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ILLUSTRATIVE ANALYSIS: LIFE TABLE ANALYSIS OF BIRTH INTERVALS IN COLOMBIA

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The World Fertility Survey is an international research programme whose purpose is to assess the current state of human fertility throughout the world. This is being done principally through promoting and supporting nationally representative, internationally comparable, and scientifically designed and conducted sample surveys of fertility behaviour in as many countries as possible.

The WFS is being undertaken, with the collaboration of the United Nations, by the International Statistical Institute in cooperation with the International Union for the Scientific Study of Population. Financial support is provided principally by the United Nations Fund for Population Activities and the United States Agency for International Development.

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Illustrative Analysis: Life Table Analysis Of Birth Intervals In Colombia

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ERRATA

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p. 12, Equation (8) should read:

$$B_x = 1/_n \left[(n-\tfrac{1}{2}) B_{x-\frac{1}{2}} + \tfrac{1}{2} B_{x+n-\frac{1}{2}} \right]$$

p. 12, R.H. Column, 12th line from end should read:
"sensitive measure of location is Tukey's (1978) trimean,"

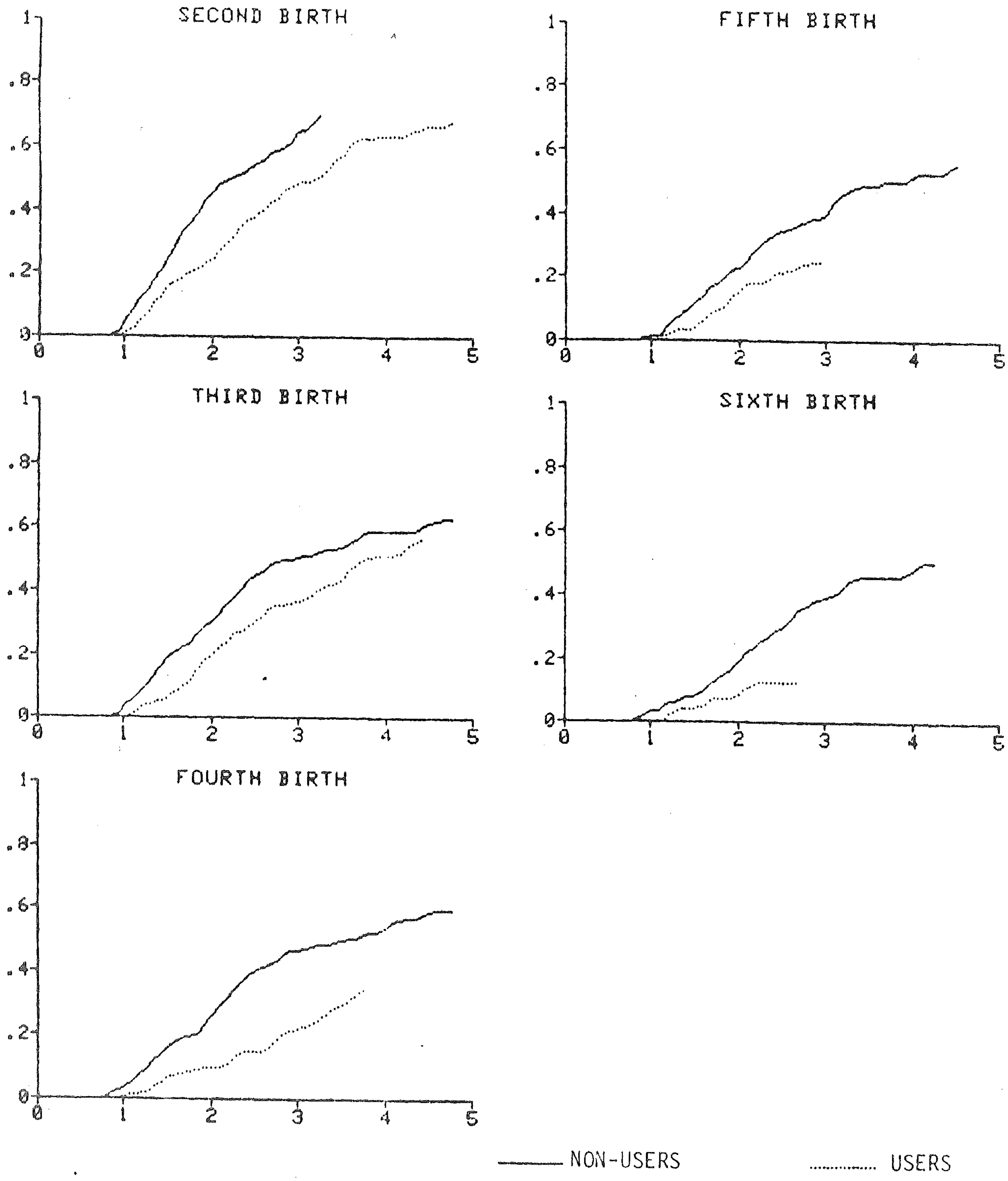
p. 16, R.H. Column, table 'Selected Birth Intervals by Age at Start of Interval': 19.21 should read 19-21.

p. 18, second table 'Third Birth Interval by Cohort Controlling Relative Age', Cohort sub-heading should read:
" 15-24 25-29 30-34 35-39 40-49 "

p. 24, R.H. Column, table 'Selected Birth Intervals by Level of Education', Level of Education sub-heading should read:
" 1-4 5+ "

p. 39, Figure 5.4,
Please replace with the attached Figure 5.4

Figure 5.4 Life Tables by Birth Order and Use of Contraception



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ACKNOWLEDGMENTS

The authors would like to express their appreciation to Jane Menken for a very useful discussion at the planning stage of this project, to Mick Pearce and the rest of the WFS staff for their forbearance and endurance of the implementation of this project and to Henri Leridon for his constructive comments on the almost final product.

Preface

One of the main concerns of the World Fertility Survey has been the analysis of the data collected by the participating countries. It was decided at the outset that, in order to obtain quickly some basic results on a comparable basis, each country would produce soon after the field work a 'First Country Report', consisting of a large number of cross-tabulations with a short accompanying text. Precise guidelines for the preparation of the tables were produced and made available to the participating countries.

It was also recognised, however, that at later stages many countries would wish to study in greater depth some of the topics covered in their first reports, or indeed new but related subjects, using more refined analytic techniques. In order to assist the countries at this stage a general 'Strategy for the Analysis of WFS Data' was outlined, a series of 'Technical Bulletins' was started, dealing with specific methodological issues arising in the analysis, and a list of 'Selected Topics for Further Analysis of WFS Data' was prepared, to serve as a basis for selecting research topics and assigning priorities.

It soon became evident that many of the participating countries would require assistance and more detailed guidelines for further analysis of their data. Acting upon a recommendation of its Programme Steering Committee, the WFS then launched the present series of 'Illustrative Analyses' of selected topics. The main purpose of the series is to illustrate the application of certain demographic and statistical techniques in the analysis of WFS data, thereby encouraging other researchers and other countries to undertake similar work.

In view of the potentially large number of research topics which could be undertaken, some selection was necessary. After consultation with the participating countries, 12 subjects which are believed to be of top priority and of considerable interest to the countries themselves were selected. The topics chosen for the series span the areas of fertility estimation, levels, trend and determinants, marital formation and dissolution, breastfeeding, sterilization, contraceptive use, fertility preferences, family structure, and infant and child mortality.

It was envisaged that each study would include a brief literature review summarizing important developments in the subject studied, a clear statement of the substantive and methodological approach adopted in the analysis, and a detailed illustration of the application of such an approach to the data from one of the participating countries, but with emphasis on the general applicability of the analysis. These studies have been conducted in close collaboration with the country concerned, where possible with the active participation of national staff.

It should perhaps be emphasised that the studies in the 'Illustrative Analyses' series are meant to be didactic examples rather than prescriptive models of research, and should therefore not be viewed as cookbook recipes to be followed indiscriminately. In many cases the investigators have had to choose a particular course of action from several possible, sometimes equally sound, approaches. In some instances this choice has been made more difficult by the fact that demographers or statisticians disagree among themselves as to the approach most appropriate for a particular problem. In the present series we have, quite intentionally, resisted the temptation to enter the ongoing debates on all such issues. Instead, and in view of the urgency with which countries require guidelines for analysis, an attempt has been made to present what we believe to be a basically sound approach to each problem, spelling out clearly its drawbacks and limitations.

In this difficult task the WFS has been aided by an *ad hoc* advisory committee established in consultation with the International Union for the Scientific Study of Population (IUSSP) and consisting of Ansley Coale (Chairman) Mercedes Concepcion, Gwendolyn Johnson-Ascádi and Henri Leridon, to whom we express our gratitude. Thanks are also due to the referees who have generously donated their time to review the manuscripts and to the consultants who have contributed to the series.

Many members of the WFS staff made valuable contributions to this project, which was co-ordinated by V.C. Chidambaram and Germán Rodríguez.

Sir Maurice Kendall
WFS Project Director

1. Introduction

The purpose of this study is to illustrate the application of life table techniques to the analysis of birth intervals, using data from the Colombian National Fertility Survey conducted in 1976 as part of the World Fertility Survey Programme.

1.1 THE ANALYSIS OF BIRTH INTERVALS

The basic approach underlying the analysis of birth intervals is to view the process of family building as consisting of a series of stages where women move successively from marriage to first birth, from first to second birth, and so on, until they reach their completed family size. That is, we consider separately the transition from each parity to the next, with marriage defined as the starting point or parity zero.

There are two aspects of interest to the demographer in this process. One aspect is the proportion of women at each parity who eventually move to the next highest parity, or the parity progression ratio, which is related to the quantity or *quantum* of fertility. The other aspect is the time it takes to make the transition from one parity to the next for those women who continue reproduction, or the distribution of birth intervals, which is related to the timing or *tempo* of fertility. For a discussion of the concepts of quantum and tempo see Ryder (1980).

One of the main insights to be gained from an analysis of birth intervals relates precisely to the untangling of these two components of the family building process. It is well known that Colombia has experienced a substantial decline in fertility in recent years, see for example Hobcraft (1980) and the references therein. One of the objectives of the present analysis will be to shed light on the extent to which the decline has affected women at different stages of their reproductive careers, both in terms of the proportion who have another child and the timing of the next birth.

The analysis of these two components of the family building process is relatively simple when one has data on the complete maternity histories of cohorts of women who have reached the end of their reproductive life. In such cases parity progression ratios may be calculated directly from the distribution of completed family sizes, and the timing of each birth may be studied directly from the observed distribution of the intervals between births of different orders. Moreover, the determinants of the quantum and tempo of fertility may be analysed by applying standard techniques such as cross-tabulation or regression analysis.

The situation is somewhat more complicated when one has cross-sectional data of the type collected in most fertility surveys, where the information pertains to the experience up to the date of the survey of cohorts of women who are still engaged in reproduction. In such cases the analyst is faced with a set of incomplete maternity histories and, except for the oldest cohorts, cannot proceed to a direct calculation of parity progression ratios or birth interval distributions. It is useful to distinguish two problems caused by the incomplete nature of the data, namely selectivity and censoring.

Selectivity refers to the fact that the transition from parity i to i+1 can only be studied for women who have reached parity i or more at the time of the survey, who tend to be selected on a number of characteristics and are thus not representative of the whole population. The transition from parity 2 to 3 for example, can only be studied for women who have 2 or more children at the time of the survey. For the cohort aged 20-24 the subset with 2 or more children consists of women who married early and had two children in relatively quick succession. Such women will tend to be more fertile, and hence less educated and modern, than the average member of the cohort aged 20-24.

Censoring refers to the fact that some of the women who have reached parity i at the time of the survey, and are thus selected for analysis, have not yet reached parity i+1. In this case all we know is that they will either stay at parity i or the birth interval will exceed the time elapsed since the last birth. Censoring denotes essentially a curtailment of exposure by the date of the interview, and introduces ambiguity in the definition of the parity progression ratio and the length of the birth interval.

Fortunately these methodological problems are not insurmountable. Censoring can be handled by using life table techniques, which have been specially devised to give proper consideration to incomplete exposure and lead to an estimate of the proportion of women who move from one parity to the next at successive durations of exposure. Selectivity can be handled by introducing proper controls in the analysis, essentially by constructing separate life tables for women reaching each parity at different ages. An important objective of the present study is to illustrate the application of these techniques with careful consideration of the types of biases just discussed.

It might be noted here that we depart from other analysts who study separately the *closed* interval, defined as the interval between two successive births, and the *open* interval, defined as the interval between the most recent birth and the interview. The analysis of open and closed intervals is quite appropriate for women who have completed their reproductive careers, but leads to serious biases from cross-sectional data. See for example the paper by Srinivasan (1967) and the comment by Leridon (1969).

1.2 OVERVIEW OF THE PRESENT STUDY

This paper is organised in seven chapters, including this introduction. In Chapter 2 we provide the methodological basis of our work by reviewing the procedures followed in the construction of life tables by birth order, describing the strategy followed in the presentation of results, including the choice of summary measures of the quantum and tempo of fertility, and illustrating the problems of selectivity and censoring.

In Chapter 3 we turn our attention to the substantive results of the analysis by considering age, cohort and period effects on birth intervals. In the analysis of the transition from parity i to i+l age denotes the respondent's age at the time of the i-th birth, and serves as a measure of past reproductive performance. Cohort denotes the respondent's age at the time of the survey and permits the study of trends by comparing the behaviour of different generations of women. Period denotes the calendar period of occurrence of the ith birth and serves to place the study of the interval to the (i+1)st birth at approximately the correct epoch, thus permitting a refined analysis of trends over time.

In Chapter 4 we consider socio-economic differentials in the family building process by producing life tables by birth order for selected subgroups of the population. The variables studied include childhood type of place of residence, education as measured by number of years of schooling, and labour force participation. Of these variables education emerges as the most interesting determinant of fertility, and we trace its effect over time by considering trends within educational groups.

In Chapter 5 we turn our attention to a different set of variables by considering the effects of infant mortality, breastfeeding and contraception on fertility. Not surprisingly we find that the survival of the i-th child for at least one year has an important effect on the proportion of women who have another child and on the timing of the next birth. The analysis of contraception and breastfeeding is somewhat more complicated by the fact that data on these two variables are available only for the two most recent births. We show that use of data on the last two children leads to serious biases even if proper controls are introduced in the analysis.

In Chapter 6 we discuss briefly some mathematical models which may be used to fit birth interval distributions. Such models have at least two uses, one is to improve our understanding of the family building process by considering simple mechanisms which yield distributions consistent with the data. The other use, of a more practical nature, is to smooth the data when they show irregularities and to permit description of the process from incomplete observations. The discussion is brief, however, and references are given to more extensive work in this area.

Finally Chapter 7 is a summary of the main findings of the study.

1.3 THE COLOMBIAN NATIONAL FERTILITY SURVEY

The Colombian National Fertility Survey was conducted in 1976 jointly by the *Corporación Centro Regional de Población* (CCRP), a non-profit private institution devoted to research in population, and the *Departamento Administrativo Nacional de Estadística* (DANE), the state agency responsible for the collection, processing and publication of statistical data, with the collaboration of the Division of Information Systems of the Ministry of Health in the design and implementation of the sample.

The survey used a stratified, two-stage area sample of 5378 women between the ages of 15 and 49, selected with equal final probability so as to yield a self-weighted sample of women. In the sample there were 3481 women who were either ever-married or had had at least one child, and were thus selected for the present study.

The birth history data appear to be of reasonable quality, at least for the past 15 or 20 years. Fertility rates obtained from the 1976 survey for past periods have been compared with rates obtained from the 1973 census and a previous survey conducted in 1969, and have been found in close agreement. Several studies have assessed the quality of the birth and marriage histories, for which see Hobcraft (1980), Somoza (1980) and Florez and Goldman (1980).

Dating of births has been found to be reasonably complete, with 91 per cent of the dates given in calendar month and year form, 2 per cent given as calendar year with the month missing, and 7 per cent given as "years ago". Missing months were imputed and dates given as years ago were transformed to month and year form by also imputing a month. Note that imputation has affected only 9 per cent of the dates of birth.

The results of the survey indicate a notable decline in fertility in the last 10 or 15 years, from a total fertility rate just above 7 children per women in 1960-64 to 4.2 in 1976. The decline in fertility is reflected in all age groups but is particularly pronounced at ages 25-34, the prime childbearing ages. A short review of the results of the survey may be found in the summary of findings published by the WFS. For further details the reader is referred to the First Country Report produced by CCRP and DANE (1976).

2. Life Table Methodology

In this chapter we describe in detail the procedures followed in the construction of life tables by birth order, discuss the approach adopted in the presentation of results and in particular our choice of summary indicators of the quantum and tempo of fertility, and illustrate the problems of selectivity and censoring as well as the choice of appropriate controls.

2.1 LIFE TABLES BY BIRTH ORDER

The methodology for constructing life tables from WFS data is described in a separate Technical Bulletin by Smith (1980). In this section we illustrate the method by constructing an abridged life table for the interval from marriage to first birth for all ever-married women. The same procedures may, of course, be applied to higher order births.

The basic information required to construct a life table is a cross tabulation of all ever-married women by duration of exposure and termination status. By duration of exposure we mean the interval from marriage to either first birth or interview, whichever comes first. By termination status we mean a variable indicating whether exposure was terminated by the interview or the first birth. An example of the required tabulation is given in Columns 1 and 3-5 of Table 2.1.

For purposes of illustration we have grouped duration of exposure in three month intervals shown in Column 1, although all other life tables presented in this study have been calculated using duration in single months for greater detail and accuracy. The choice of grouping is not crucial, however, and if we had to do the required calculations by hand we would prefer using three month intervals to save labour. A special problem that arises with first births is that premarital births, which are frequent in Colombia, occur at negative durations. Rather than omitting these events we have classified all premarital births as occurring at duration zero. Following standard life table notation we use the symbol x to refer to duration in exact months and n to refer to the width of the intervals of exposure.

As regards termination status, we have distinguished three categories shown in Columns 3 to 5, namely (a) censored cases, or women reaching the interview without a first birth, (b) censored events, or women having both the first birth and the interview in the same interval of exposure, and (c) events, or women having the first birth in an interval of exposure prior to the interview. We denote by ${}_nC_x$ the total number of women reaching interview in the interval x to $x+n$, that is categories (a) and (b), and by ${}_nE_x$ the number of events in the interval x to $x+n$ to women reaching interview later, or category (c).

The actual calculation of the life table involves a series of steps which are illustrated in Columns 2 and 6-10 of Table 2.1. We calculate first the number of women under observation at the beginning of each interval of exposure, which we denote N_x as shown in Column 2. For the first interval of exposure this entry is simply the total number of ever-married women. For each subsequent interval we calculate the number observed at duration $x+n$ as the number observed at duration x minus those censored or having a first birth between x and $x+n$, that is

$$N_{x+n} = N_x - {}_nC_x - {}_nE_x \qquad (1)$$

Next we estimate the number of women exposed to the risk of having a first birth through each interval of exposure, denoted N_x^* and shown in Column 6. This number is simply the number of women under observation at the beginning of the interval less those who reach interview during the interval and are thus not fully exposed to risk, that is

$$N_x^* = N_x - {}_nC_x \qquad (2)$$

We are now in a position to estimate the proportion of women having a first birth in the interval x to $x+n$ among women childless at the beginning of the interval, denoted ${}_nq_x$ in standard life table notation and shown in Column 7. This proportion is estimated simply as the ratio of the number of births in the interval to the number of women exposed throughout the interval, that is

$${}_nq_x = {}_nE_x \,/\, N_x^* \qquad (3)$$

It may be noted here that in estimating ${}_nq_x$ we have effectively ignored events that occur in the same category of duration of exposure as the interview, a practice which is preferable because it leads to unbiased estimates, yet it is not universally followed in the literature. For a discussion of this issue the reader is referred to Smith (1980).

All remaining standard life table functions can easily be derived from ${}_nq_x$. We are particularly interested in estimating the proportion having a first birth in the interval x to $x+n$ among all women, which we denote ${}_nb_x$ and show in Column 8, and the cumulative proportion having a first birth by duration x among all women, which we denote B_x and show in Column 9. Since by assumption all women are childless at duration 0, these proportions are both equal to ${}_nq_0$ for the category of exposure starting at duration 0, that is

$${}_nb_0 = B_n = {}_nq_0 \qquad (4)$$

For subsequent categories of duration we estimate the proportion having a first birth in the interval x to $x+n$ among all women as the product of the proportion of women who have not had a child by duration x times the proportion having a first birth between x and $x+n$ among those childless at x, that is

$${}_nb_x = (1-B_x)\,{}_nq_x \qquad (5)$$

The cumulative proportion having a first birth by duration $x+n$ among all women is then calculated simply as the sum of the proportion having a first birth by duration x plus the proportion having a first birth between durations x and $x+n$, i.e.

$$B_{x+n} = B_x + {}_nb_x \qquad (6)$$

In applications in mortality analysis one is usually interested in survival probabilities. It is then customary to define a proportion surviving up to age x which is denoted l_x. By definition $l_0 = 1$ and the proportion surviving to age $x+n$ is estimated as the product of the proportion

Table 2.1 Construction of Abridged Life Table for Interval Between Marriage and First Birth

Duration of Exposure	Number Observed at Start	Termination Status: Inter-view	Termination Status: Birth & Interview	First Birth	Exposed Through	Conditional Probability of 1st Birth	Unconditional Probability of 1st Birth	Cumulative Probability of 1st Birth	Interpolated Cumulative Probability
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$x,x{+}n$	N_x	$_nC_x$		$_nE_x$	N_x^*	$_nq_x$	$_nb_x$	B_{x+n}	
0- 3	3302	16	5	394	3281	.1201	.1201	.1201	.1262
3- 6	2887	28	0	119	2859	.0416	.0366	.1567	.1686
6- 9	2740	52	3	227	2685	.0845	.0713	.2280	.2700
9-12	2458	26	4	793	2428	.3266	.2521	.4801	.5010
12-15	1635	16	1	389	1618	.2404	.1250	.6051	.6175
15-18	1229	7	4	229	1218	.1880	.0742	.6794	.6889
18-21	989	8	2	175	979	.1788	.0573	.7367	.7469
21-24	804	5	1	185	798	.2318	.0610	.7977	.8035
24-27	613	4	1	104	608	.1711	.0346	.8323	.8361
27-30	504	4	0	68	500	.1360	.0228	.8551	.8580
30-33	432	3	0	51	429	.1189	.0172	.8724	.8754
33-36	378	5	0	54	373	.1448	.0185	.8908	.8929
36-39	319	4	0	35	315	.1111	.0121	.9030	.9046
39-42	280	2	0	29	278	.1043	.0101	.9131	.9140
42-45	249	5	0	16	244	.0656	.0057	.9188	.9200
45-48	228	1	0	21	227	.0925	.0075	.9263	.9276
48-51	206	5	0	21	201	.1045	.0077	.9340	.9349
51-54	180	0	0	15	180	.0833	.0055	.9395	.9400
54-57	165	4	0	8	161	.0497	.0030	.9425	.9431
57-60	153	2	0	9	151	.0596	.0034	.9459	.9464
60-63	142	2	0	8	140	.0571	.0031	.9490	.9495
63-66	132	1	0	7	131	.0534	.0027	.9517	.9521
66-69	124	1	0	5	123	.0407	.0020	.9537	.9541
69-72	118	6	0	6	112	.0536	.0025	.9562	.9565
72-75	106	2	0	5	104	.0481	.0021	.9583	.9583
75+	99	48	51	0					
		257	72	2973					

surviving to age x times the proportion of those alive at x who survive to $x+n$, or

$$l_{x+n} = l_x(1 - {}_nq_x) \tag{7}$$

In our case we are more interested in proportions having a first child than in proportions remaining childless (which would be equivalent to "survival") and consequently work with B_x rather than l_x. Of course these two proportions are complementary, and the reader may verify that expressions (5) and (6) follow from substituting $1-B_x$ for l_x in the more familiar expression (7). For convenience we shall refer to B_x as the *birth function*, which is analogous to the term survival function used for l_x.

