social Psychological Factors Affecting Fertility: Concepts and Hypotheses. Pp. 121-150 in Milbank Memorial Fund (ed.), Current Research in Human Fertility. New York: Milbank Memorial Fund .

Namboodiri, N.K. (1972). Some Observations on the Economic Framework for Fertility Analysis. Population Studies 26: 185-206.

Namboodiri, N.K. (1974). Which Couples at Given Parities Expect to Have Additional Births? Demography 11: 45-56.

Ryder, N.B. (1975). Fertility Measurement Through Cross-Sectional Surveys. Social Forces 54: 7-35.

Ryder, N.B. and Westoff, C.F. (1971). Reproduction in the United States, 1965. Princeton:

Princeton University Press.
Schoen, R. (1975). Constructing Increment-Decrement Life Tables. Demography 12: 313-324.
Schoen, R. and Nelson, V.E. (1974). Marriage, Divorce, and Mortality: A Life Table Analysis. Demography 11: 267-290.
Shryock, H.S. and Seigel, J.S. (1973). The Methods and Materials of Demography. U.S. Department of Commerce, Washington, D.C.

TABLE 1

Observed Timing of Transition from One Parity to the Next: 2,443 Selected White Women (Married for 9 Years or More with No History of Marital Dissolution or Premarital Births): 1965 U.S. National Fertility Study

Marital Duration (in completed years)	Parity 0			Parity 1			Parity 2			Parity 3		
	Remaining at this Parity	Moved to Next Parity	At this Parity on Survey Date	Remaining at this Parity	Moved to Next Parity	At this Parity on Survey Date	Remaining at this Parity	Moved to Next Parity	At this Parity on Survey Date	Remaining at this Parity	Moved to Next Parity	At this Parity on Survey Date
1	2	3	4	5	6	7	8	9	10	11	12	13
0	2,443	636										
1	1,807	774		636	93							
2	1,033	305		1,317	377		93	17				
2	728	210		1,245	406		453	101		17	2	
4	518	136		1,049	319		758	194		116	35	
5	382	69		866	243		883	187		275	61	
6	313	50		692	189		939	177		401	93	
7	263	31		553	107		951	163		485	99	
8	232	19		477	96		895	112		549	98	
9	213	8	6	400	59	13	879	106	41	563	69	50
10	199	14	7	336	47	14	791	97	42	550	71	32
11	178	8	7	289	24	15	699	58	43	544	63	34
12	163	6	12	258	20	12	622	46	22	505	56	32
13	145	5	12	232	12	8	574	34	31	463	37	36
14	128	2	11	217	7	15	521	32	22	424	30	42
15	115	5	12	197	7	10	474	18	37	384	26	30
16	98	1	13	185	5	13	426	15	36	346	16	36
17	84	1	14	168	3	15	380	4	50	309	12	37
18	69	0	9	151	4	10	329	2	52	264	5	46
19	60	1	59	137	0	137	279	6	273	215	6	209

TABLE 2

Calculation of Life Table Probabilities of Having an ith Birth by Year of Marriage