Finally we introduce a minor correction in our estimate of B_x, to allow for the fact that where durations are calculated from dates given in calendar month and year (or equivalently in century month form), the actual width of the first category of duration is n-½ rather than n months, see Smith (1980). The correction is shown in Column 10 and is done by simple linear interpolation, calculating

$$B_x = 1/n\,[(n-½)B_{x-½} + B_{x+n-½}] \tag{8}$$

Revised estimates of ${}_nb_x$ and ${}_nq_x$ may be obtained by simply reversing the procedure followed in (5) and (6), although the correction is minor and the revised estimate of B_x is usually sufficient for most purposes.

The same procedures just described may be applied to higher order births. To study the second birth interval for example, we start from a cross-tabulation of all women who have had at least one birth by duration of exposure, this time defined as the interval from first birth to either second birth or interview, whichever comes first, and termination status, defined as whether or not the woman had a second birth before the interview.

The only complication that arises in the analysis of higher order births is the treatment of multiple births. One strategy is to work with fertile pregnancies, that is separate confinements leading to one or more children. Thus, a woman having twins followed by a single birth, would contribute to the intervals from marriage to first confinement and from first to second confinement (the third child). We prefer, however to work with actual births by simply ignoring intervals of length zero. Thus the woman in the example would contribute to the intervals from marriage to first birth and from second to third birth. This approach has the advantage of using actual family size to define birth order.

All tables calculated in this study are single decrement tables, in that we consider only one type of event, namely a subsequent birth. The basic methodology can easily be extended to multiple decrement tables by defining several types of competing risks, such as marital dissolution. For details see Smith (1980).

2.2 SUMMARY INDICATORS

In the course of this study we have calculated life tables by birth order using single months of duration, which leads to rather detailed and extensive tables. These tables have been generated separately for parities one to six, which cover most of the range of experience of the Colombian sample. Since we are interested in studying differentials in the quantum and tempo of fertility, we have generated tables separately for many subgroups of the population, defined in terms of age, cohort, period, childhood place of residence, education, work status, infant mortality, breastfeeding, contraceptive use, and several combinations of the above mentioned variables. In all we have produced well over 800 life tables. Clearly the problem of summarising the results for analysis and presentation deserves more than cursory attention.

The first step we took in reducing the volume of figures was to present all results in terms of the birth function B_x, that is, the cumulative proportion of women having a subsequent birth by single months of duration since the previous birth (or marriage). This reduction entails no loss of information, as all other life table functions can easily be derived from B_x. For purposes of presentation we have relied extensively on computerised plots of the birth function by single months of duration.

For the tabular material we have had to present values of the birth function for selected durations in order to keep the tables to a manageable size. The strategy adopted is to present B_x for duration 1, which is relevant as a measure of pre-marital births, then for durations 9 to 24 in steps of 3 months, durations 30 to 48 in steps of 6 months and finally durations 60 and 72. This reduces a life table to about a dozen figures with relatively little loss of information. Tabular material of this kind is presented in the Appendix for a wide selection of our life tables.

The next step was to search for perhaps two or three summary measures that would convey most of the information contained in the life table and could be meaningfully interpreted in terms of the quantum and tempo of fertility. A parity progression ratio as such cannot be calculated from incomplete cross-sectional data, but the proportion of women having a subsequent birth after a reasonably long duration provides a natural analog. We considered the values of the birth function at four, five, and six years, that is B_{48}, B_{60} and B_{72}, as suitable candidates. Due to incomplete experience those quantities are not available for all tables, and we had values of B_{48} for 91 per cent, of B_{60} for 84 per cent and of B_{72} for 74 per cent of the tables. We found that B_{48} was not sufficient, as many women have birth intervals longer than four years, whereas B_{60} included on average 97 per cent of the women having a subsequent birth within six years and was available for more tables than B_{72}. We therefore settled on B_{60} as the most convenient indicator of the quantum of fertility. As this measure is based on five years' experience we will refer to it as the *quintum* of fertility, denoted Q.

The choice of companion measures which would reflect the distribution of birth intervals and could be interpreted in terms of the tempo of fertility is not so straightforward. The procedure we have followed is to standardise the birth function to make $B_{60} = 1$, so as to obtain proportions of women having a subsequent birth by single months of duration among women who have another child within five years. We then calculate the quartiles of the standardised distribution, denoted q_1, q_2 and q_3 and defined as the durations by which 25, 50 and 75 per cent of the women who will have a subsequent birth within five years will have had it. Several measures of location and dispersion can be calculated from the quartiles, such as the median $M=q_2$ and the spread $S=q_3-q_1$. We found that a more sensitive measure of location is Tukey's (1978) trimean, $T=(q_1+2q_2+q_3)/4$, which contains some information about the shape of the distribution. We will therefore use as indicators of the tempo of fertility the *trimean*, denoted T, occasionally supplemented by the *spread*, denoted S.

For first births we will supplement the trimean and quintum by using the proportion of women who have a first birth before the ninth month of marriage, B_9, as an estimate of pre-marital conceptions. Of course the measures described so far are not the only ones that could be used; alternatives are subsets of values of the birth function such as B_{15}, B_{30} and B_{60}, or the unstandardised quartiles

Q_1, Q_2, Q_3 defined as the durations by which 25, 50 and 75 per cent of all women have had a subsequent birth. Our choice of indicators is based on a rather extensive exploratory data analysis exercise which is reported in Hobcraft and Rodriguez (1980).

To illustrate the calculation of these measures we return to Table 2.1. Reading down column 10 of the table we find the quintum, B_{60}, to be Q = .9464. To calculate the standardised quartiles we require the durations by which the cumulative proportions having a first birth are .2366, .4732 and .7098 (these values being 25, 50 and 75 per cent of .9464). The first quartile is found by linear interpolation between durations 6 and 9 as q_1 = 8.01. Similarly q_2 = 11.65 and q_3 = 19.08. The trimean is thus T = 12.60 months and the spread is S = 11.07. Thus, 95 per cent of Colombian women have their first child within five years of marriage, with an average first birth interval of just over one year and a spread of just under one year.

Figure 2.1 and Appendix Table 3.1 present life tables by birth order for parities one to six for the total sample. The results for first birth differ slightly from those given earlier, as all our life tables are in fact calculated using single months of duration.

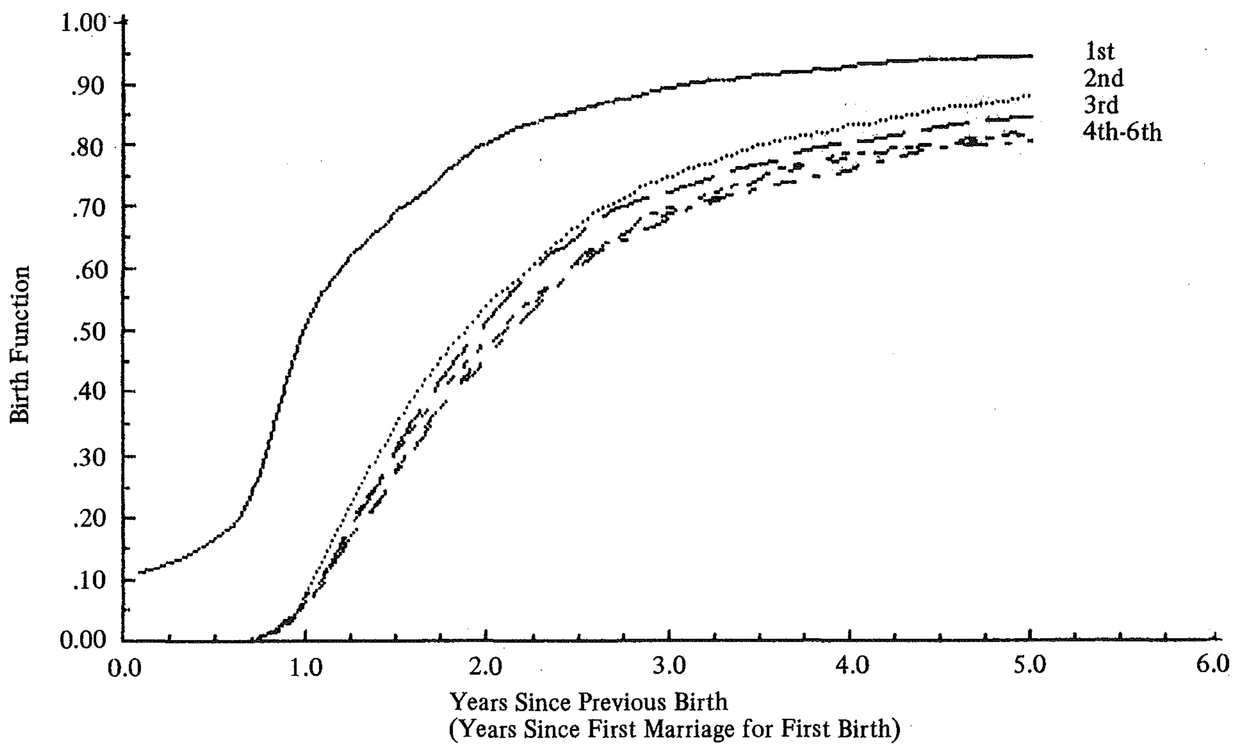
The tables may be summarised as follows:

Summary Measures for Birth Intervals

Summary Measure	Birth Order					
	1	2	3	4	5	6
B_9	.274	–	–	–	–	–
B_{15}	.618	.328	.188	.172	.192	.171
B_{30}	.859	.670	.653	.614	.612	.610
B_{60} or Quintum (Q)	.946	.879	.849	.821	.818	.807
Trimean (T)	12.6	21.3	21.8	22.6	22.0	22.5
Spread (S)	10.6	14.6	13.5	14.0	14.8	14.3
N of cases	3296	3202	2644	2085	1613	1266

As can be seen from Figure 2.1, the proportion of women having a subsequent birth by each duration declines with parity. Most of the differences are captured by the quintum, which ranges from 95 per cent for first births to just over 80 per cent for sixth births. The average birth interval is about one year for first births and nearly two years for births of higher order, with a slight tendency to increase from parities two to six. The spread is just under one year for first births and slightly over one year for later births.

Figure 2.1 Life Table Birth Function by Birth Order



These results highlight the differences in the distribution for first birth intervals as compared with later ones: first intervals are shorter and more homogeneous than other intervals. The results also indicate that after the birth of the first child, family size affects the probability of having a subsequent birth, but not the timing of the next birth (for women who have another child within five years).

2.3 SELECTIVITY AND CENSORING

As stated in the introduction, the incomplete nature of cross-sectional data on birth intervals introduces two types of bias, namely selectivity and censoring. We felt it would be useful to illustrate these types of bias using the Colombian data. For this purpose we use data on the third birth interval, for the cohort aged 40-49 at the time of the survey. For all practical purposes this cohort may be considered to have completed its reproductive career, especially at birth orders below six. To introduce selectivity and censoring we artificially truncate the experience of this cohort by moving the date of the interview 20 years back in time. Except for response errors, the backdated experience represents the results we would have obtained if we had interviewed this cohort 20 years ago, when they were aged 20 to 29.

Selectivity stems from the fact that the transition from parity 2 to 3 can only be studied for women with 2 or more children at the time of the survey. In the cohort aged 40-49 a total of 757 women had 2 or more children by the time of the survey in 1976, and 94 per cent of them went on to have a third child with an average interval of 31 months. If we had interviewed this cohort 20 years earlier we would have found only 424 women with 2 or more children. That this is a selected subset can be seen from the fact that 98 per cent of these women went on to have a third child, with an average interval of 29 months.

Censoring results from the fact that at the time of the survey some of the women with 2 or more children who are selected for analysis have not yet reached parity 3, but will eventually do so. Ignoring the fact that some of these open intervals will eventually be closed would lead to a serious bias. To illustrate this point we consider again the 424 women in the cohort aged 40-49 who had had 2 or more children 20 years before the survey. We know, with the benefit of hindsight, that 98 per cent had a third child with an average interval of 29 months. If we had interviewed them 20 years earlier we would have found that only 73 per cent had had a third child at that time, with an average interval of only 23 months.

Life tables allow us to control censoring biases by properly taking into account the duration of exposure, in the manner described in Section 2.1. Although we cannot estimate a parity progression ratio, we do obtain correct estimates of the proportion who have a subsequent birth at successive durations of exposure. Consider again the 424 women in the cohort 40-49 who had 2 or more children 20 years before the survey. The actual proportion who had a third child within 5 years of the second birth was 92 per cent. If we had interviewed these women 20 years earlier we would have found an observed proportion of only 71 per cent, but we would have obtained a life table estimate of 93 per cent, which does reflect their actual experience. These comparisons are given for selected durations in the table below.

Illustration of Selectivity and Censoring Using Actual and Backdated Experience:
Third Birth Interval for Cohort Aged 40-49 at Survey

Type of Experience	Number of Cases	Proportion Having a Third Child by Interval from Second Birth						Mean Interval (months)	
		12	24	36	48	60	Ever		
Actual Experience of Complete Cohort	757	.06	.52	.76	.83	.86	.94	30.9	Selectivity
Actual Experience of Subset Selected 20 Years Earlier	424	.07	.55	.81	.88	.92	.98	29.3	
Life Table for Subset Selected 20 Years Earlier	424	.09	.57	.84	.90	.91	–	–	Censoring
Censored Experience of Subset Selected 20 Years Earlier	424	.06	.46	.67	.70	.71	.73	22.9	

Selectivity biases can be controlled by constructing separate life tables by categories of age at the start of the interval. Since this categorisation is based on the respondent's age relative to other women at the same stage of reproductive life, it may also be referred to as *relative* age, see Ryder (1973). The boundaries of the age categories have been chosen so as to yield four groups of approximately the same size, and thus correspond roughly to the quartiles of the distribution of ages at the start of the interval. This definition of relative age has been used by Vaughan *et al* (1977) and by Stoto and Menken (1977).

To illustrate the effect of controlling relative age, we return to the cohort aged 40-49 at the time of the survey, and construct life tables for the interval from second to third birth for each of four categories of age at second birth: under 20, 20 to 21, 22 to 24 and 25 or more. These tables are calculated using both the complete experience of the cohort and the artifically selected and censored data obtained by backdating the interview 20 years. The results are shown in Figures 2.2-2.3 and Appendix Tables 2.2-2.3 (which also include information for birth of orders two and four). We note that for the whole cohort the actual and backdated experiences differ substantially, indicating the effect of selectivity. Within categories of relative age, however, the actual and backdated experiences are practically identical. (The backdated curve for age 25+ is omitted as there are only 35 cases in that category.)

Thus relative age, or age at the start of the interval, serves as a useful control for selectivity in the analysis of cohort data. Alternative controls for selectivity are marital duration at the start of the interval, the length of the reproductive period defined as the duration from first birth to the start of the interval, or the length of the previous birth interval. For a discussion of these alternate measures of exposure and/or past reproductive performance see Hobcraft and Rodriguez (1980).

Figure 2.2 Life Tables by Birth Order and Backdating Interview for Cohort 40+

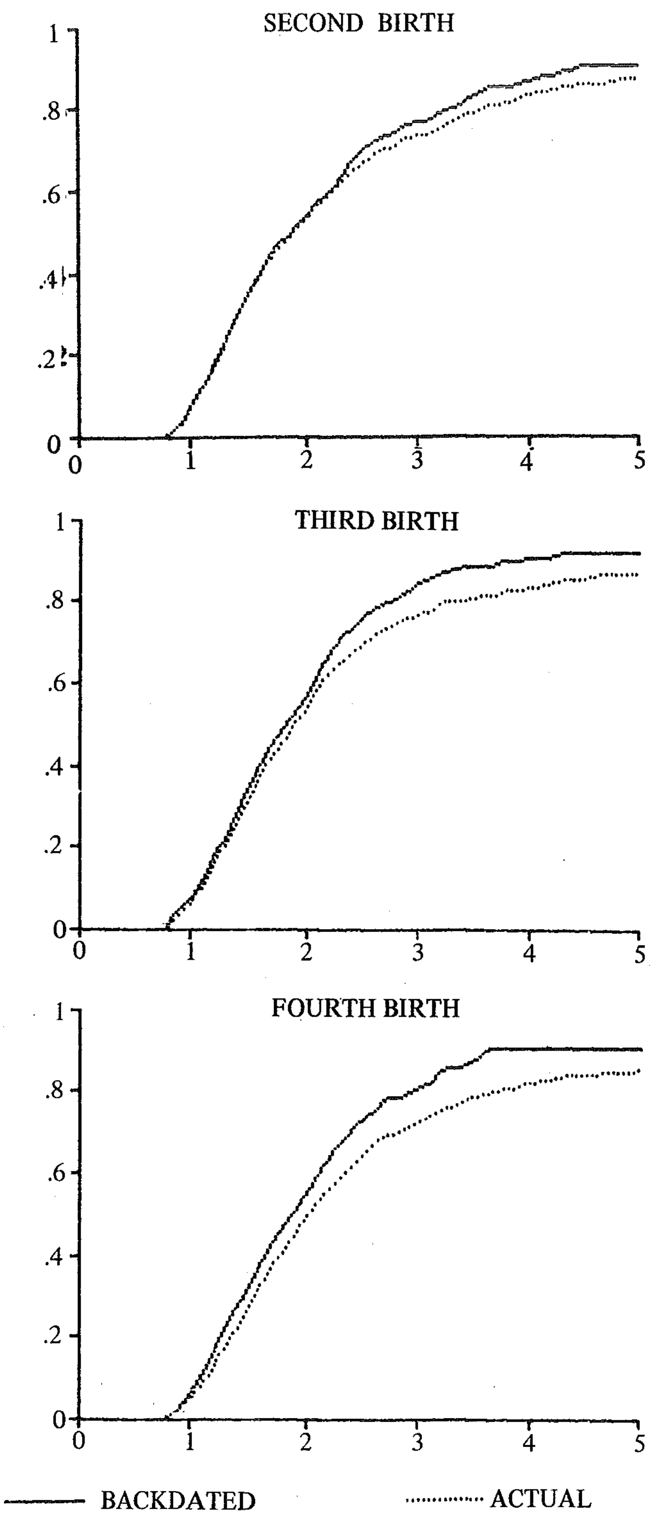
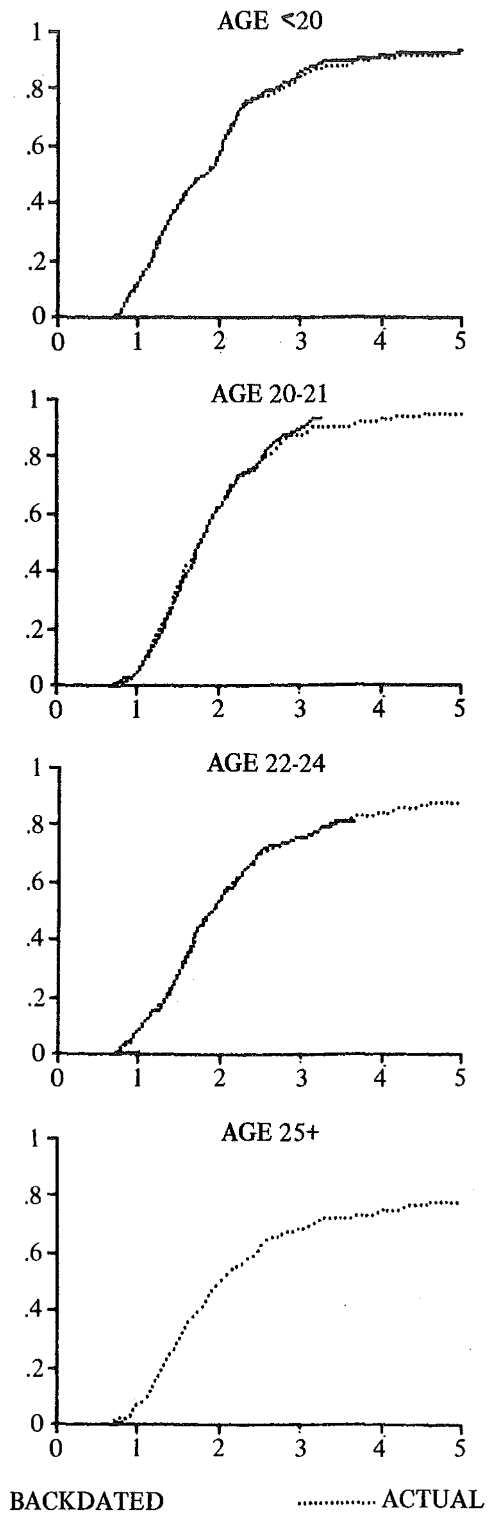


Figure 2.3 Third Birth by Age at Start of Interval and Backdating Interview for Cohort 40+



3. Age, Cohort, and Period Effects

We now turn to an examination of birth intervals by order in relation to age, cohort and period. In the present context age refers to the age of the woman at the start of the interval, cohort refers to her age at the time of the survey, and period to the calendar period where the interval starts. For a general discussion of age, period and cohort effects in demographic analysis the reader is referred to Hobcraft, Menken and Preston (1979).

3.1 AGE AT THE START OF THE INTERVAL

Given the importance of controlling for age in the analysis of cohort and period effects it seems convenient to start by considering the effect of age alone on the quantum and tempo of fertility. For this purpose we construct life tables by birth order separately for four categories of age, determined by the quartiles of the distribution of age at the start of the interval in the whole sample. For simplicity we take the quartiles to the nearest completed year of age, even if this results in a slightly uneven distribution of the sample. The quartiles used are as follows:

Quartile	Previous Event: Marriage	1st	2nd	3rd	4th	5th
Q_1	17	18	20	22	23	25
Q_2	19	20	22	24	26	28
Q_3	22	23	25	27	29	31

The results for birth orders one to six are presented in Figure 3.1 and Appendix Table 3.1, and are summarised for selected birth orders below.

Selected Birth Intervals by Age at Start of Interval

Birth Order	Summary Measure	Age at Start of Interval: $<Q_1$	Q_1-Q_2	Q_2-Q_3	$>Q_3$
1	Ages	<17	17-18	19.21	22+
	B_9	.192	.264	.311	.344
	Quintum	.928	.963	.969	.926
	Trimean	14.8	12.4	11.5	10.5
3	Ages	<20	20-21	22-24	25+
	Quintum	.920	.867	.829	.748
	Trimean	20.9	21.3	22.2	22.8
6	Ages	<25	25-27	28-30	31+
	Quintum	.853	.850	.797	.677
	Trimean	19.8	23.6	24.2	25.9

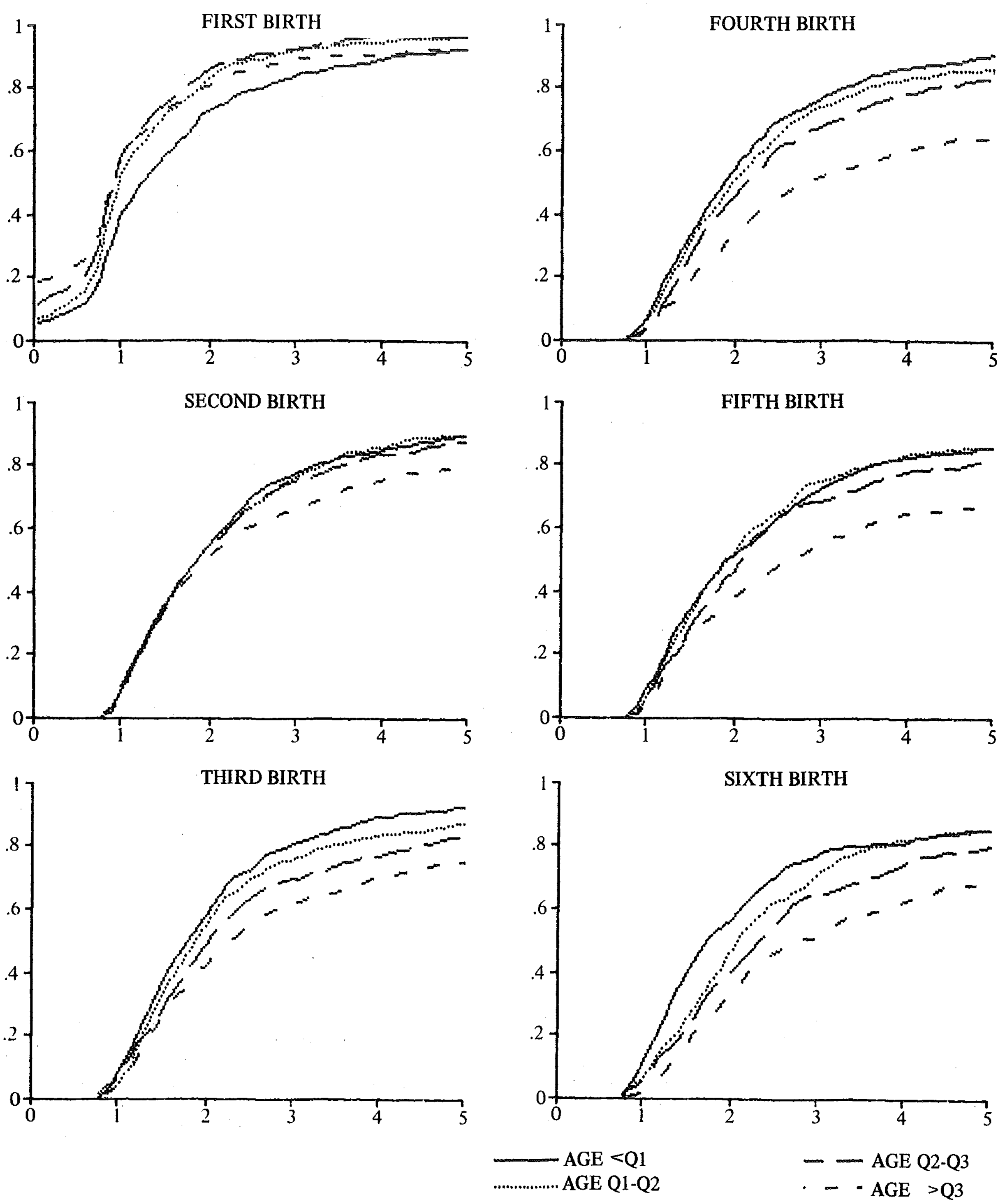
Consider first the interval from marriage to first birth, which is shown in the first frame of Figure 3.1. The four categories of age at the start of interval correspond to ages at marriage: under 17, 17-18, 19-21 and 22 and over. We note that age at marriage has practically no effect on the proportion of women who have their first child by the end of the fifth year following marriage, the quintum always being around 95 per cent. Age at marriage has a notable effect on the timing of the first birth, with the trimean being nearly 15 months for women marrying under the age of 17 compared with 10½ months for women marrying after their twenty-second birthday. This difference is largely explained by the prevalence of premarital births and conceptions: the proportion of women who are estimated to have conceived the first child before marriage ranges from under 20 per cent for those marrying relatively early to nearly 35 per cent for those marrying relatively late. Under these circumstances the date of first marriage is a very poor indicator of the start of exposure to the risk of childbearing, and the true effect of age at marriage on the length of the interval cannot be stated unequivocally.

As we move to higher parities the effect of age on the quantum and tempo of fertility becomes clearer. Consider for example the interval from second to third birth. Here the categories of age correspond to women having their second child at ages under 20, 20-21, 22-24 and 25 and over. We find that the quintum of fertility for third births ranges from 92 per cent for women having the second child while teenagers to only 75 per cent for women who had their second child after their twentyfifth birthday. The effect of age on the length of the interval is less pronounced, as the trimean ranges from 21 months for those who had their second child while relatively young to 23 months for those who had it relatively later in life.

Consider now the interval from fifth to sixth birth. Here the categories of relative age correspond to ages at fifth birth under 25, 25-27, 28-30 and 31 or over. We find that the quintum of fertility for sixth births ranges from 85 to 67 per cent according to relative age, with the trimean varying from 20 months among those who have the fifth birth relatively young to 26 months among those who have it relatively old. Clearly the effect of relative age on the timing of the next birth increases with parity.

In the context of the analysis of contraceptive failure in the United States, Ryder (1973) and Vaughan *et al* (1977) use relative age as a control variable which subsumes the effects of both parity and age. Our results indicate, however, that in Colombia relative age does not account for all the effect of parity on subsequent fertility, and that both variables need to be used as controls.

Figure 3.1 Life Tables by Birth Order and Age at Start of Interval



Note: see page 16 for values of Q1, Q2, Q3 for each birth order

3.2 COHORT EFFECTS

We compare the childbearing experience of different generations of women using life tables by birth order constructed separately for five categories of age at the time of the survey, namely 15-24, 25-29, 30-34, 35-39 and 40-49. The results are presented in Figure 3.2 and Appendix Table 3.2 and are summarised for selected intervals below.

Selected Birth Intervals by Cohort

Birth Order	Summary Measure	Cohort				
		15-24	25-29	30-34	35-39	40-49
1	B_9	.244	.277	.266	.277	.304
	Q	.964	.934	.967	.936	.938
	T	13.3	12.6	12.1	12.7	12.0
3	Q	.831	.819	.851	.869	.863
	T	23.8	23.3	21.0	20.8	21.1
6	Q	–	–	.721	.826	.825
	T	–	–	22.9	21.9	22.4

Q=Quintum T=Trimean

Examining the interval from marriage to first birth we notice that the younger cohorts show a somewhat lower incidence of pre-marital conceptions and consequently a longer interval to first birth. The younger cohorts, however, are selected for a relatively early age at marriage, and we have seen in the previous section that early marrying women are less likely to have pre-marital conceptions and therefore tend to show longer intervals to first birth. If we control for age at marriage the observed differences disappear, as can be seen from Appendix Table 3.3. Hence the apparent trend is a spurious result of selectivity.

Consider now the third birth interval. We notice that the younger cohorts have a somewhat smaller proportion progressing from second to third birth within five years and a slightly longer interval than the older cohorts, a result that suggests a recent change in fertility at this early stage of family building. The younger cohorts are, of course, selected for a relatively young age at second birth, but we have just seen that women who have their second birth relatively early are *more* likely to have a third child and tend to have a *shorter* birth interval. Hence in this case the effect of selectivity is to attenuate differences among cohorts. This is confirmed if we control relative age, as seen at Figure 3.3 and Appendix Table 3.3. The results are summarised below.

Third Birth Interval By Cohort Controlling Relative Age

Age at Second Birth	Summary Measure	Cohort				
		15-24	24-29	30-34	35-39	40-49
<20	Q	.859	.948	.938	.922	.924
	T	22.7	21.9	19.5	19.9	20.0
20-21	Q		.777	.899	.899	.951
	T		22.9	19.2	19.9	20.7
22-24	Q			.823	.897	.879
	T			21.6	20.5	22.0
25+	Q			.728	.746	.772
	T			24.8	24.1	21.5

Within each category of age at second birth we notice that the youngest cohort for which data are available shows a lower proportion having a third birth within five years, and in some cases a longer interval to third birth, than the older cohorts. This is particularly noticeable among women who have the second birth before age 22, where the cohorts 15-24 and 25-29 have clearly longer intervals than the older cohorts.

The same pattern of results holds for higher order births. Considering the sixth birth interval, for example, we find that the proportion who move from parity five to six within five years ranges from 72 per cent for the cohort 30-34 to 82 per cent for the cohort 40-49, with no cohort differences in the timing of the sixth birth. These differences in the quintum of fertility remain after controlling for relative age, as shown in Appendix Table 3.3.

Figure 3.2 Life Tables by Birth Order and Age at Time of Survey

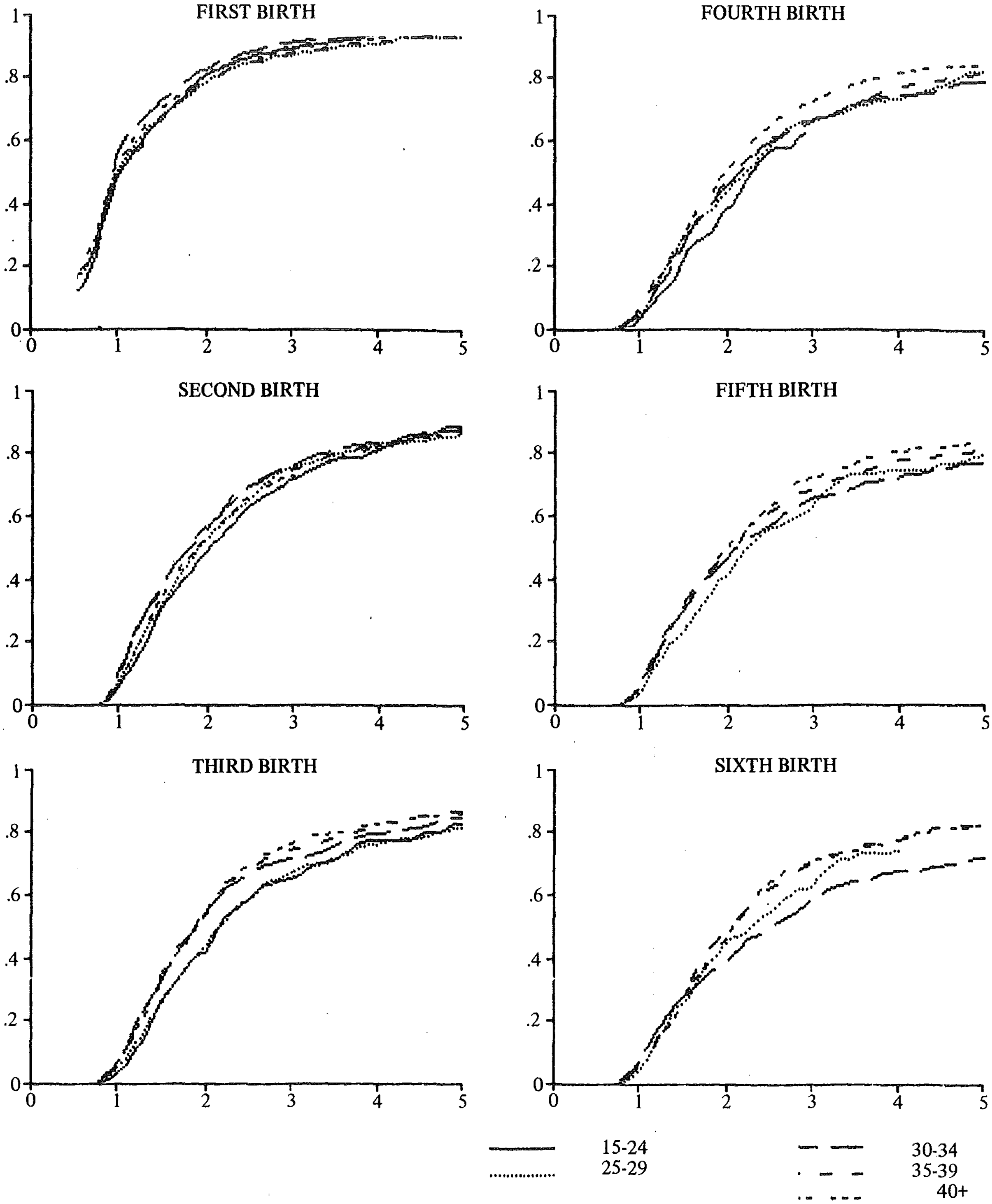
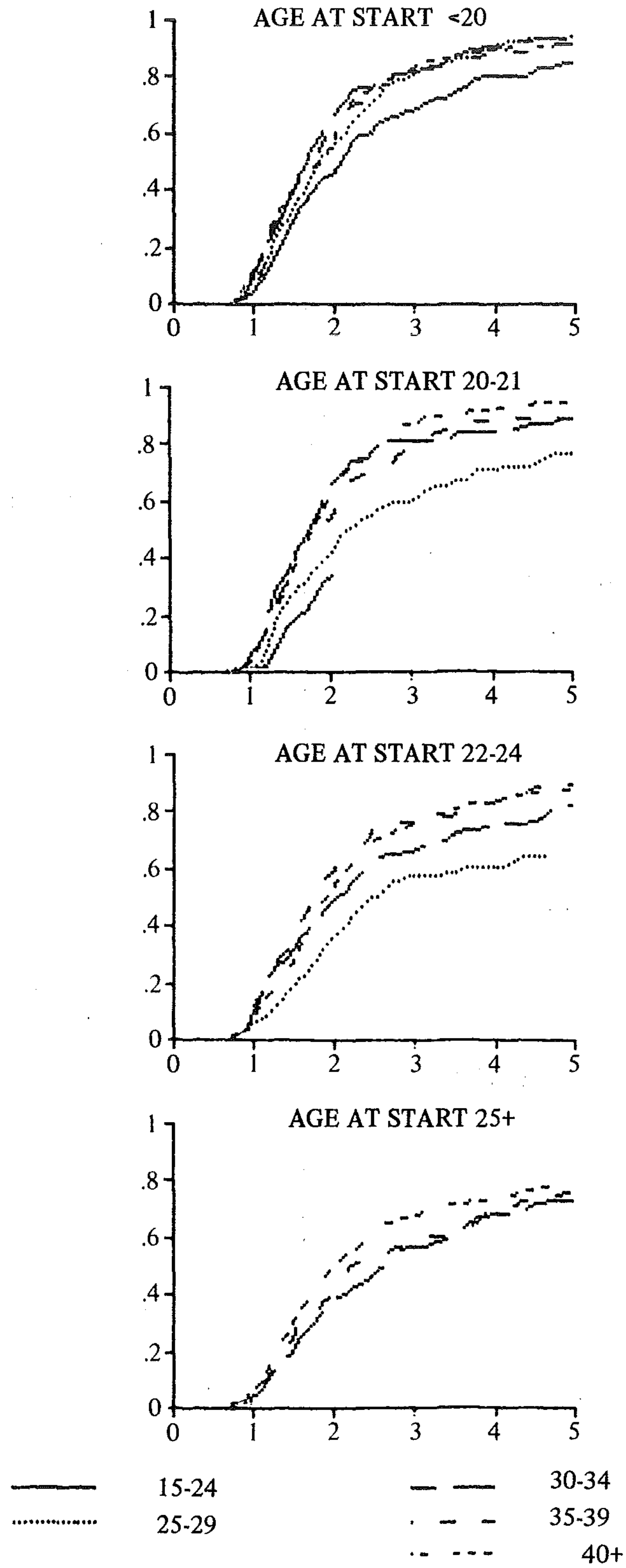


Figure 3.3 Third Birth by Age at Start of Interval and Age at Time of Survey



3.3 PERIOD EFFECTS

We study trends over time using life tables by birth order and calendar period where the interval started. Calendar periods have been classified in five categories as follows: before 1955, 1955-59, 1960-64, 1965-69 and 1970 to interview. Since the survey took place in 1976, women starting an interval in the most recent period have been exposed to the risk of having another child for an average of less than four years. This results in relatively small sample numbers and incomplete experiences for the most recent period. The overall results are shown in Figure 3.4, and Appendix Table 3.4, and may be summarised for selected intervals as follows.

Selected Birth Intervals by Calendar Period

Birth Order	Summary Measure	Calendar Period				
		<1955	1955-59	1960-64	1965-69	1970+
1	B_9	.262	.273	.258	.297	.275
	Q	.941	.948	.949	.946	.944
	T	13.1	12.5	12.1	12.2	12.6
3	Q	.917	.879	.890	.832	.743
	T	21.1	20.2	20.1	22.0	24.0
6	Q	.929	.906	.857	.757	.698
	T	21.2	22.1	21.3	22.4	25.8

We find no trends over time in the transition from marriage to first birth. The proportion of pre-marital conceptions fluctuates just under 30 per cent, and the quintum and trimean are practically constant at 95 per cent and just above one year, respectively. As shown in Appendix Table 3.5, the introduction of a control for age at marriage does not alter this conclusion.

As we move to higher order births we find evidence of substantial period effects in the quantum and tempo of fertility. As seen in Figure 3.4, the trend begins to emerge in the transition from first to second birth and becomes quite clear in the transition from second to third birth. The proportion of women who move from parity two to three within five years has declined from around 90 per cent before 1964 to 83 per cent in the period 1965-69 and to only 74 per cent since 1970. The average length of the third birth interval did not change much till 1965, but there is evidence of an increase of about three months since then.

At this point we must note the effect of selectivity on retrospective period data. As we go back in time we are dealing with a progressively younger group of women. Thus, birth intervals for past periods are based on women who, on the average, were relatively younger at the start of the interval. Since relatively younger women are more likely to have another child and tend to have shorter intervals, selectivity may cause a spurious time trend. To control for this bias we have constructed life tables by birth order for categories of period and relative age. The results for parities one to six are given in Appendix Table 3.5. Results for the third birth interval are depicted in Figure 3.5 and are summarised below. We note that the sample numbers are too small for the period before 1955 and the length of exposure is too short for the period since 1970, so that we have omitted these two periods from the summary.

Third Birth Interval By Period Controlling Relative Age

Age at Second Birth	Summary Measure	Calendar Period		
		1955-59	1960-64	1965-69
<20	Q	.913	.947	.935
	T	19.2	19.0	22.2
20-21	Q	.884	.931	.832
	T	19.3	20.6	20.7
22-24	Q	.897	.896	.810
	T	22.1	20.9	21.3
25+	Q	.801	.775	.726
	T	21.1	20.5	23.8

We find that among women who have their second child before age 20 the proportion having a third child within five years remained unchanged till 1970 (but appears to have declined since), whereas for women who have their second child at ages 20-24 the quintum declined substantially in the late sixties, from around 90 per cent to 83-81 per cent. A similar change would appear to be true for women who have the second child at age 25 or later, but the open-ended nature of this category does not permit a rigorous control for selectivity. In conclusion, then, the change observed in the late sixties in the proportion moving from parity two to three within five years cannot be attributed to selectivity by age at second birth.