Year of Marriage (x)	First Birth			Second Births			Third Births			Fourth Births		
	l^0_x	d^0_x	q^0_x	l^1_x	d^1_x	q^1_x	l^2_x	d^2_x	q^2_x	l^3_x	d^3_x	q^3_x
0	100,000	26,034	.26034									
1	73,966	31,682	.42833	26,034	3,807	.09091						
2	42,284	12,485	.29526	53,909	15,431	.25655	3,807	696	.06039			
3	29,800	8,596	.28846	50,963	16,619	.30074	18,542	4,134	.15396	696	82	.02963
4	21,204	5,567	.26255	42,940	13,058	.28558	31,027	7,941	.21144	4,748	1,433	.16432
5	15,637	2,824	.18063	35,449	9,946	.26985	36,141	7,561	.18616	11,255	2,489	.16554
6	12,813	2,047	.15974	28,327	7,737	.26360	38,525	7,260	.17126	16,327	3,792	.18999
7	10,766	1,269	.11787	22,637	4,380	.18821	39,002	6,683	.16223	19,795	4,043	.17476
8	9,497	778	.08190	19,526	3,930	.19733	36,699	4,592	.11877	22,435	4,006	.16198
9	8,719	332	.03809	16,374	2,455	.14843	36,037	4,252	.11410	23,021	2,936	.11675
10	8,387	601	.07161	14,251	2,035	.13988	34,240	4,186	.12224	24,337	3,203	.12118
11	7,786	357	.04584	12,817	1,092	.08406	32,089	2,745	.08412	25,320	3,025	.11331
12	7,429	284	.03822	12,082	959	.07843	30,436	2,290	.07407	25,040	2,864	.10938
13	7,145	257	.03597	11,407	601	.05206	29,105	1,771	.06023	24,466	2,030	.08008
14	6,888	112	.01633	11,063	370	.03325	27,935	1,752	.06232	24,207	1,796	.07160
15	6,776	311	.04587	10,805	394	.03599	26,553	1,049	.03922	24,163	1,698	.06878
16	6,465	71	.01093	10,722	300	.02793	25,898	952	.03654	23,514	1,141	.04767
17	6,394	83	.01299	10,493	196	.01863	25,246	285	.01122	23,325	963	.04102
18	6,311	0	.0	10,380	803	.07734	25,157	168	.00656	22,647	470	.02066
19	6,311	207	.03278	9,577	0	.0	25,792	372	.01444	22,326	1,190	.05286
TOTAL		93,897			84,113			58,689			37,161	

l^i_x = number of women of the cohort who reach parity i at the completion of x years after marriage

d^i_x = number of women who move from parity i to parity i + 1 during the xth year after marriage

q^i_x = the conditional probability of moving from parity i to parity i + 1 during the xth year after marriage

TABLE 3

Observed Timing of Transition from One Parity to the Next: 3,851 Selected White Women

Age	Women Eligible to Marry	Women Who Marry	Parity 0: Remaining at this Parity	Parity 0: Moved to Next Parity	Parity 0: At this Parity on Survey Date	Parity 1: Remaining at this Parity	Parity 1: Moved to Next Parity	Parity 1: At this Parity on Survey Date	Parity 2: Remaining at this Parity	Parity 2: Moved to Next Parity	Parity 2: At this Parity on Survey Date	Parity 3: Remaining at this Parity	Parity 3: Moved to Next Parity	Parity 3: At this Parity on Survey Date
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
13	3,851	8	0	1										
14	3,843	34	7	5		1	0							
15	3,809	91	36	28		6	2	1						
16	3,718	232	99	86	5	31	8	1	2					
17	3,486	383	240	185	8	108	32	7	10	2	1			
18	3,103	525	430	303	20	254	92	11	39	15	5	2		
19	2,578	524	632	381	26	454	148	28	111	29	6	17	2	4
20	2,054	518	749	380	31	659	188	38	224	71	13	40	15	3
21	1,536	445	856	376	31	813	245	23	328	83	18	93	22	13
22	1,091	301	894	337	44	921	269	44	472	111	29	141	42	12
23	790	206	814	277	23	945	272	42	601	120	36	198	60	14
24	584	157	720	229	21	908	251	31	717	156	52	244	53	19
25	427	96	627	195	17	855	225	35	760	154	42	328	62	27
26	331	89	511	146	15	790	222	22	789	146	30	393	70	31
27	242	51	439	100	11	692	194	22	835	140	35	438	82	30
28	191	46	379	79	12	576	128	16	854	128	39	466	74	28
29	145	32	334	60	7	511	94	18	815	120	41	492	72	21
30	113	24	299	49	4	459	104	13	748	90	32	519	62	31
31	89	26	270	41	8	391	71	13	730	68	42	516	65	39
32	63	17	247	37	8	348	51	13	691	75	42	480	45	36
33	46	14	219	18	16	321	49	13	625	45	18	474	48	36
34	32	8	199	22	10	277	24	12	611	41	30	435	24	32
35	24	3	175	19	7	263	20	12	564	39	26	420	29	31
36	21	4	152	9	8	250	23	12	519	25	36	399	28	36
37	17	3	139	6	10	224	10	8	481	17	40	360	20	27
38	14	5	126	3	10	212	11	14	434	16	30	330	14	26
39	9	2	118	4	9	190	3	13	399	6	32	306	14	24
40	7	1	107	3	6	178	2	14	364	6	43	274	6	36
41	6	1	99	1	7	165	3	25	317	6	33	238	4	41
42	5	2	92	1	10	138	4	13	281	3	41	199	3	25
43	3	1	83	1	9	122	0	15	241	1	38	174	4	28
44	2	1	74	0	10	108	2	16	202	0	36	143	0	35
45	1	0	65	1	4	90	0	12	168	1	34	108	0	22