As we proceed from third to fourth and fifth birth the evidence of period effects becomes clearer, as seen from Figure 3.4. The proportion of women who move from parity five to six within five years has declined from over

Figure 3.4 Life Tables by Birth Order and Calendar Period

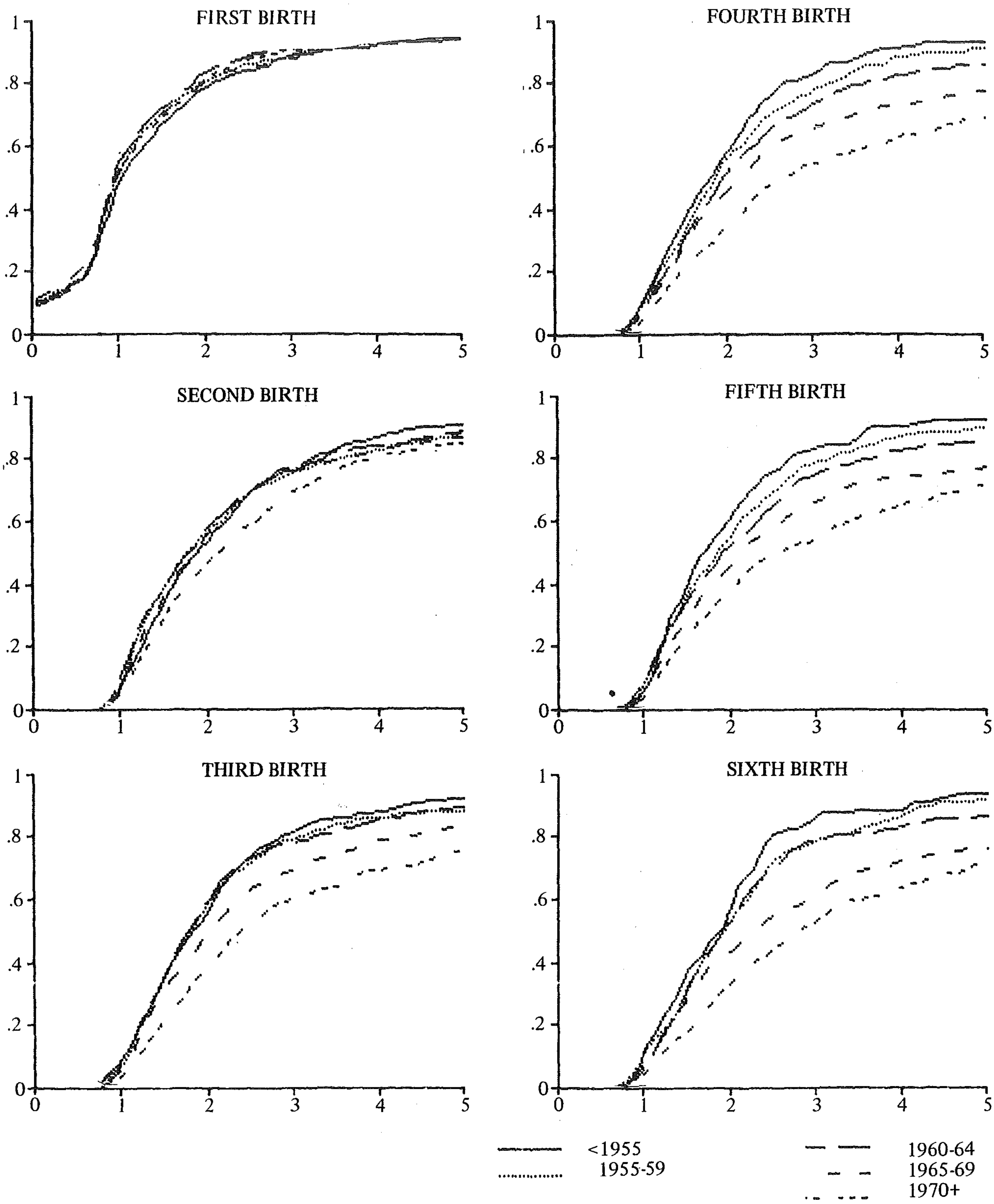
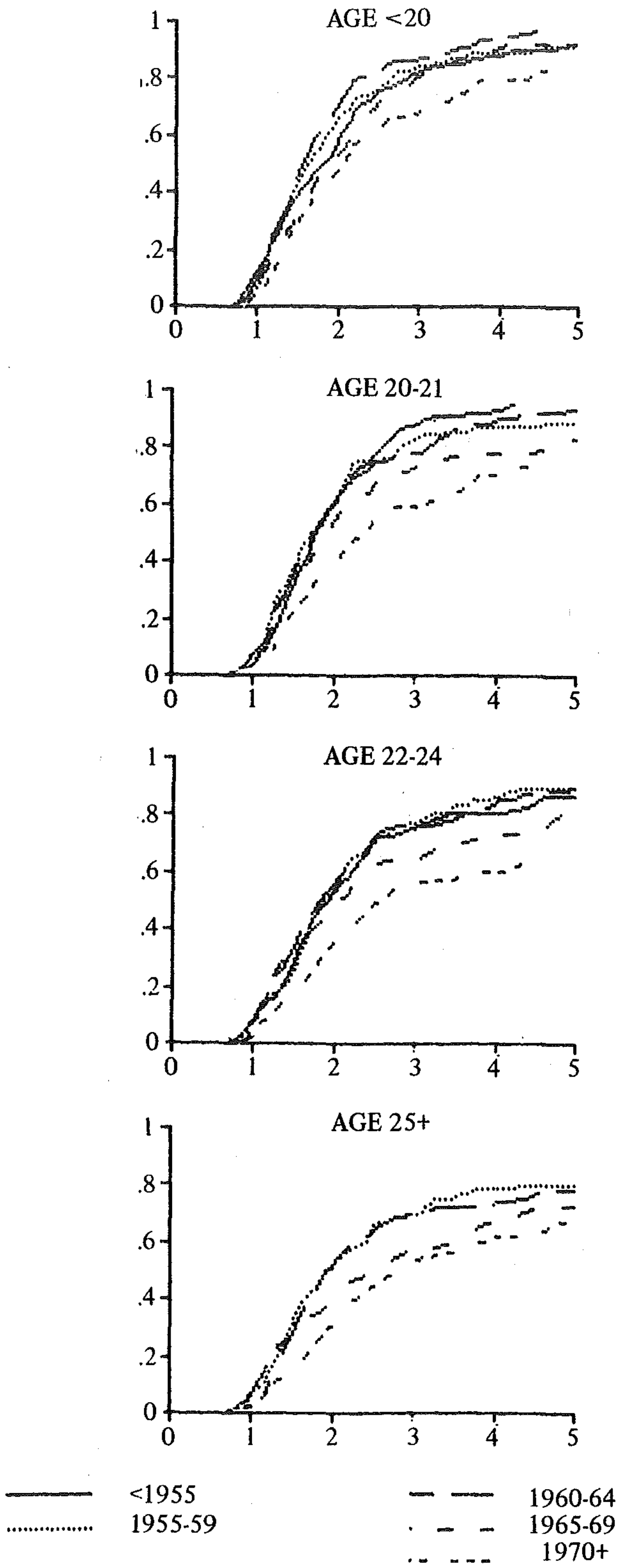


Figure 3.5 Third Birth by Age at Start of Interval and Calendar Period



90 per cent in the fifties to 85 per cent in the early sixties, 75 per cent in the late sixties and 70 per cent in the early seventies. At the same time the average interval from fifth to sixth birth would appear to have increased by about three months in the seventies. Controlling for age at fifth birth does not account for this trend, as can be seen from Appendix Table 3.5; although the sample numbers become small there is evidence of a decline over time in the proportion having a sixth birth within three, four and five years for all categories of age at fifth birth.

These results are consistent with the notion that fertility change originates as a decline in transition probabilities at high parities and gradually filters down to lower parities. In Colombia the quintum of fertility started to decline in the early sixties for birth orders six, five and four, the late sixties for birth order three, and possibly in the early seventies for birth order two as well. Of course, the quintum indicates only the probability of having a subsequent child within five years. Hence a decline in the quintum, although likely to reflect a change in the parity progression ratio, may also correspond to a change in tempo which leads to intervals longer than five years. We consider the latter possibility to be rather unlikely for high parities but a plausible explanation at low parities.

The analysis of fertility by birth order for the cluster of variables age, period and cohort demonstrates the problems of cohort analysis at a time of period changes in fertility. Essentially we show that neither period nor cohort effects can be examined without a control of age. With such a control on age introduced it is clear that the trends observed for cohorts can only be induced by a period related change in fertility, although this period change affects different cohorts at different times. As the changes are more easily understood and more clearly identified by using a period framework for the analysis, we shall not consider cohort experience further, when trying to identify changes in Colombian fertility.

4. Childhood Residence, Education, and Work Status

We now consider the effect of some socio-economic variables on the quantum and tempo of fertility. We have selected for analysis three variables, namely childhood type of place of residence, level of education as measured by years of schooling, and work status before marriage and between marriage and first birth. These variables are possible important determinants of fertility, and they all share the property of being temporally prior to the birth intervals of interest, a fact which leads to the possibility of causal inferences. The same could not be said of other socio-economic variables such as current place of residence or occupation, which reflect current status and could only be related to the lifetime experience of respondents on rather weak logical grounds.

4.1 CHILDHOOD PLACE OF RESIDENCE

To study the effect of childhood type of place of residence on fertility, we have constructed life tables by birth order separately for women who grew up in rural areas, in towns and in cities. Although the concepts of town and city are admittedly ambiguous, this classification should provide a broad indication of the type of environment in which the respondent spent her formative years, and may therefore be expected to have an effect on her subsequent reproductive behaviour. The results shown in Figure 4.1 and Appendix Table 4.1, and summarized below, clearly support this expectation.

Selected Birth Intervals by Childhood Residence

Birth Order	Summary Measure	Childhood Type of Place of Residence		
		Rural	Town	City
1	B_9	.291	.266	.253
	Q	.947	.941	.950
	T	12.6	12.4	12.6
3	Q	.882	.843	.791
	T	21.3	22.2	21.9
6	Q	.864	.794	.658
	T	23.0	22.5	20.9

For first births we find a higher incidence of pre-marital conceptions, and particularly pre-marital births, among women who grew up in rural areas, but the differential disappears by the end of the first year of marriage, when about half the women have had their first child.

As we move on to higher parities we find an increasing effect of childhood residence on fertility. The lower fertility of women who grew up in cities is already suggested in the transition from first to second birth, a very early stage of family formation. The differential becomes quite noticeable in the transition from second to third birth, where the quintums of fertility range from 88 per cent for rural to 79 per cent for the more urban, with women who spent their childhood in towns showing an intermediate value of 84 per cent. At this stage, however, there are no differences in the tempo of fertility as measured by the trimean.

The same pattern of results is observed for higher parities, with the differential continuing to increase, so that for the transition from fifth to sixth birth the quintums of fertility range from 86 per cent for women with a rural background to only 66 per cent for the more urban. The average birth interval does not follow a consistent pattern with childhood residence. In conclusion, the type of place where the respondent spent her formative years has a substantial zero-order effect on the quantum of fertility and this effect increases with parity.

4.2 LEVEL OF EDUCATION

We study the effect of education on birth intervals by constructing life tables by birth order separately for three broad educational groupings: no education, 1-4 years of schooling, and 5 or more years of schooling. We have restricted ourselves to only three categories of education in order to retain adequate sample numbers for detailed analysis. The dividing point of 5 years of schooling has, been chosen because in Colombia it represents complete primary school, and yields a convenient split of the sample. The results are shown in Figure 4.2 and Appendix Table 4.2, and may be summarised for selected intervals as follows:

Selected Birth Intervals by Level of Education

Birth Order	Summary Measure	Level of Education		
		None	0-4 Incomplete Primary	5+ Complete Primary
1	B_9	.335	.285	.233
	Q	.940	.945	.951
	T	12.4	12.2	12.8
3	Q	.896	.868	.783
	T	21.8	21.2	22.6
6	Q	.874	.833	.671
	T	23.4	22.0	23.3

Women with no education show a substantially higher incidence of pre-marital births and conceptions than women with some education, but the latter are more likely to have a child between nine and twelve months of marital duration, so that the differences in the birth function disappear by the end of the first year of marriage.

After the birth of the first child, however, women with completed primary or higher education begin to show considerably lower fertility than women with less than five years of schooling. This differential emerges in the

Figure 4.1 Life Tables by Birth Order and Childhood Residence

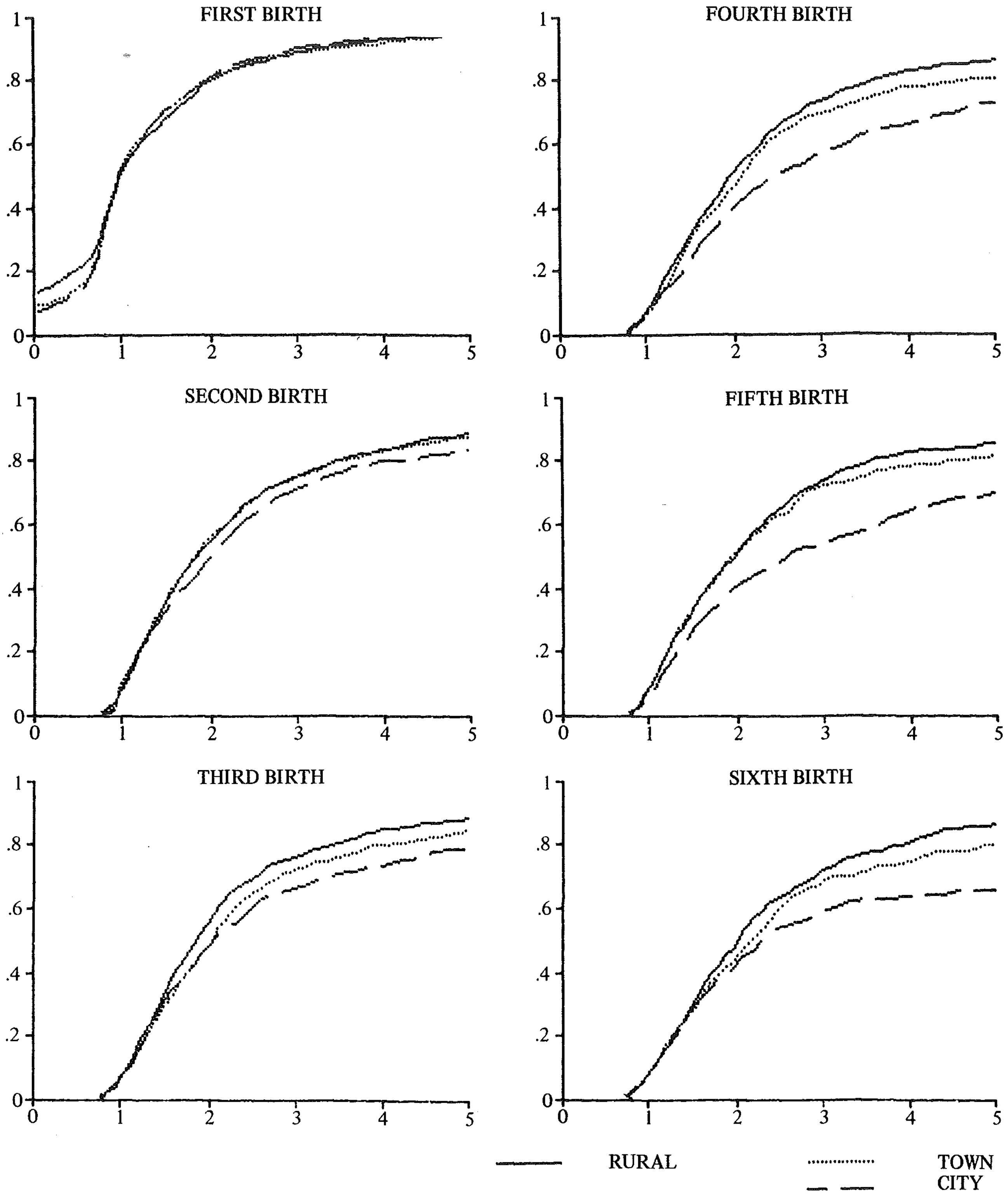
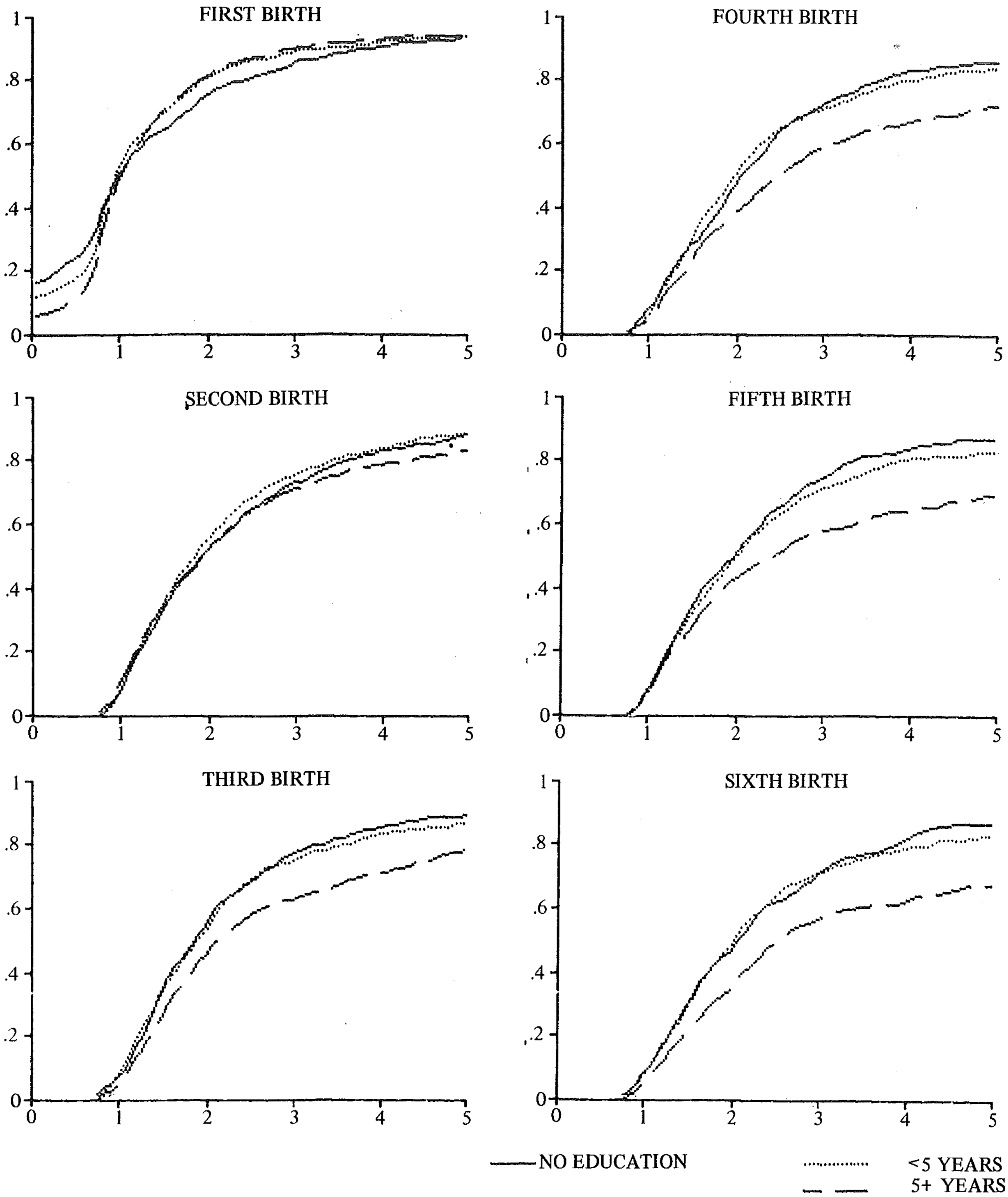


Figure 4.2 Life Tables by Birth Order and Educational Level



transition from parity one to two, and becomes fully-fledged in the transition from parity two to three. Indeed, the proportion of women with two children who go on to have a third child within five years is 78 per cent for the more educated compared with 90 per cent for those with no education.

The difference in the quintum of fertility increases as we move on to higher parities, as can be clearly seen from Figure 4.2. By the time women reach the fifth birth we find that the proportion who have another child within five years ranges from 67 per cent for the more educated to 87 per cent for those with no education. The group with incomplete primary education behaves generally in the same way as those with no education, indicating that a few years of schooling have little effect on subsequent fertility. Examination of the trimeans indicates that there are no systematic educational differentials in the timing of fertility.

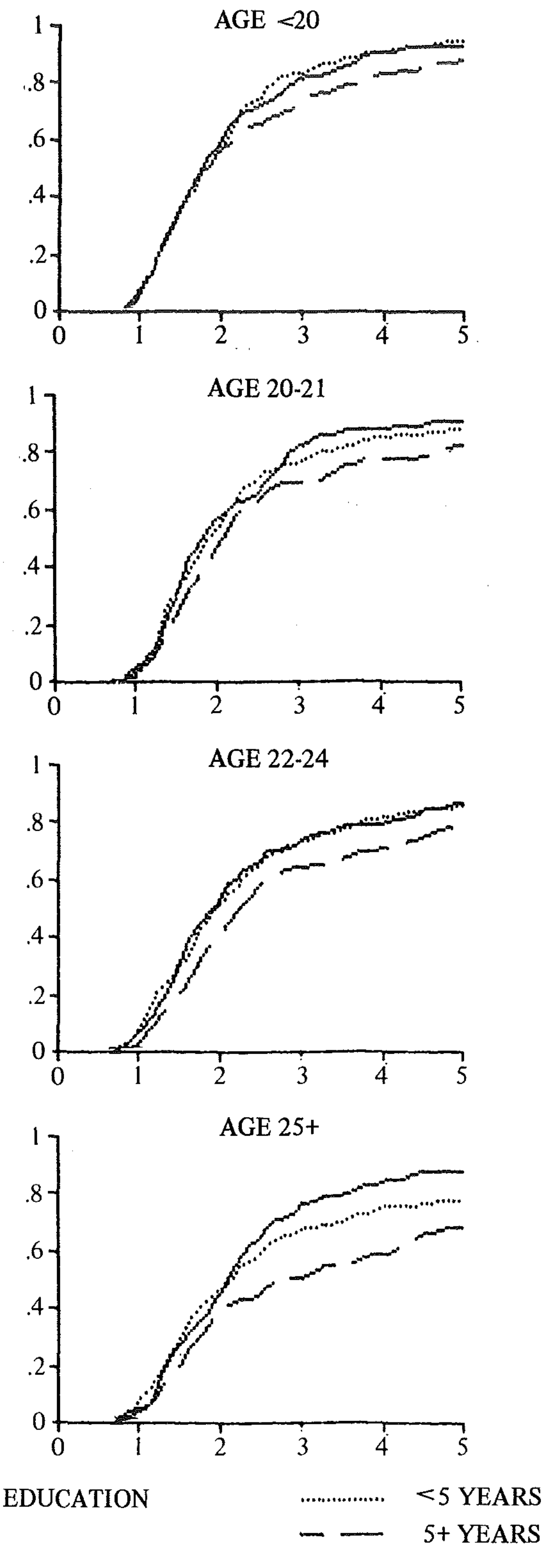
The question may arise as to whether the observed educational differentials in the quintum of fertility can be partly explained by the age of the woman at the start of each interval. We know, for example, that more educated women tend to marry later, and will therefore be relatively older than the less educated by the time they reach the second birth, a fact which should decrease the proportion having a third birth within five years. To examine this question we have repeated the analysis controlling for relative age. The results for births of order 1 to 6 are given in Appendix Table 4.3 Results for births of order three are shown in Figure 4.3, and are summarised below.

Effect of Educational Level on the Third Birth Interval Controlling Relative Age

Age at Second Birth	Summary Measure	Level of Education		
		No Education	Incomplete Primary	Complete Primary
<19	*Q*	.926	.938	.874
	T	20.8	21.0	20.7
20-21	*Q*	.907	.879	.818
	T	21.5	20.8	21.9
22-24	*Q*	.865	.853	.774
	T	21.5	21.5	23.4
25+	*Q*	.858	.760	.671
	T	23.4	21.4	24.9

The results indicate that educational differentials in the transition from parity two to three cannot be explained by age at second birth. The quintum of fertility is considerably lower among the better educated even when we compare women in the same category of rélative age. Furthermore, we find that educational differentials increase with relative age: the older the woman is on reaching parity two, the greater is the effect of level of education on the probability that she will have another child within five years. The same pattern of widening differentials between education groups by age is observed for higher parities, as can be seen from Appendix Table 4.3.

Figure 4.3 Third Birth by Age at Start of Interval and Educational Level



4.3 PERIOD TRENDS WITHIN EDUCATIONAL GROUPS

The analysis of birth intervals by calendar period has indicated recent changes in the quantum and tempo of fertility in Colombia, whilst the previous analysis showed important education differentials. We now combine these two variables in a joint analysis by education and period. The purpose of this exercise is to ascertain to what extent the educational groups have experienced a differential change in reproductive behaviour and, if so, when and at what stages of family building. The results are presented in some detail in Figure 4.4 and Appendix Table 4.4, and are summarised below. It should be noted that the incomplete nature of the data imposes limitations on the analysis. In particular, data for the earlier time periods reflect only the experience of relatively young women and the duration of exposure is relatively short for the most recent period, especially for the relatively small group with no education. These facts account for the empty cells in the table. In addition it would be desirable to introduce a further control by relative age to overcome selection effects for earlier periods, but the small number of cases precludes such a detailed breakdown. However, it is likely that any differences that would be introduced into the analysis by controlling age would be small since, as shown earlier, relative age does not account for either period or education effects.

Looking first at the interval from marriage to first birth we find no differences over time for any educational group. It would appear safe to conclude that most Colombian women in all strata of society have their first child before the end of the fifth year of marriage with an average interval of about one year, and that this situation has not changed over time.

After the birth of the first child, however, we see the emergence of a trend: the proportion of women having their second child within five years used to be about 90 per cent for all educational strata, and continues to be at that level for the less educated, but declined to about 80 per cent in the late sixties and early seventies for women with completed primary of higher education. There is thus evidence of a recent change in reproductive behaviour at a very early stage of the family building process for the more educated. The change in the quintum, however, may reflect a change in the eventual parity progression ratio or purely a timing effect.

After the birth of the second child we observe a clearer trend. The proportion having a third child within five years has declined substantially for the more educated, from a traditional level of about 90 per cent to less than 80 per cent in the late sixties and to nearly 60 per cent in the early seventies. The group with incomplete primary education also shows some change, with the quintum declining to just above 80 per cent since 1970, but the change is of lesser magnitude and more recent. The group with no education continues to have a high proportion of women progressing to parity three, with no apparent change over time. Thus, we have evidence that at a later stage of the family building process the fertility transition begins to affect the middle educational stratum.

After the birth of the third child the trend becomes more pronounced among the better educated and begins to emerge among the lesser educated. The proportion

Summary Measures for Birth Intervals
by Level of Education and Calendar Period

Birth Order	Educational Level	Quintum				Trimean			
		1955-59	1960-64	1965-69	1970+	1955-59	1960-64	1965-69	1970+
1	0	.929	.924	.936	–	12.9	11.7	11.6	–
	1-4	.957	.950	.943	.934	12.4	11.7	12.1	11.8
	5+	.948	.961	.955	.940	12.3	12.6	12.3	13.2
2	0	.890	.881	.870	–	22.1	21.7	23.3	–
	1-4	.863	.897	.913	.880	20.2	21.0	19.7	23.1
	5+	.902	.871	.816	.781	19.4	18.5	21.2	23.5
3	0	.889	.935	.855	–	21.4	20.1	22.0	–
	1-4	.892	.874	.865	.812	19.4	19.9	22.0	23.6
	5+	.851	.890	.770	.606	21.8	21.0	22.2	27.4
4	0	.899	.849	.845	–	22.3	24.9	22.2	–
	1-4	.914	.876	.822	.772	21.4	20.6	21.8	23.6
	5+	.907	.826	.637	–	23.6	23.4	21.8	–
5	0	.902	.940	.861	–	22.7	20.0	24.4	–
	1-4	.923	.892	.803	.756	20.9	22.8	21.3	23.2
	5+	.810	.730	.644	–	21.0	21.0	21.3	–
6	0	–	.875	.905	–	–	21.6	21.8	–
	1-4	–	.877	.809	.741	–	20.4	22.3	25.2
	5+	–	.800	.487	–	–	22.8	24.1	–

Figure 4.4 Life Tables by Birth Order, Educational Level and Calendar Period

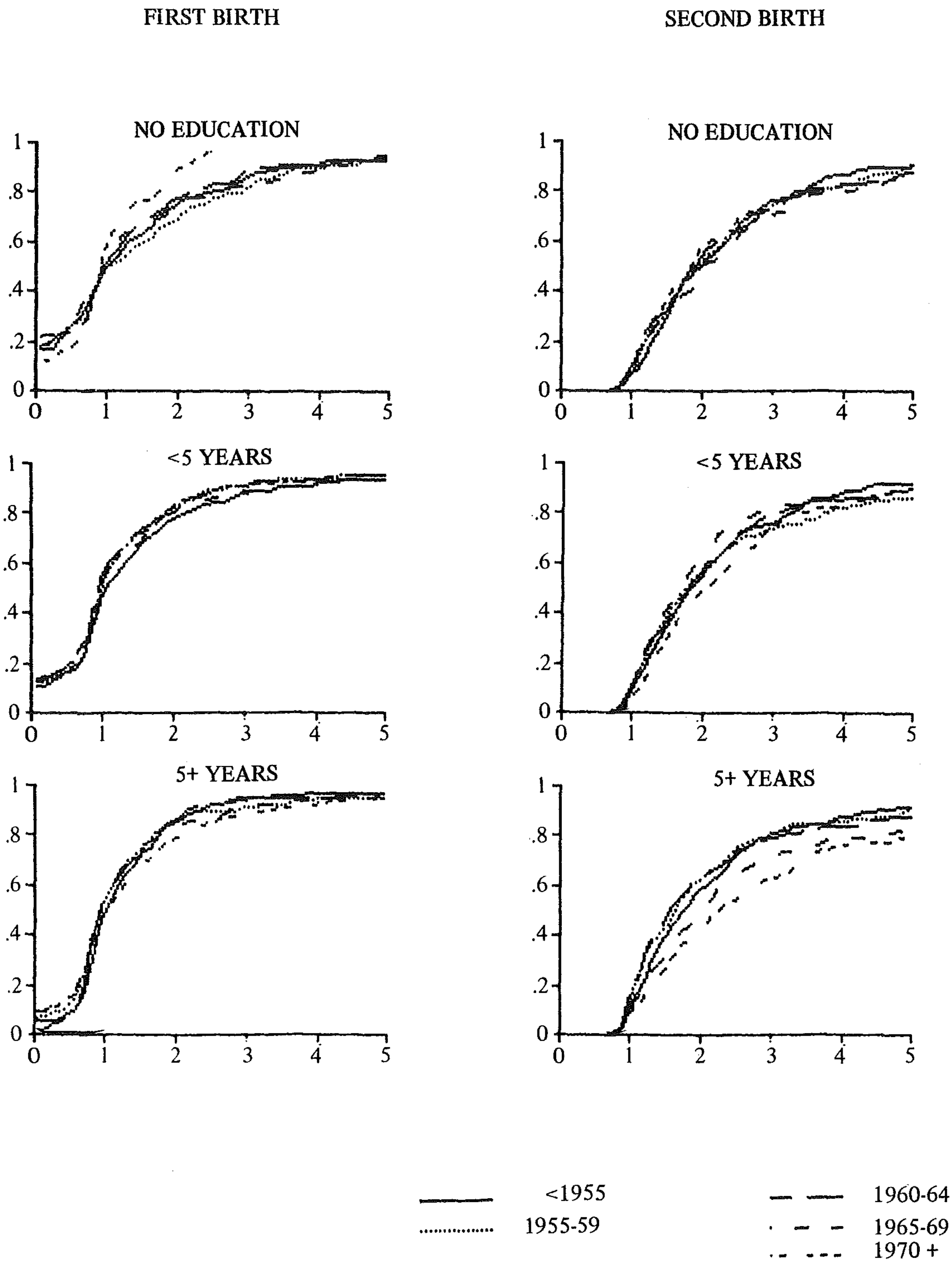


Figure 4.4 (Continued)

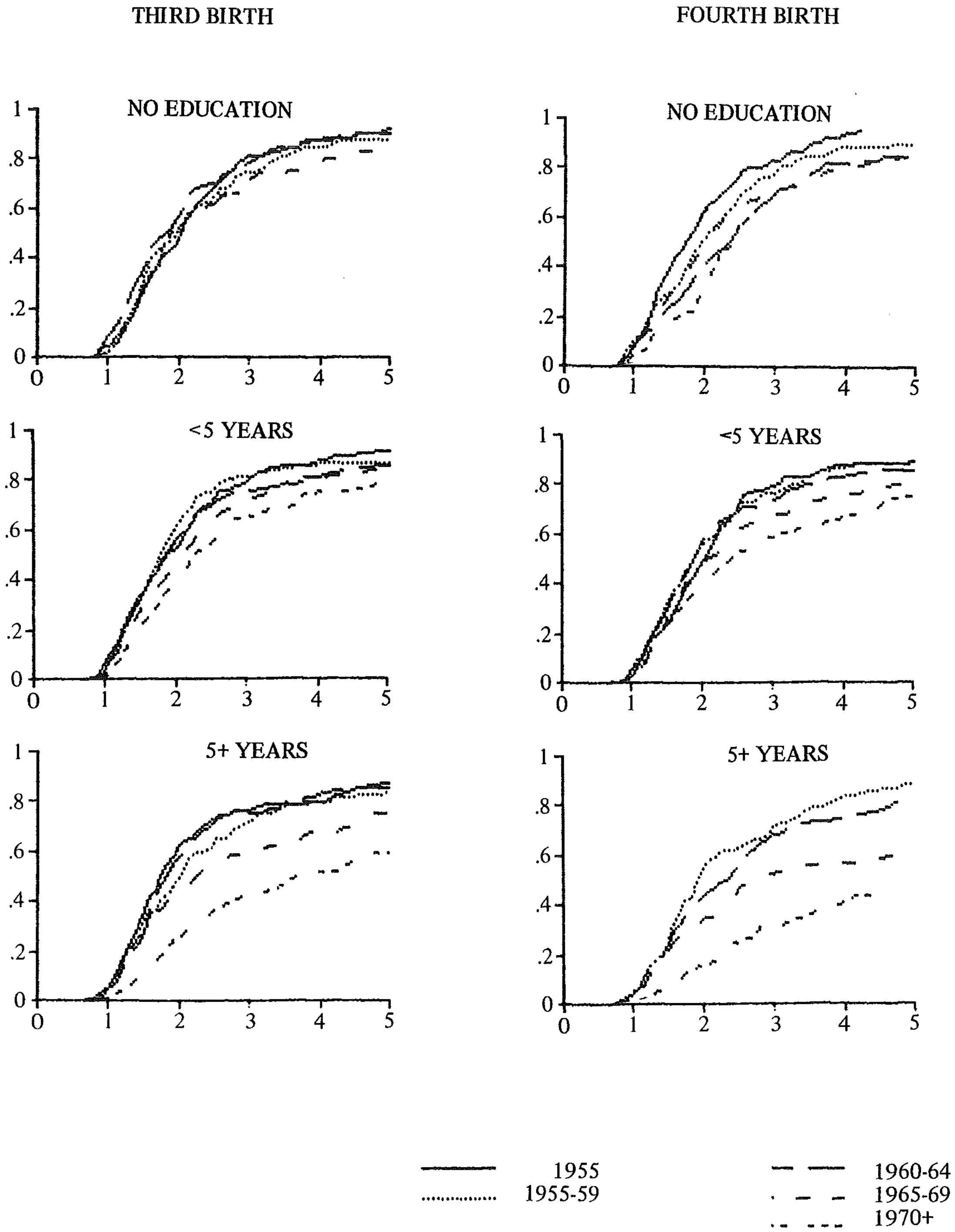
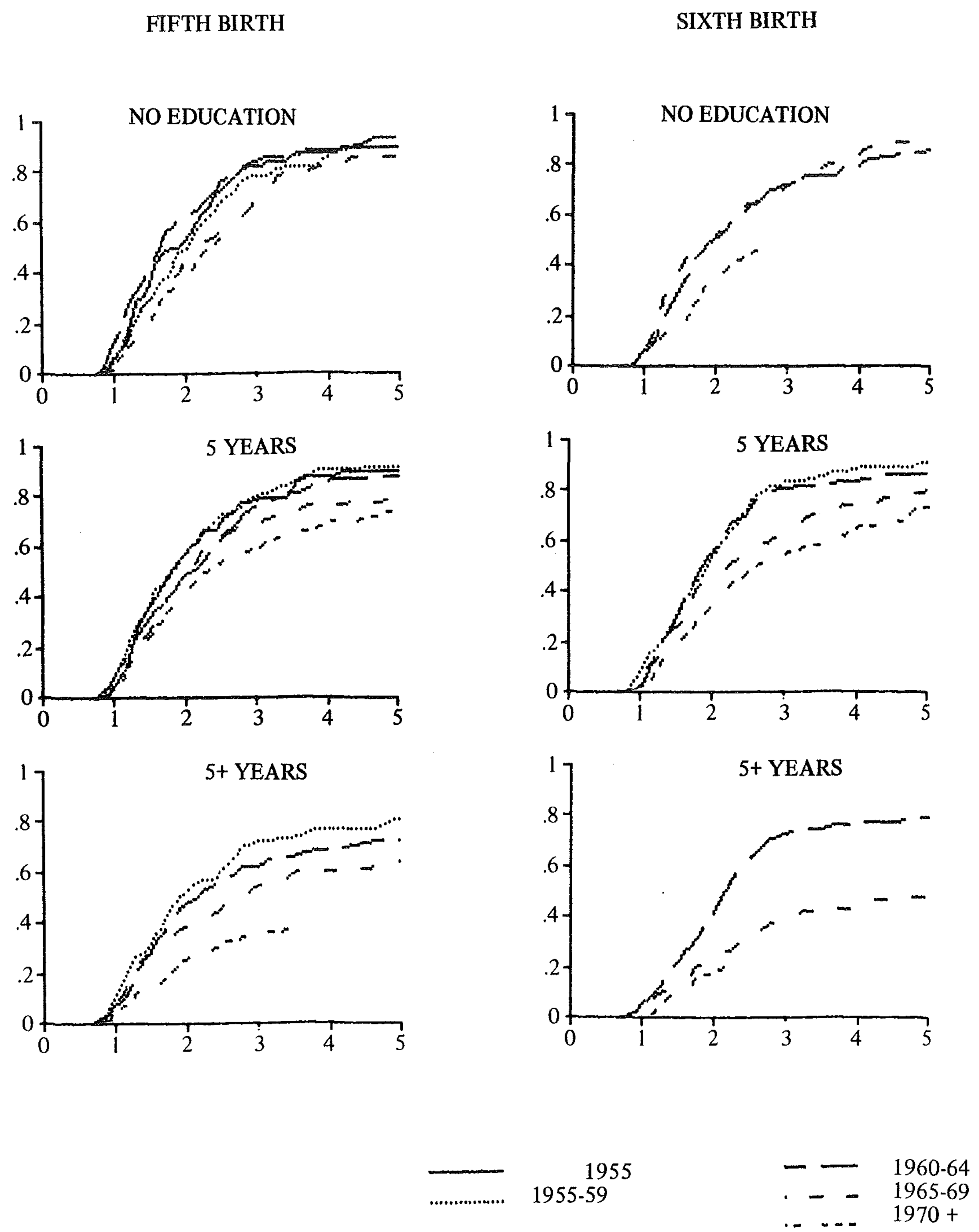


Figure 4.4 (Continued)



having a fourth child within five years declined from its traditional level of about 90 per cent to varying degrees in the different strata. Among those with completed primary or more it reached the 80 per cent level sometime in the mid-sixties, and had reached 60 per cent by the early seventies. Among those with incomplete primary it reached the 80 per cent mark by 1970, whereas among those with no education it had reduced to about 85 per cent by 1970. Thus we find that at this more advanced stage of family formation the fertility transition has probably begun to affect even the lowest educational stratum.

After the birth of the fourth child the same pattern is observed, although the data become more incomplete. What evidence we do have, however, indicates that for the more educated the onset of fertility decline occurs earlier in time than for the other educational strata and proceeds at a faster pace.

As regards the tempo of fertility the results are less conclusive and no clear pattern emerges. Our general impression is that there was practically no change in the length of birth intervals through the sixties for all educational strata. The results for the period since 1970 are fairly incomplete due to the truncated nature of the experience and the small sample numbers available, but suggest a lengthening of birth intervals for the higher educational strata. If there has been any substantial change in the tempo of fertility it is probably too recent to be clearly documented at this stage.

The foregoing results are consistent with a view of the fertility transition as a process which starts affecting transition probabilities at relatively high birth orders and for the higher strata of society, and gradually filters down to lower birth orders and lower strata of society with a significant time lag and a dampened effect.

An interesting consequence of this process is that while the society is undergoing the transition, differentials among strata widen. This effect can clearly be seen from our summary table. Whereas in the early sixties there were practically no educational differentials in the quintums of fertility for low birth orders, by the late sixties and particularly the early seventies substantial differences had emerged, whilst for high birth orders the previously moderate differentials had become quite considerable in magnitude. Experience from the developed world suggests that differentials are again reduced at late stages of the transition.

A further noteworthy aspect of these results is that declines in fertility appear to have been initiated for the higher educational groups at least by the early 1960's, with no apparent differentials prior to this. Thus, for Colombia, it is possible to identify the beginning of a process of change which was not identifiable in the national aggregate statistics until after 1965. This sensitivity of analysis by birth order (and education) seems ample justification for the greater complexity of our analysis over more conventional approaches.