TABLE 4

Calculation of Life Table Probabilities of Having an ith Birth by Age

Age	Marriage			First Birth			Second Birth			Third Birth			Fourth Birth		
	l_0	d_0	q_0	l_1	d_1	q_1	l_2	d_2	q_2	l_3	d_3	q_3	l_4	d_4	q_4
13	100,000	208	.00208												
14	99,792	883	.00885	·208	135	.20833									
15	98,909	2,367	.02393	956	735	.34355	135	51	.10256						
16	96,542	6,024	.06240	2,588	2,266	.40471	819	212	.10884	51	0	.00000			
17	90,518	9,961	.10987	6,346	4,901	.43274	2,873	865	.16234	263	55	.07843	0	0	.00000
18	80,557	13,629	.16919	11,406	8,089	.44396	6,909	2,519	.23000	1,073	424	.18181	55	0	.00000
19	66,928	13,630	.20365	16,946	10,276	.43246	12,479	4,135	.23473	3,168	834	.15934	479	61	.06780
20	53,298	13,441	.25219	20,300	10,345	.38287	18,620	5,389	.22650	6,469	2,089	.22793	1,252	466	.20270
21	39,857	12,528	.28971	23,396	10,491	.35371	23,576	7,136	.24760	9,769	2,507	.18799	2,875	710	.17187
22	27,329	7,540	.27590	25,433	9,625	.32960	26,931	8,005	.25219	14,398	3,450	.18750	4,672	1,410	.22047
23	19,789	5,160	.26076	23,348	7,122	.27467	28,551	8,221	.25600	18,953	3,849	.16689	6,712	2,064	.23904
24	14,629	3,944	.26963	21,386	6,788	.29061	27,452	7,688	.24925	23,325	5,191	.19105	8,497	1,881	.16960
25	10,685	2,402	.22482	18,542	5,776	.29257	26,552	7,084	.24064	25,822	5,310	.18085	11,807	2,290	.15836
26	8,283	2,227	.26888	15,168	4,338	.26642	25,244	7,143	.26056	27,596	5,142	.16497	14,827	2,703	.15538
27	6,056	1,304	.21074	13,057	2,989	.21806	22,439	6,351	.26538	29,597	5,017	.15309	17,266	3,289	.16632
28	4,752	1,144	.24085	11,372	2,383	.19949	19,077	4,271	.21070	30,931	4,711	.14246	18,994	3,062	.14341
29	3,608	796	.22069	10,133	1,824	.17316	17,189	3,198	.17669	30,491	4,576	.14260	20,643	3,049	.13296
30	2,812	597	.21239	9,105	1,491	.15857	15,815	3,618	.21849	29,113	3,550	.11479	22,170	2,707	.11303
31	2,215	647	.29213	8,211	1,254	.14695	13,688	2,509	.17530	29,181	2,780	.09133	23,013	2,992	.12260
32	1,568	423	.26984	7,604	1,150	.14711	12,433	1,843	.14169	28,910	3,217	.10783	22,801	2,199	.09009
33	1,145	348	.30435	6,877	582	.08257	11,740	1,822	.15147	27,536	1,998	.07025	23,819	2,489	.10031
34	797	199	.25000	6,643	749	.11111	10,500	925	.08510	27,360	1,876	.06743	23,328	1,325	.03460
35	598	75	.12500	6,093	673	.10983	10,324	822	.07707	26,409	1,859	.06933	23,879	1,697	.06839
36	523	100	.19047	5,495	333	.06000	10,175	926	.09255	25,372	1,260	.04878	23,717	1,732	.07115
37	423	75	.17647	5,262	316	.04428	9,582	437	.04484	25,038	921	.03648	23,245	1,355	.05714
38	348	124	.35714	5,021	122	.02429	9,461	507	.05326	24,554	940	.03769	24,165	1,061	.04307
39	224	50	.22222	5,023	176	.03493	9,076	148	.01617	24,121	377	.01560	24,044	1,142	.04713
40	174	25	.14286	4,897	141	.02870	9,104	106	.01159	23,892	418	.01746	23,279	544	.02316
41	149	25	.16667	4,781	50	.01041	9,139	179	.01953	23,580	470	.01986	23,153	367	.01568
42	124	50	.40000	4,756	54	.01136	9,010	274	.03030	23,289	338	.01442	23,256	335	.01428
43	74	25	.33333	4,752	61	.01282	8,790	0	.00000	23,225	105	.00450	23,253	582	.02496
44	49	25	.50000	4,716	0	.00000	8,851	173	.01960	23,120	0	.00000	22,776	0	.00000
45	24	24	.00000	4,741	75	.01587	8,678	0	.00000	23,293	154	.00662	22,776	0	.00000