4.4 WORK STATUS

Labour force participation is strongly related to fertility. A proper examination of the relationship between work status and the quantum and tempo of fertility, however, requires a complete work history for each woman, so that each birth interval of interest can be related to her work status at the relevant time. The nature of the available data forces us to restrict attention to the transitions from marriage to first birth and from first to second birth, according to the woman's work status before marriage and between marriage and the first birth. The results are shown in Figure 4.5 and Appendix Table 4.5, and may be summarised as follows:

First and Second Birth Intervals by Work Status

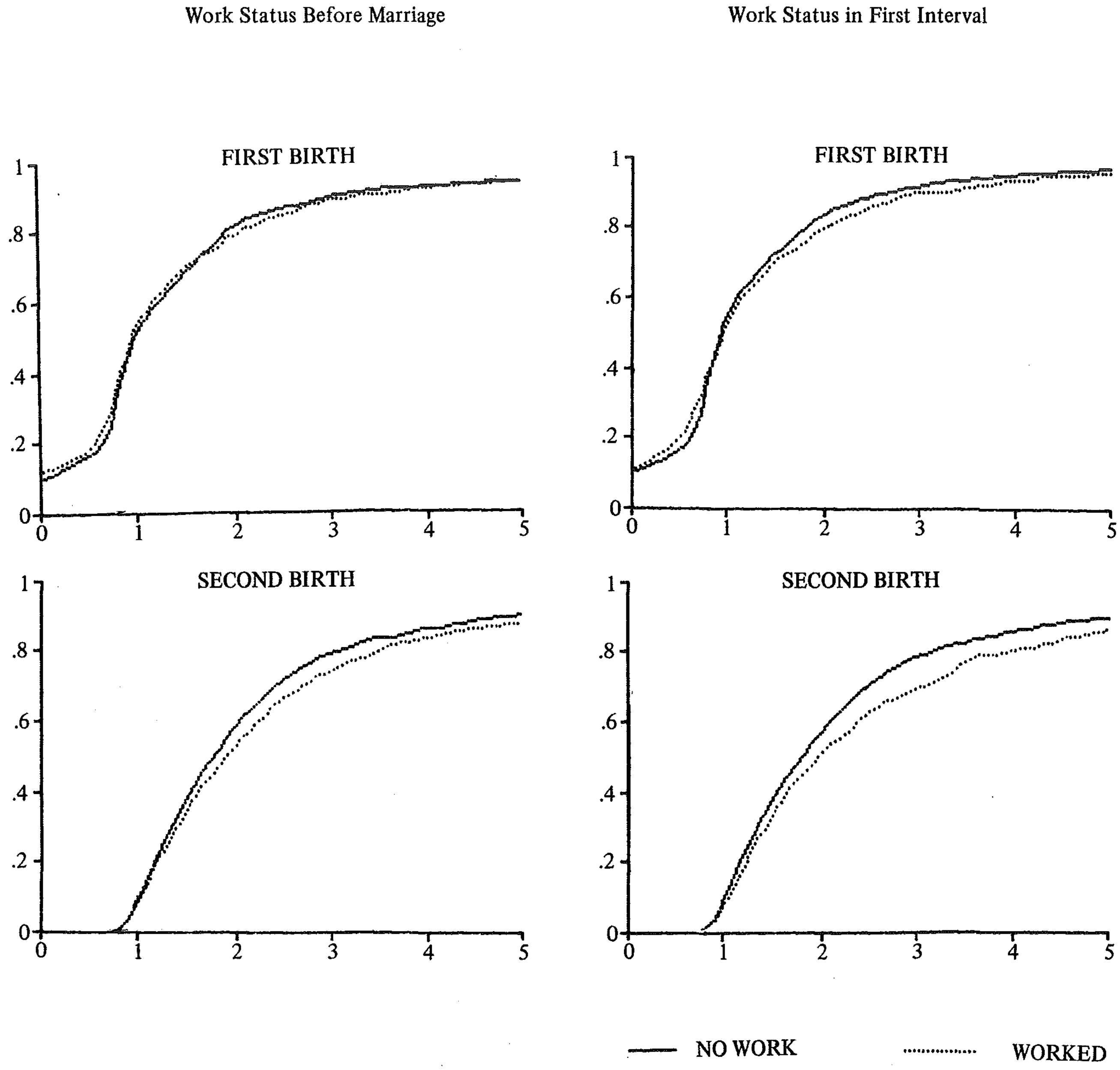
Birth Order	Summary Measure	Work Before Marriage		Work in First Birth Interval	
		No	Yes	No	Yes
1	B_9	.253	.293	.280	.335
	Q	.948	.944	.976	.963
	T	12.8	12.3	12.3	12.2
2	Q	.909	.885	.905	.807
	T	20.6	21.6	20.8	22.1

We find that women who work before marriage are somewhat more likely to have a pre-marital conception than those who do not work. Some of the difference is undoubtedly an age effect, as women who are older at entry into union in Colombia generally have higher incidence of pre-marital conceptions, and are also more likely to have worked before marriage. This difference does not otherwise affect the timing of the first birth and the two groups show no differences in the transition from first to second birth.

Similarly we find that women who work immediately after marriage are somewhat more likely to have a birth in the first nine months following marriage than those who do not work, but the difference is rather small and does not affect the timing of the first birth. These two groups show, however, a small difference in the transition from first to second birth. Women who work before the first birth are less likely to have a second child within five years and show a slightly longer birth interval.

The lack of substantial differentials by work status is not surprising if one considers the general uniformity of first and second birth intervals in Colombia.

Figure 4.5 Life Tables by Birth Order and



5. Mortality, Breastfeeding, and Contraception

We now turn our attention to a set of variables which are more proximate to fertility in a causal sense, namely infant mortality, breastfeeding practices and contraceptive use. We present first the results on infant mortality, and then pause to consider some methodological problems posed by the last two variables before presenting the results for breastfeeding and contraception.

5.1 INFANT MORTALITY

It is often postulated that infant and child mortality have a direct effect on fertility either because mothers tend to replace children who have died, or because women whose children die have reduced periods of breastfeeding and amenorrhea, resulting in shorter intervals. See Preston (1978) for a collection of papers debating this issue.

To assess the magnitude of the effect of infant mortality on fertility we have constructed life tables by birth order according to whether or not the previous child survived the first year of life. Thus, we study the interval from first to second birth according to survival of the first child. The results for birth orders two to six are presented in Figure 5.1 and Appendix Table 5.1, and are summarised below:

Birth Intervals by Survivorship of Previous Child

Birth Order	Summary Measure	Survivorship Status	
		Survived	Died in First Year
2	*Q*	.877	.908
	T	21.5	19.0
3	*Q*	.843	.901
	T	22.2	18.1
4	*Q*	.818	.861
	T	22.9	17.8
5	*Q*	.815	.862
	T	22.4	17.3
6	*Q*	.804	.843
	T	23.1	16.7

We find that for each of the birth orders studied, the death of the previous child within the first year of life increases the proportion of women who go on to have another child and reduces the waiting time to the next birth. Both effects, but particularly the difference in the timing of the next birth, are more noticeable at higher parities.

The death of the first child in the first year of life increases the proportion having a second child within five years from 88 to 91 per cent, and reduces the average interval from 21.5 to 19 months. The death of the third child increases the proportion having a fourth birth within five years from 82 to 86 per cent, while reducing the average interval from 23 to 18 months. The death of the fifth child increases the quintum from 80 to 84 per cent and reduces the sixth birth interval from 23 to 17 months.

These results indicate not only that women tend to replace a child who has died in infancy, but that they do it rapidly: for all parities the proportion having a subsequent birth is higher at every duration when the previous child died in the first year of life. These results are all the more remarkable because they represent the impact of a single infant death on the birth interval immediately following. One can only speculate that the cumulative effect of several infant deaths on subsequent reproductive behaviour would be greater still.

The question may arise as to whether this difference could be explained by some variable that we have failed to control. The most obvious demographic variable is age at the start of the interval, which tends to reduce the proportion having a subsequent birth. In a study of infant mortality in Colombia using these same data, Somoza (1980) has shown that, except for very young mothers who are subject to a large risk, infant mortality tends to increase with age of mother at the time of birth of the child. This implies that children who have died in infancy would have, if anything, relatively older mothers, which would lead us to expect a longer than average subsequent interval. Controlling for age would thus only increase the differential.

The same cannot be said of socio-economic variables such as education and type of place of residence. Somoza (1980) has shown that infant mortality in Colombia is highest among the rural and uneducated. We have shown, however, that education and place of residence have a significant effect on the quintum of fertility but not on the average length of birth intervals. Hence the fact that women who have suffered the death of an infant tend to have a shorter waiting time to the next birth cannot be attributed to their educational level or type of place of residence.

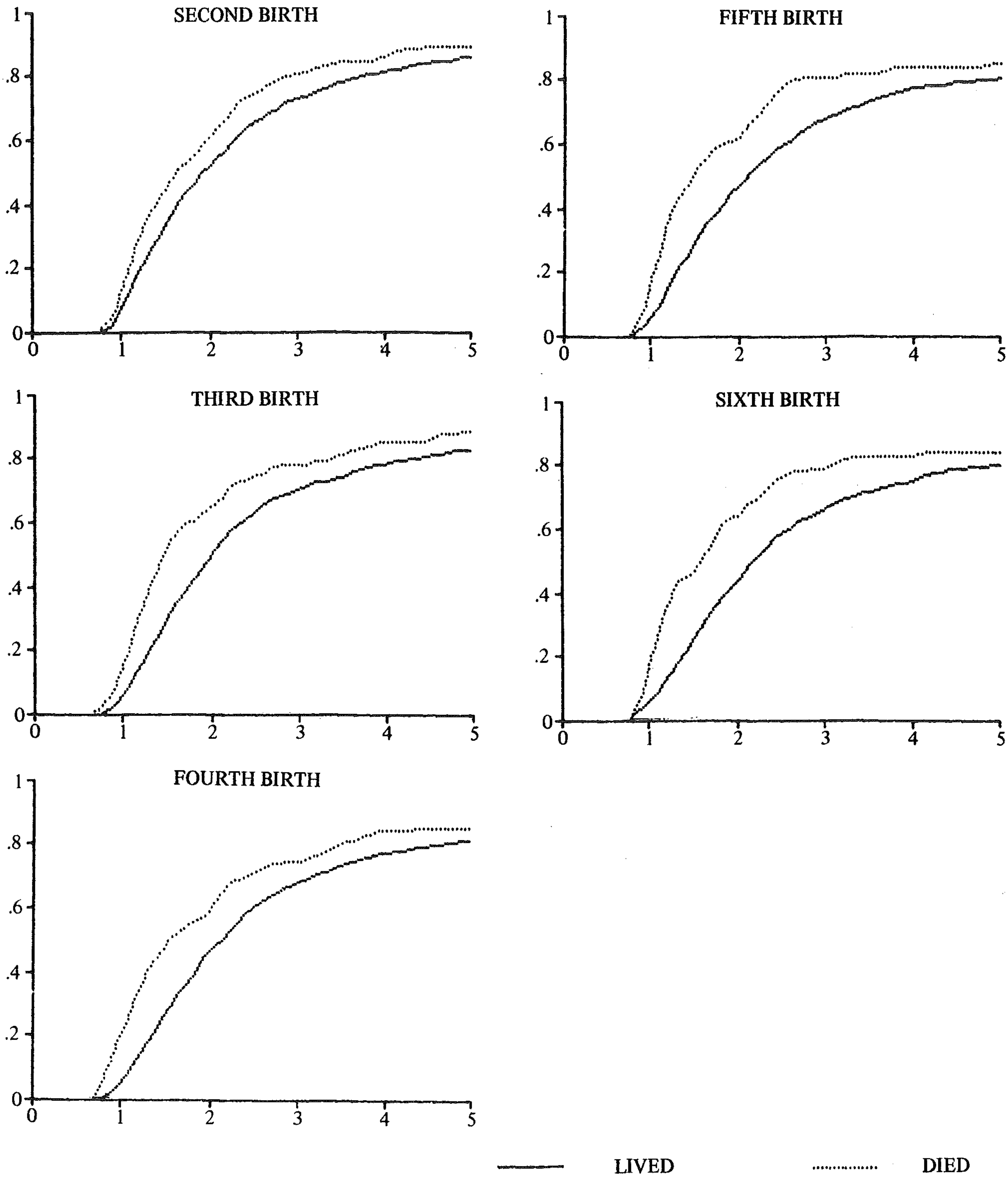
Finally we can only speculate as to the mechanisms causing this differential. Certainly the loss of breastfeeding associated with an infant death is a relevant factor; use of contraception may well be another. We now turn to an examination of these variables.

5.2 LAST TWO CHILDREN ANALYSIS

A methodological problem that arises in the study of breastfeeding and contraception is that data on these two variables are obtained in most fertility surveys, including the WFS, only for the last and next-to-last births, that is the last closed and the open intervals. The problem is that for each birth order the last closed interval tends to be longer than the average closed interval, leading to an under-estimate of the birth function at each duration.

To see this difficulty consider the analysis of the second birth interval for a cohort of women aged 20 to 24 at the time of the survey. The early marrying and most fertile members of this cohort will have short first and second birth intervals and may well have reached parity three or more by the time of the survey. As a result their second birth intervals would not be captured by questions on the last two births. The late marrying and less fertile members of the cohort will have longer intervals and may still be at parity one or two at the time of the survey. Therefore, the experience of these women with respect to second birth intervals will be captured by questions on the last two births. As a result, the more fertile women's experience will be grossly under-represented in an analysis based

Figure 5.1 Life Tables by Birth Order and Survival of Previous Child



Comparison of Estimates for the Third Birth Interval Based on All Children and on Last Two Children

Summary Measure	Period 1965+		Period 1970+		Period 1973+	
	All	Last Two	All	Last Two	All	Last Two
B_{15}	.151	.068	.119	.072	.105	.086
B_{30}	.571	.342	.520	.374	.480	.426
B_{60} or Q	.793	.566	.743	.616	–	–
T	23.1	27.4	24.0	27.8	–	–

on the last two children only, in this example as well as in general. Note that this bias pertains to analysis by birth order and may be less acute when birth intervals are analysed irrespective of parity.

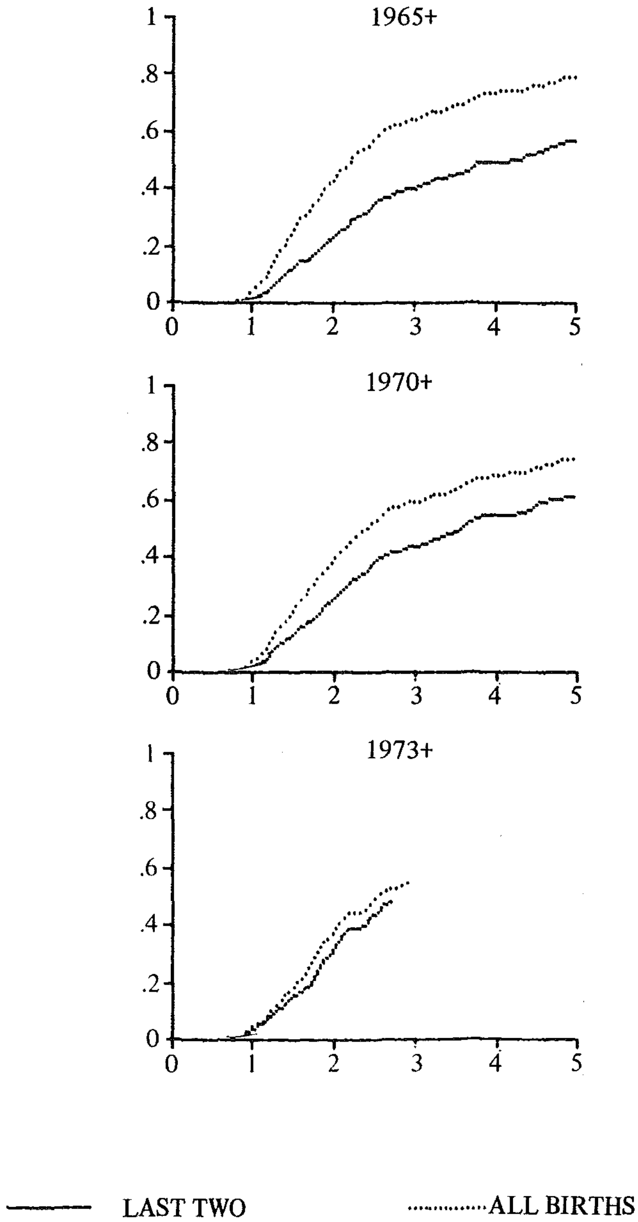
Perhaps the best way to illustrate the magnitude of this bias is to use the Colombian data. In Appendix Table 5.2 we show life tables for birth orders two, three and four based on (a) all intervals starting in 1965 or later, and (b) the last closed and the last open interval. We restrict ourselves to intervals starting since 1965 to avoid period effects. The results for births of order three are shown in Figure 5.2 and summarised above. We note that the proportion moving from parity two to three within five years is 79 per cent but the estimate based on the last two children is only 57 per cent. The average interval is 23 months but the last two children estimate is 27 months. The bias is in the expected direction and of surprising magnitude.

The conventional control for this type of bias is to restrict the analysis to intervals that have started in the recent past, and the usual rule of thumb is to take the past five years. To assess this practice we have repeated our comparison restricting the analysis to intervals starting in 1970 or later. As seen from Figure 5.2 and the summary table above, a very substantial bias persists even after this control. For the period since 1970 the proportion moving from parity two to three within five years is 74 per cent, whereas the estimate based only on the last two children is 62 per cent. The average interval is 24 months but the last two children estimate is 28 months.

Indeed, our own experimentation indicates that even if we restrict attention to intervals starting in the last three years, or more precisely in 1973 or later, a small bias still persists, as can be seen from Figure 5.2 or the summary table above. Moreover, by taking the last three years we are no longer able to estimate the proportion progressing from one parity to the next within five years, nor the average interval. The same pattern of results is obtained for the second and fourth birth intervals, as documented in Appendix Table 5.2.

We believe that these results throw serious doubts on any analysis based only on the last closed and the open interval, as the only way of reducing the bias is to restrict the period of observation to the point where it becomes useless. It could be argued that the existence of this bias will affect mostly levels and not differentials, as the selectivity effect might be roughly the same for different subgroups. We are convinced this is not the case, because the bias is strongly related to interval length which in turn depends on factors such as breastfeeding and contraception. In the brief analysis that follows, however, we have opted for a five year observation period in the hope that it gives at least an indication of the existence and nature of differentials.

Figure 5.2 Third Birth by Period Restriction and Subset of Recent Births



5.3 BREASTFEEDING

We study the effect of breastfeeding using life tables by birth order based on last closed and open intervals starting in 1970 or later, separately for two categories of breastfeeding status, determined by whether or not the previous child was breastfed through its first year of life. The results are given in Figure 5.3 and Appendix Table 5.3 for birth orders two to six, and are summarised for selected birth orders below. We use as summaries the values of the birth function at durations 15, 30 and 42, as the incomplete nature of the data prevents us from using Q and T.

Selected Birth Intervals by Breastfeeding

Birth Order	Summary Measure	Breastfeeding Duration	
		<12 Months	12+ Months
2	B_{15}	.137	.010
	B_{30}	.468	.356
	B_{42}	.632	.647
4	B_{15}	.083	.019
	B_{30}	.326	.274
	B_{42}	.406	.472
6	B_{15}	.071	.021
	B_{30}	.225	.267
	B_{42}	.357	(.396 at 36)

The general effect of breastfeeding is to delay substantially but not prevent the birth of the next child; on the contrary, women who breastfeed a child are, in the long run, more likely to have another child. For example, the cumulative proportion having a second child is lower for those who breastfeed the first child for a year than for those who do not for every duration up to three years, but at three and a half years the birth function is about 65 per cent for both groups.

At parities three and above the cross-over effect is quite clear. The cumulative proportion having a fourth child by duration 30 months is 27 per cent for those who breastfeed the third child for a year, compared to 33 per cent for those who do not, but by duration 42 months the corresponding proportions are 47 per cent and 41 per cent. A similar effect is observed for birth order six, except that the cross-over point is earlier still. These results imply that women who breastfeed a child for a year are more fertile than women who do not, but experience a temporary reduction in fertility through breastfeeding.

It should be noted that in our analysis we have not controlled for survival of the child, so that the category of women who did not breastfeed through the child's first year of life includes infant deaths. No attempt has been made here to separate the effects of infant mortality and breastfeeding. Neither have we controlled for other variables likely to be associated with breastfeeding practices and known to be associated with fertility, such as age and education. For a more complete discussion of issues arising in the analysis of breastfeeding from WFS survey data the reader is referred to Lestaeghe and Page (1980).

5.4. CONTRACEPTIVE USE

To study the effect of contraceptive use on birth intervals we construct life tables by birth order based on last closed and open intervals starting in 1970 or later, separately for women classified into two categories according to whether or not they used contraception at any time in the interval. The results for births of order two to six are presented in Figure 5.4 and Appendix Table 5.4 and are summarised for selected birth orders below. Again we use B_{15}, B_{30} and B_{42} as summaries.

We find a clear differential according to use of contraception in the interval. Thirty months after the birth of the first child, the proportion of women who have had a second child is 54 per cent among non-users compared to 38 per cent among users, and this difference is maintained at higher durations. For parity four, the proportion of women who have had a fourth child thirty months after the birth of the third child is 40 per cent among non-users, compared to 15 per cent among users, although the difference decreases to 20 percentage points at later durations.

Selected Birth Intervals by Contraceptive Use

Birth Order	Summary Measure	Contraceptive Use	
		Did Not Use	Used in Interval
2	B_{15}	.145	.075
	B_{30}	.541	.376
	B_{42}	.740	.569
4	B_{15}	.088	.015
	B_{30}	.398	.148
	B_{42}	.500	.301

There is however, an element of tautology in these results, stemming from the fact that the longer an interval is, the greater the chance the woman has had of starting using contraception. In view of this fact, and the biases discussed in Section 5.2, the results herein presented have very limited value. A more rigorous analysis of the effect of contraceptive use on birth intervals requires dating every period of use–information which is usually not collected in retrospective surveys because of its susceptibility to recall lapse–and applying increment-decrement life tables. For an example of this type of analysis the reader is referred to Vaughan et al (1977).

Figure 5.3 Life Tables by Birth Order and Breastfeeding

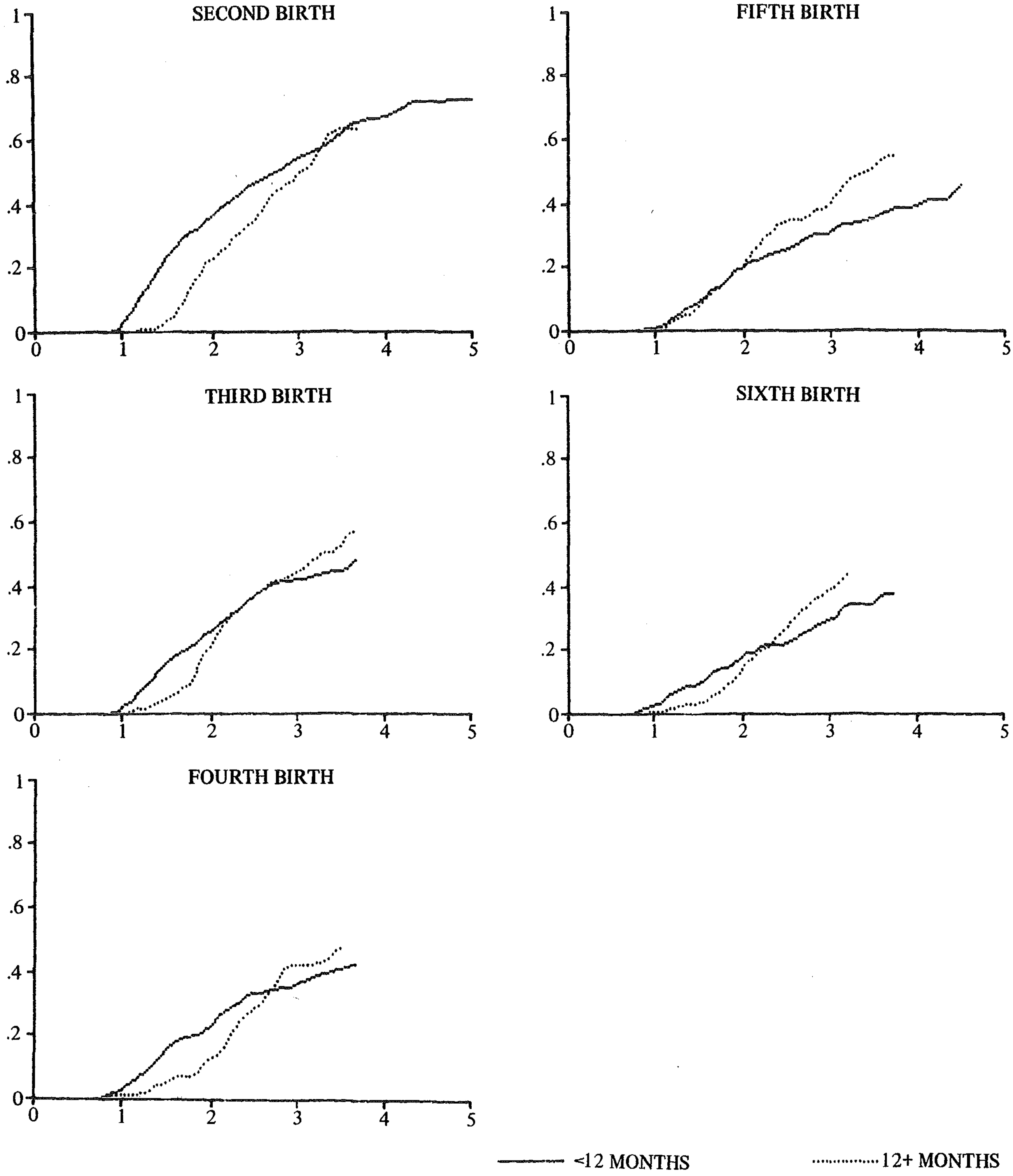
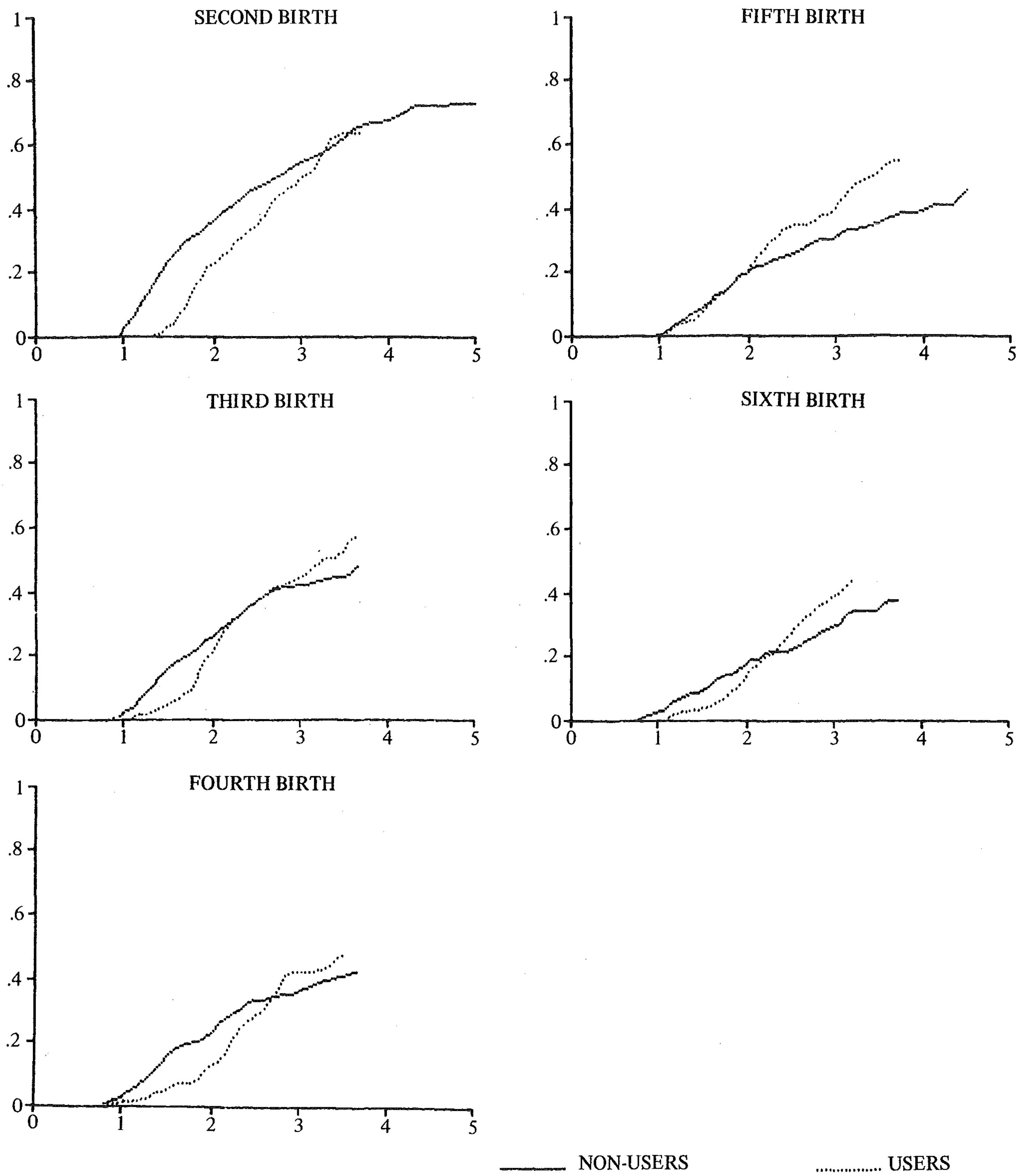


Figure 5.4 Life Tables by Birth Order and Use of Contraception



6. The Use Of Mathematical Models

The approach adopted in this study has relied extensively on the calculation of life tables by birth order for subgroups of the population. We now summarize some alternative approaches involving the use of models, and provide references to the literature.

6.1 MODELS FOR BIRTH INTERVALS

There are at least two reasons why one might be interested in developing mathematical models for birth intervals. The first may be to gain some understanding of the process of family formation by considering simple mechanisms which are consistent with the observations. The second is to smooth the data when they show irregularities and/or to reduce the data to two or three parameters which provide a more concise description of the observations.

Sheps and Menken (1973) consider a series of stochastic models for the reproductive process. The simplest model assumes that women are subject to a constant risk (or hazard) of having a subsequent birth, leading to an exponential distribution of the time to the next birth. This simple model serves as a basis for the development of more complicated but realistic models. The authors show, for example, that if the risk for each woman is constant over time but the population is heterogeneous, in that the level of risk is different for each woman, the average risk for the population would decline over time as the more fecund conceive and are thus no longer exposed to risk.

D'Souza (1974) has developed a model for closed birth intervals which breaks the waiting time to the next birth into two components; the duration of anovulation, assumed to follow a normal distribution, and the time it takes to conceive once the woman is susceptible, assumed to follow an exponential distribution. The resulting model is termed a "convolution" and has three parameters corresponding to the mean and variance of the anovulatory period and the mean waiting time to conception. Lee and Lin (1976) and Stoto and Menken (1977) have added a fourth parameter corresponding to a parity progression ratio and have developed procedures for fitting the model to cross-sectional data.

Braun (1977 or Braun and Hoem, 1979) has developed a more complex model where the risk of having a subsequent birth at a given time is modelled by a gamma function depending on several parameters which include age and length of reproductive period.

We have carried out some exploratory work fitting models to the Colombian data. We found that the risk of having a subsequent birth rises rapidly between 9 months and 1 or 2 years of duration—as women come out of the non-susceptible state—reaches a plateau, and then declines slowly, presumably as the more fertile women have a child and are thus no longer exposed. To trace the risk over time we have proposed two families of models, termed the multilinear and the gamma families. Both have been found to fit the Colombian data extremely well, not only in terms of the risk of having a subsequent birth, but also in terms of the implied birth function. For a review of these models the reader is referred to Hobcraft and Rodriguez (1980).

Another approach to modelling birth order data is to work with life tables by age rather than duration since previous birth. Coale (1971), see also Coale and McNeil (1972), has proposed a model for the distribution of age at first union which essentially corresponds to the sum of a normal and three exponential random variables. Trussell, Menken and Coale (1979) have considered adding a fourth exponential component for the waiting time to first birth, but some initial analysis indicated that the additional parameter was not necessary and the marriage model itself could fit age at first (and even second, or third) birth. Rodriguez and Trussell (1980) have fitted the model to the distribution of age at first birth in Colombia with encouraging results. Casterline and Trussell (1980) have tried the model on age at first birth in several countries with mixed success. Hobcraft and Trussell (1980) have carried out some exploratory fitting of the model to the distribution of age at births of orders up to five in Colombia, again with limited success.

6.2 PROPORTIONAL HAZARDS MODELS

Differentials in the quantum and tempo of fertility have been studied using life tables constructed by birth order separately for categories of the variables of interest. This approach permits a detailed examination of differences and allows for interaction effects where they exist, but, severely restricts the number of variables and categories within variables that can be examined simultaneously.

In recent years a methodology has evolved for the multivariate analysis of censored data which combines the basic ideas underlying life table analysis and regression analysis into a new approach known either as proportional hazards models or life tables with regression. The basis of the method is to assume that for each individual the hazard (in our case the force of fertility) is proportional to a standard hazard, which may or may not have a parametric form. The proportionality factor, in turn, depends on a number of covariates or explanatory variables through a linear model.

Non-parametric models are obtained when the standard hazard is left unspecified. Mention should be made here of a pioneering paper by Cox (1972) setting out the basic ideas of life tables with regression, which stimulated considerable further work in this area. For some recent contributions see Kay (1977), Prentice and Gloeckler (1978) and Buckley and James (1979).

Parametric models are obtained when a functional form is specified for the standard hazard. A constant hazard leads to the exponential model proposed by Glasser (1967) and further studied by Prentice (1973) and Breslow(1974), but many other functional forms have been proposed in the literature, see e.g. Prentice (1973).

Although proportional hazards models are used extensively in biomedical science, we have seen few applications in demographic analysis; exceptions being recent papers by Vaupel, Manton and Stallard (1979) using essentially a proportional hazards approach to study the impact of heterogeneity on mortality and by Menken *et al* (1980) applying life tables with regression to the study of marital dissolution.

With reference to our own work, the multilinear and gamma families provide a basic parametric form for a proportional hazards approach to the study of birth intervals, which we consider an avenue worth further investigation.

7. Concluding Remarks

The approach adopted here divides the family building process into a series of stages including marriage and births of successive orders, and studies the transition from each stage to the next separately. In Colombia, entry into first union is a poor indicator of entry into risk of child-bearing and therefore the inclusion of marriage as the first stage in the process is of doubtful validity. In retrospect we feel that an analysis of age at first birth would have been more illuminating than the analysis of the interval from marriage to first birth.

The process of transition to each parity has been studied in terms of the birth function, or cumulative proportion of women having a birth of a certain order by successive durations since the previous birth (or marriage), which is estimated using life table techniques. A more compact description of the process relies on summary indicators of the quantum and tempo of fertility. For incomplete cross-sectional data we have proposed the *quintum,* or proportion having a subsequent birth within five years of the previous birth, and the *trimean,* a robust estimate of the average birth interval for women who have a subsequent birth within five years.

The greater sensitivity of birth interval analysis compared with more conventional methods for the study of fertility is best illustrated by our analysis of time trends within educational groups. We have been able to identify the beginnings of fertility decline in Colombia in the early sixties for women with complete primary or higher education, the late sixties for women with incomplete primary and the late seventies for women with no education.

Moreover, we have shown that for women with no education the decline is not only more recent but affects only transition probabilities at high parities, whereas for the more educated the decline started long ago at the high parities and has recently affected very early stages of family building. Thus, fertility decline in Colombia started in the early sixties in the higher socio-economic strata and at high parities and has gradually filtered down to the lower strata and the lower parities.

Most of the work presented in this illustrative analysis demonstrates that certain associations between variables exist but not that they can be interpreted in casual terms. Much more intricate analysis would be desirable, for example examining whether childhood place of residence is still associated with the quantum and tempo of fertility by birth order once differences in education are controlled and account is taken of temporal changes through a control on period. This degree of control is not possible using the approach of calculating a separate life table for each subgroup of the population. We believe that the development of a proportional hazards approach, as suggested earlier, will enable a multivariate analysis to improve our understanding of the determinants of the quantum and tempo of fertility.

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TABLE 2.2 * BIRTH FUNCTION BY DURATION SINCE PREVIOUS BIRTH

BY : BIRTH ORDER
AND : BACKDATING INTERVIEW FOR COHORT 40+

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
SECOND BIRTH																
BACKDATED	576.	.000	.003	.082	.205	.352	.466	.542	.696	.769	.832	.868	.910	.925	21.5	14.0
ACTUAL DATE	799.	.000	.003	.075	.212	.353	.460	.537	.668	.738	.790	.832	.877	.906	21.3	14.3
THIRD BIRTH																
BACKDATED	424.	.000	.008	.085	.210	.357	.474	.572	.755	.839	.880	.898	.914	.930	20.9	11.6
ACTUAL DATE	758.	.000	.005	.073	.199	.328	.440	.542	.691	.765	.805	.830	.863	.890	21.1	12.1
FOURTH BIRTH																
BACKDATED	307.	.000	.004	.079	.219	.341	.462	.563	.734	.811	.878	.904	.904		21.0	12.4
ACTUAL DATE	707.	.000	.002	.069	.176	.290	.405	.506	.648	.727	.785	.822	.847	.866	22.1	13.4

TABLE 2.3 * BIRTH FUNCTION BY DURATION SINCE PREVIOUS BIRTH

BY : BIRTH ORDER
AND : BACKDATING INTERVIEW FOR COHORT 40+
CONTROLLING : AGE AT START OF INTERVAL *

PANEL 1 : AGE < Q1

	N OF CASES	1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
SECOND BIRTH																
BACKDATED	162.	.000	.003	.086	.210	.340	.469	.556	.722	.804	.856	.876	.915	.923	21.4	13.3
ACTUAL DATE	162.	.000	.003	.086	.210	.340	.469	.556	.722	.806	.858	.877	.914	.932	21.4	13.2
THIRD BIRTH																
BACKDATED	165.	.000	.009	.124	.271	.398	.486	.571	.773	.855	.889	.913	.934		20.3	12.3
ACTUAL DATE	165.	.000	.009	.121	.279	.409	.491	.576	.764	.839	.879	.903	.924	.939	20.0	12.4
FOURTH BIRTH																
BACKDATED	144.	.000	.007	.128	.266	.372	.510	.624	.751	.821	.895	.926	.926		20.2	12.2
ACTUAL DATE	159.	.000	.006	.157	.280	.393	.528	.642	.767	.824	.899	.934	.940	.956	19.9	12.4

PANEL 2 : AGE Q1-Q2

	N OF CASES	1	9	12	15	18	21	24	30	36	42	48	60	72	TRIMEAN	SPREAD
SECOND BIRTH																
BACKDATED	158.	.000	.003	.059	.174	.325	.453	.525	.697	.770	.850	.903	.923	.935	22.1	13.8
ACTUAL DATE	158.	.000	.003	.057	.174	.323	.446	.535	.684	.766	.832	.886	.905	.930	22.0	13.9
THIRD BIRTH																
BACKDATED	101.	.000	.012	.047	.168	.346	.493	.626	.790	.898						
ACTUAL DATE	123.	.000	.008	.049	.195	.366	.500	.638	.785	.882	.911	.931	.951	.959	20.7	10.4
FOURTH BIRTH																
BACKDATED	75.	.000	.000	.031	.204	.362	.470	.547								
ACTUAL DATE	118.	.000	.000	.034	.182	.339	.445	.551	.725	.805	.852	.890	.907	.915	21.8	13.2

TABLE 2.3 (CONTINUED)

PANEL 3 : AGE Q2-Q3

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
SECOND BIRTH																
BACKDATED	170.	.000	.000	.088	.222	.410	.490	.546	.688	.743	.811	.854	.910		20.9	14.7
ACTUAL DATE	208.	.000	.005	.079	.231	.377	.454	.524	.656	.721	.774	.832	.885	.918	21.6	15.7
THIRD BIRTH																
BACKDATED	123.	.000	.005	.076	.156	.286	.441	.535	.701	.759	.815					
ACTUAL DATE	199.	.000	.003	.073	.173	.276	.430	.533	.691	.754	.809	.842	.879	.910	22.0	11.9
FOURTH BIRTH																
BACKDATED	75.	.000	.000	.020												
ACTUAL DATE	178.	.000	.000	.034	.138	.270	.399	.486	.671	.761	.820	.871	.902	.913	23.0	13.2

PANEL 4 : AGE > Q3

SECOND BIRTH																
BACKDATED	86.	.000	.007	.108	.227	.316										
ACTUAL DATE	271.	.000	.002	.076	.220	.359	.467	.538	.637	.693	.737	.775	.833	.867	20.7	14.3
THIRD BIRTH																
BACKDATED	35.															
ACTUAL DATE	271.	.000	.004	.055	.172	.298	.391	.483	.603	.674	.708	.731	.772	.813	21.5	13.4
FOURTH BIRTH																
BACKDATED	13.															
ACTUAL DATE	252.	.000	.002	.056	.135	.216	.313	.413	.520	.605	.655	.683	.720	.752	23.2	13.5

TABLE 3.1 * BIRTH FUNCTION BY DURATION SINCE PREVIOUS BIRTH (MARRIAGE FOR FIRST BIRTHS)

BY : BIRTH ORDER
AND : AGE AT START OF INTERVAL *

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
FIRST BIRTH																
AGE < Q1	970.	.061	.192	.395	.511	.587	.658	.731	.797	.843	.873	.895	.928	.943	14.8	12.7
AGE Q1-Q2	708.	.075	.264	.519	.633	.720	.774	.832	.890	.923	.941	.949	.963	.970	12.4	9.4
AGE Q2-Q3	842.	.122	.311	.578	.689	.754	.810	.861	.904	.930	.950	.964	.969	.974	11.5	8.6
AGE > Q3	776.	.189	.344	.577	.666	.731	.772	.812	.863	.897	.904	.911	.926	.940	10.5	11.0
TOTAL	3296.	.110	.274	.511	.618	.691	.748	.805	.859	.895	.914	.928	.946	.957	12.6	10.6
SECOND BIRTH																
AGE < Q1	900.	.000	.006	.081	.229	.353	.459	.549	.705	.782	.829	.854	.902	.926	21.3	14.0
AGE Q1-Q2	765.	.000	.003	.084	.227	.343	.455	.548	.672	.772	.832	.864	.905	.926	21.8	15.3
AGE Q2-Q3	827.	.000	.006	.087	.240	.360	.457	.542	.676	.759	.805	.839	.886	.917	21.2	14.7
AGE > Q3	710.	.000	.001	.074	.215	.339	.442	.511	.610	.670	.722	.758	.810	.839	21.0	15.0
TOTAL	3202.	.000	.004	.082	.228	.349	.454	.539	.670	.750	.801	.832	.879	.905	21.3	14.6
THIRD BIRTH																
AGE < Q1	821.	.000	.008	.084	.227	.369	.481	.575	.721	.803	.850	.888	.920	.941	20.9	12.5
AGE Q1-Q2	562.	.000	.005	.045	.180	.330	.440	.544	.690	.755	.804	.832	.867	.893	21.3	12.1
AGE Q2-Q3	661.	.000	.006	.072	.183	.276	.390	.486	.634	.693	.733	.769	.829	.864	22.2	13.4
AGE > Q3	600.	.000	.004	.046	.147	.250	.341	.421	.542	.618	.653	.698	.748	.793	22.8	14.9
TOTAL	2644.	.000	.006	.064	.188	.311	.418	.512	.653	.724	.768	.805	.849	.879	21.8	13.5
FOURTH BIRTH																
AGE < Q1	704.	.000	.005	.078	.218	.331	.443	.545	.696	.768	.830	.864	.902	.919	21.7	13.9
AGE Q1-Q2	428.	.000	.006	.067	.187	.308	.407	.507	.655	.742	.795	.829	.862	.883	22.3	14.0
AGE Q2-Q3	477.	.000	.002	.040	.144	.268	.378	.460	.611	.680	.741	.784	.832	.843	23.1	14.4
AGE > Q3	476.	.000	.002	.048	.115	.185	.256	.342	.450	.522	.564	.601	.645	.692	24.0	14.7
TOTAL	2085.	.000	.004	.060	.172	.279	.379	.472	.614	.688	.744	.781	.821	.845	22.6	14.0
FIFTH BIRTH																
AGE < Q1	441.	.000	.005	.090	.218	.338	.438	.520	.638	.732	.795	.828	.861	.884	21.7	15.5
AGE Q1-Q2	476.	.000	.002	.066	.210	.319	.440	.526	.657	.760	.801	.835	.861	.879	21.5	14.2
AGE Q2-Q3	345.	.000	.000	.061	.174	.280	.377	.469	.640	.697	.739	.785	.824	.866	22.3	13.0
AGE > Q3	351.	.000	.006	.039	.151	.256	.319	.383	.483	.556	.614	.651	.688	.727	23.3	17.3
TOTAL	1613.	.000	.003	.066	.192	.303	.401	.482	.612	.696	.748	.785	.818	.847	22.0	14.8
SIXTH BIRTH																
AGE < Q1	387.	.000	.005	.117	.252	.396	.504	.564	.704	.774	.798	.806	.853	.877	19.8	12.9
AGE Q1-Q2	360.	.000	.006	.065	.164	.251	.357	.464	.622	.714	.788	.814	.850	.882	23.6	14.4
AGE Q2-Q3	261.	.000	.010	.056	.142	.217	.329	.402	.549	.648	.683	.742	.797	.826	24.2	14.6
AGE > Q3	258.	.000	.000	.023	.081	.161	.251	.317	.461	.509	.577	.619	.677	.690	25.9	17.5
TOTAL	1266.	.000	.005	.071	.171	.273	.377	.454	.601	.679	.729	.759	.807	.832	22.5	14.3