TABLE 5

Observed Timing of Transition from One Parity to the Next: Grouped Data

Age	Women Who Marry	Parity 0			Parity 1			Parity 2			Parity 3		
		Remaining at This Parity	Moved to Next Parity	At This Parity on Survey Date	Remaining at This Parity	Moved to Next Parity	At This Parity on Survey Date	Remaining at This Parity	Moved to Next Parity	At This Parity on Survey Date	Remaining at This Parity	Moved to Next Parity	At This Parity on Survey Date
15-19	1755	36	983	59	6	282	48	0	46	12	0	2	4
20-24	1627	749	1,599	150	659	1,225	178	224	541	148	40	192	61
25-29	314	627	580	62	855	863	113	760	688	187	328	360	137
30-34	89	299	167	46	459	299	64	748	319	164	519	244	174
35-39	17	175	41	44	263	67	59	564	103	164	420	105	144
40-44	6	107	6	42	178	11	83	364	16	191	274	17	165

TABLE 6

Calculation of Life Table Probabilities from Grouped Data

Age	Parity 0		Parity 1		Parity 2		Parity 3	
	Average Years Spend in Parity Before Having Birth	q_x^i	Average Years Spend in Parity Before Having Birth	q_x^i	Average Years Spend in Parity Before Having Birth	q_x^i	Average Years Spend in Parity Before Having Birth	q_x^i
15-19	.3679	.9634	.3122	.9761	.2333	.7694	.1821	.3125
20-24	.6181	.9520	.5502	.8450	.4750	.7392	.5089	.6741
25-29	.6089	.7373	.6162	.7531	.5825	.5073	.5250	.5800
30-34	.5989	.5071	.5922	.5686	.6217	.3701	.5759	.3963
35-39	.5118	.2536	.6756	.2565	.6373	.1963	.6456	.2533
40-44	.5000	.0670	.7000	.0772	.5545	.0583	.7125	.0838