TABLE 3.2 * BIRTH FUNCTION BY DURATION SINCE PREVIOUS BIRTH (MARRIAGE FOR FIRST BIRTHS)

BY : BIRTH ORDER
AND : AGE AT TIME OF SURVEY

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
FIRST BIRTH																
15-24	798.	.076	.244	.483	.598	.676	.740	.813	.865	.896	.918	.941	.964	.977	13.3	11.3
25-29	654.	.105	.277	.500	.611	.680	.728	.784	.848	.877	.900	.916	.934	.950	12.6	10.8
30-34	531.	.108	.266	.561	.663	.731	.783	.827	.879	.917	.928	.941	.967	.974	12.1	9.2
35-39	508.	.118	.276	.495	.586	.669	.740	.794	.846	.880	.906	.917	.936	.947	12.7	10.9
40+	805.	.142	.304	.523	.635	.704	.754	.809	.860	.902	.920	.928	.938	.945	12.0	10.4
SECOND BIRTH																
15-24	720.	.000	.006	.065	.179	.318	.403	.492	.631	.723	.792	.819	.894	.913	23.3	16.3
25-29	637.	.000	.005	.074	.218	.319	.438	.532	.656	.769	.802	.835	.868	.893	21.6	14.8
30-34	538.	.000	.002	.108	.276	.389	.483	.564	.701	.768	.821	.842	.887	.913	20.2	13.8
35-39	508.	.000	.005	.094	.274	.375	.489	.576	.695	.760	.810	.833	.884	.908	20.3	14.5
40+	799.	.000	.003	.075	.212	.353	.460	.537	.668	.738	.790	.832	.877	.906	21.3	14.3
THIRD BIRTH																
15-24	405.	.000	.002	.036	.127	.265	.355	.426	.583	.656	.716	.777	.831		23.8	15.0
25-29	518.	.000	.005	.057	.150	.261	.355	.441	.584	.672	.719	.767	.819	.853	23.3	15.0
30-34	495.	.000	.005	.071	.215	.330	.443	.547	.664	.721	.760	.800	.851	.880	21.0	13.2
35-39	468.	.000	.011	.068	.220	.345	.457	.545	.684	.746	.788	.826	.869	.895	20.8	13.1
40+	758.	.000	.005	.073	.199	.328	.440	.542	.691	.765	.805	.830	.863	.890	21.1	12.1
FOURTH BIRTH																
15-24	168.	.000	.000	.037	.117	.216	.294	.385	.569							
25-29	367.	.000	.003	.056	.177	.288	.364	.437	.582	.668	.712	.740	.819	.846	23.3	15.8
30-34	422.	.000	.006	.048	.150	.265	.379	.458	.596	.670	.720	.747	.792	.819	22.4	13.4
35-39	421.	.000	.007	.068	.196	.284	.367	.476	.608	.665	.725	.770	.818	.842	22.7	15.4
40+	707.	.000	.002	.069	.176	.290	.405	.506	.648	.727	.785	.822	.847	.866	22.1	13.4
FIFTH BIRTH																
15-24	57.															
25-29	236.	.000	.000	.047	.160	.241	.333	.422	.567	.635	.745	.761	.807	.839	24.0	17.4
30-34	321.	.000	.003	.081	.194	.301	.405	.474	.577	.664	.701	.732	.779	.822	21.6	15.4
35-39	362.	.000	.006	.079	.215	.326	.417	.485	.621	.697	.743	.787	.819	.835	21.5	14.8
40+	637.	.000	.003	.059	.192	.310	.411	.504	.640	.733	.780	.818	.844	.871	21.9	14.3
SIXTH BIRTH																
15-24	17.															
25-29	141.	.000	.000	.053	.165	.255	.368	.454	.544	.632	.730	.749				
30-34	241.	.000	.009	.082	.196	.275	.340	.393	.496	.588	.649	.683	.721	.746	22.9	18.9
35-39	301.	.000	.002	.061	.169	.295	.413	.480	.622	.705	.755	.777	.826	.836	21.9	14.1
40+	566.	.000	.007	.076	.165	.265	.378	.468	.642	.708	.746	.780	.825	.855	22.4	12.4

TABLE 3.3 * BIRTH FUNCTION BY DURATION SINCE PREVIOUS BIRTH (MARRIAGE FOR FIRST BIRTHS)
BY : BIRTH ORDER
AND : AGE AT TIME OF SURVEY
CONTROLLING : AGE AT START OF INTERVAL *

PANEL 1 : AGE < 01

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
FIRST BIRTH																
15-24	328.	.059	.207	.400	.524	.608	.674	.753	.820	.853	.876	.907	.948	.966	14.7	12.7
25-29	189.	.077	.196	.402	.513	.593	.651	.722	.775	.833	.868	.886	.915	.937	14.7	13.1
30-34	137.	.015	.131	.401	.547	.613	.697	.748	.828	.861	.883	.909	.949	.960	14.6	11.2
35-39	145.	.062	.190	.383	.476	.555	.652	.728	.786	.817	.859	.872	.917	.924	15.2	12.5
40+	171.	.082	.211	.386	.485	.553	.611	.693	.766	.842	.877	.892	.904	.918	15.0	14.0
SECOND BIRTH																
15-24	304.	.000	.007	.067	.192	.352	.439	.530	.680	.747	.797	.821	.890	.911	21.9	13.8
25-29	172.	.000	.009	.070	.235	.349	.465	.561	.709	.802	.823	.852	.895	.919	21.2	14.1
30-34	133.	.000	.004	.132	.331	.414	.500	.560	.718	.789	.861	.883	.921	.947	20.3	15.4
35-39	129.	.000	.004	.070	.217	.318	.438	.550	.709	.779	.822	.853	.899	.930	21.7	13.5
40+	162.	.000	.003	.086	.210	.340	.469	.556	.722	.806	.858	.877	.914	.932	21.4	13.2
THIRD BIRTH																
15-24	226.	.000	.003	.054	.152	.307	.402	.470	.618	.692	.748	.812	.859	.867	22.7	14.6
25-29	172.	.000	.009	.090	.206	.343	.468	.561	.712	.817	.869	.916	.948	.965	21.9	14.3
30-34	129.	.000	.015	.097	.252	.411	.558	.663	.779	.829	.876	.915	.938	.953	19.5	10.6
35-39	129.	.000	.004	.058	.267	.399	.512	.636	.744	.833	.868	.888	.922	.938	19.9	11.7
40+	165.	.000	.009	.121	.279	.409	.491	.576	.764	.839	.879	.903	.924	.939	20.0	12.4
FOURTH BIRTH																
15-24	120.	.000	.000	.026	.113	.220	.296	.390	.579							
25-29	158.	.000	.000	.038	.196	.332	.411	.500	.658	.759	.791	.807	.878	.896	22.4	14.4
30-34	138.	.000	.011	.065	.199	.308	.464	.565	.703	.764	.830	.848	.884	.906	21.4	13.1
35-39	129.	.000	.008	.081	.264	.357	.453	.558	.721	.779	.845	.899	.938	.946	21.7	14.7
40+	159.	.000	.006	.157	.280	.393	.528	.642	.767	.824	.899	.934	.940	.956	19.9	12.4
FIFTH BIRTH																
15-24	49.															
25-29	104.	.000	.000	.058	.154	.207	.284	.385	.538	.616	.734	.754	.784	.820	25.0	17.8
30-34	82.	.000	.006	.116	.232	.335	.409	.470	.573	.695	.720	.756	.829	.866	22.3	17.2
35-39	89.	.000	.017	.112	.236	.382	.500	.596	.702	.803	.854	.888	.899	.899	20.7	14.0
40+	117.	.000	.000	.103	.278	.432	.556	.628	.744	.833	.889	.923	.940	.957	19.9	13.3
SIXTH BIRTH																
15-24	17.															
25-29	88.	.000	.000	.069	.213	.283	.390	.474	.573	.664	.731					
30-34	76.	.000	.013	.145	.276	.467	.579	.618	.711	.750	.776	.776	.816	.843	17.6	10.5
35-39	88.	.000	.000	.074	.210	.426	.523	.591	.727	.824	.830	.830	.841	.847	18.9	9.9
40+	118.	.000	.008	.174	.309	.432	.551	.602	.792	.839	.847	.860	.915	.941	19.3	14.3

TABLE 3.3 (CONTINUED)

PANEL 2 : AGE Q1-Q2

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
FIRST BIRTH																
15-24	232.	.050	.247	.515	.635	.722	.784	.853	.897	.933	.950					
25-29	120.	.100	.321	.508	.667	.717	.758	.817	.888	.908	.929	.950				
30-34	109.	.101	.266	.628	.725	.812	.830	.885	.931							
35-39	103.	.073	.267	.515	.592	.689	.757	.786	.850	.879	.913	.922	.942		12.4	10.2
40+	144.	.076	.243	.455	.563	.674	.743	.813	.882	.917	.924	.924	.944	.951	13.2	10.4
SECOND BIRTH																
15-24	236.	.000	.005	.068	.176	.299	.392	.473	.570	.707	.797	.830				
25-29	146.	.000	.000	.096	.250	.342	.466	.568	.688	.808	.842	.870	.890	.902	21.1	14.3
30-34	119.	.000	.000	.092	.248	.361	.466	.584	.731	.807	.857	.866	.916	.924	20.9	13.1
35-39	106.	.000	.009	.127	.344	.439	.557	.627	.722	.792	.854	.877	.934		19.5	14.6
40+	158.	.000	.003	.057	.174	.323	.446	.535	.684	.766	.832	.886	.905	.930	22.0	13.9
THIRD BIRTH																
15-24	112.	.000	.000	.006	.060	.191	.258	.343								
25-29	119.	.000	.004	.021	.143	.277	.361	.433	.559	.613	.674	.723	.777	.800	22.9	15.6
30-34	109.	.000	.000	.078	.252	.395	.523	.670	.789	.817	.835	.853	.899	.940	19.2	9.5
35-39	99.	.000	.010	.066	.222	.384	.495	.556	.727	.793	.874	.894	.899	.909	19.9	11.5
40+	123.	.000	.008	.049	.195	.366	.500	.638	.785	.882	.911	.931	.951	.959	20.7	10.4
FOURTH BIRTH																
15-24	44.															
25-29	94.	.000	.005	.096	.181	.288	.364	.431	.572	.640	.702	.730				
30-34	87.	.000	.011	.069	.184	.316	.397	.466	.580	.724	.759	.793	.810	.839	22.3	15.4
35-39	85.	.000	.012	.076	.218	.306	.435	.594	.741	.794	.859	.888	.935		21.9	13.1
40+	118.	.000	.000	.034	.182	.339	.445	.551	.725	.805	.852	.890	.907	.915	21.8	13.2
FIFTH BIRTH																
15-24	8.															
25-29	97.	.000	.000	.045	.188	.299	.415	.495	.629	.688						
30-34	108.	.000	.005	.069	.190	.315	.458	.556	.634	.722	.764	.787	.815	.829	20.5	11.4
35-39	117.	.000	.004	.103	.265	.342	.462	.530	.658	.756	.791	.829	.846	.855	20.7	14.7
40+	146.	.000	.000	.048	.195	.318	.428	.521	.688	.818	.849	.890	.911	.938	22.4	14.1
SIXTH BIRTH																
15-24	0.															
25-29	46.															
30-34	95.	.000	.011	.068	.195	.216	.258	.332	.453	.589	.652	.687	.701		24.5	19.6
35-39	93.	.000	.005	.097	.237	.339	.468	.538	.688	.769	.849	.882	.935	.946	22.5	18.2
40+	126.	.000	.004	.052	.119	.230	.361	.520	.726	.794	.849	.865	.897	.940	23.0	10.3

TABLE 3.3 (CONTINUED)

PANEL 3 : AGE Q2-Q3

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
FIRST BIRTH																
15-24	206.	.124	.299	.579	.676	.741	.805	.877	.914	.938						
25-29	190.	.126	.334	.582	.679	.753	.805	.850	.889	.908	.929	.937	.942	.958	11.0	8.4
30-34	124.	.089	.270	.613	.694	.750	.819	.871	.915	.940	.944					
35-39	119.	.139	.315	.525	.643	.744	.811	.866	.912	.937	.958					
40+	203.	.126	.325	.586	.734	.773	.813	.855	.899	.936	.958	.966	.970	.975	10.9	7.3
SECOND BIRTH																
15-24	169.	.000	.008	.059	.156	.265	.331	.426	.610							
25-29	185.	.000	.008	.068	.208	.311	.424	.530	.646	.776	.812	.848	.871	.897	22.0	15.1
30-34	132.	.000	.004	.133	.295	.417	.515	.602	.723	.780	.811	.833	.894	.943	19.5	13.4
35-39	133.	.000	.008	.105	.316	.421	.541	.613	.752	.820	.861	.865	.910	.917	19.5	13.6
40+	208.	.000	.005	.079	.231	.377	.454	.524	.656	.721	.774	.832	.885	.918	21.6	15.7
THIRD BIRTH																
15-24	67.															
25-29	154.	.000	.003	.056	.108	.194	.266	.357	.502	.576	.587	.613				
30-34	124.	.000	.004	.077	.238	.319	.403	.488	.617	.669	.722	.750	.823	.835	21.6	16.1
35-39	117.	.000	.017	.103	.248	.359	.483	.590	.735	.773	.791	.833	.897	.932	20.5	13.3
40+	199.	.000	.003	.073	.173	.276	.430	.533	.691	.754	.809	.842	.879	.910	22.0	11.9
FOURTH BIRTH																
15-24	4.															
25-29	91.	.000	.006	.045	.138	.209	.259	.296								
30-34	98.	.000	.000	.031	.117	.260	.398	.459	.597	.643	.694	.704	.765	.783	21.7	11.7
35-39	106.	.000	.005	.057	.184	.307	.392	.505	.632	.689	.759	.802	.849	.849	22.8	15.3
40+	178.	.000	.000	.034	.138	.270	.399	.486	.671	.761	.820	.871	.902	.913	23.0	13.2
FIFTH BIRTH																
15-24	0.															
25-29	32.															
30-34	78.	.000	.000	.083	.199	.277	.388	.447	.572	.621	.657	.691				
35-39	86.	.000	.000	.052	.174	.320	.395	.430	.628	.674	.715	.756	.797	.826	22.2	13.2
40+	149.	.000	.000	.060	.174	.272	.376	.520	.698	.765	.809	.859	.896	.919	22.7	12.1
SIXTH BIRTH																
15-24	0.															
25-29	7.															
30-34	50.															
35-39	64.	.000	.000	.023	.078	.125	.266	.336	.523	.609	.648	.680	.750	.766	26.0	12.6
40+	140.	.000	.018	.082	.189	.293	.414	.500	.643	.750	.771	.825	.861	.893	22.3	13.9

TABLE 3.3 (CONTINUED)

PANEL 4 : AGE > Q3

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
FIRST BIRTH																
15-24	32.															
25-29	155.	.119	.273	.512	.604	.665	.699	.747	.861	.866	.866	.887				
30-34	161.	.208	.378	.612	.697	.763	.798	.821	.858	.905	.912	.912	.952		10.2	11.7
35-39	141.	.191	.337	.573	.646	.709	.757	.805	.849	.897	.906	.906	.906	.927	10.3	12.5
40+	287.	.221	.375	.594	.692	.760	.802	.844	.878	.906	.915	.925	.931	.936	9.3	13.0
SECOND BIRTH																
15-24	11.															
25-29	134.	.000	.000	.060	.159	.250	.373	.408	.488							
30-34	154.	.000	.000	.077	.231	.367	.452	.518	.638	.702	.761	.790	.815	.826	20.0	13.1
35-39	140.	.000	.000	.081	.232	.335	.432	.521	.600	.652	.706	.743	.797	.819	21.0	15.7
40+	271.	.000	.002	.076	.220	.359	.467	.538	.637	.693	.737	.775	.833	.867	20.7	14.3
THIRD BIRTH																
15-24	0.															
25-29	73.	.000	.000	.030												
30-34	133.	.000	.000	.032	.120	.197	.286	.366	.465	.563	.597	.673	.728		24.8	17.0
35-39	123.	.000	.012	.046	.138	.240	.339	.388	.525	.573	.612	.684	.746	.787	24.1	17.8
40+	271.	.000	.004	.055	.172	.298	.391	.483	.603	.674	.708	.731	.772	.813	21.5	13.4
FOURTH BIRTH																
15-24	0.															
25-29	24.															
30-34	99.	.000	.000	.017	.072	.143	.179	.247	.404	.440						
35-39	101.	.000	.005	.056	.102	.143	.164	.227	.304	.362	.386	.431	.479	.571	25.5	19.0
40+	252.	.000	.002	.056	.135	.216	.313	.413	.520	.605	.655	.683	.720	.752	23.2	13.5
FIFTH BIRTH																
15-24	0.															
25-29	3.															
30-34	53.															
35-39	70.	.000	.000	.030	.151	.228	.252	.319	.418	.438	.505					
40+	225.	.000	.009	.043	.156	.267	.346	.417	.513	.599	.654	.681	.706	.742	22.3	15.7
SIXTH BIRTH																
15-24	0.															
25-29	0.															
30-34	20.															
35-39	56.															
40+	182.	.000	.000	.025	.084	.157	.247	.317	.481	.527	.585	.628	.683	.697	25.3	14.7

TABLE 3.4 * BIRTH FUNCTION BY DURATION SINCE PREVIOUS BIRTH (MARRIAGE FOR FIRST BIRTHS)

BY : BIRTH ORDER
AND : CALENDAR PERIOD

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
FIRST BIRTH																
< 1955	637.	.100	.262	.475	.583	.662	.724	.785	.840	.889	.911	.922	.941	.950	13.1	11.6
1955-59	483.	.109	.273	.512	.623	.696	.757	.800	.858	.889	.914	.931	.948	.957	12.5	10.3
1960-64	554.	.111	.258	.542	.645	.715	.771	.830	.884	.913	.930	.935	.949	.957	12.1	9.2
1965-69	651.	.121	.297	.525	.634	.697	.750	.800	.846	.882	.905	.922	.946	.962	12.2	11.0
1970 +	971.	.108	.275	.506	.613	.692	.743	.810	.872	.900	.913	.933	.944		12.6	10.6
SECOND BIRTH																
< 1955	548.	.000	.003	.084	.204	.344	.459	.541	.694	.769	.830	.870	.910	.931	21.7	14.1
1955-59	481.	.000	.006	.085	.270	.388	.495	.573	.692	.758	.796	.831	.880	.917	20.2	14.1
1960-64	534.	.000	.004	.108	.287	.390	.489	.579	.692	.778	.826	.842	.887	.913	20.3	14.6
1965-69	615.	.000	.005	.079	.237	.360	.464	.562	.701	.764	.798	.828	.872	.889	20.5	12.8
1970 +	1023.	.000	.004	.065	.176	.297	.395	.471	.592	.698	.769	.803	.853	.887	23.2	16.7
THIRD BIRTH																
< 1955	368.	.000	.008	.087	.213	.356	.470	.565	.735	.814	.855	.876	.917	.946	21.1	12.3
1955-59	408.	.000	.004	.069	.228	.358	.482	.587	.716	.789	.836	.859	.879	.897	20.2	11.4
1960-64	491.	.000	.010	.087	.229	.358	.492	.598	.725	.777	.815	.849	.890	.914	20.1	11.4
1965-69	546.	.000	.005	.059	.190	.314	.401	.487	.626	.696	.742	.784	.832	.855	22.0	14.5
1970 +	830.	.000	.003	.037	.119	.218	.303	.382	.520	.599	.635	.689	.743		24.0	14.9
FOURTH BIRTH																
< 1955	227.	.000	.004	.086	.227	.350	.471	.573	.751	.824	.874	.910	.927	.936	21.1	12.7
1955-59	345.	.000	.004	.078	.207	.314	.441	.557	.691	.767	.838	.881	.909	.928	22.0	14.0
1960-64	438.	.000	.008	.058	.179	.293	.396	.510	.645	.726	.787	.818	.855	.870	22.4	13.7
1965-69	477.	.000	.003	.062	.164	.278	.378	.452	.591	.655	.698	.727	.773	.801	22.1	13.5
1970 +	597.	.000	.001	.037	.123	.207	.270	.338	.467	.539	.582	.623	.689		24.8	16.9
FIFTH BIRTH																
< 1955	143.	.000	.000	.052	.231	.374	.514	.601	.752	.829	.860	.902	.923	.944	20.3	12.0
1955-59	250.	.000	.000	.086	.232	.352	.450	.546	.688	.784	.828	.872	.892	.912	21.4	14.3
1960-64	389.	.000	.008	.089	.224	.337	.432	.522	.645	.748	.788	.825	.857	.879	21.6	15.1
1965-69	382.	.000	.005	.064	.173	.283	.382	.453	.581	.660	.719	.742	.771	.793	21.9	14.4
1970 +	448.	.000	.000	.037	.138	.224	.305	.374	.488	.539	.609	.650	.717		24.5	19.5
SIXTH BIRTH																
< 1955	84.	.000	.006	.119	.238	.369	.458	.571	.798	.857	.875	.881	.929	.940	21.2	12.4
1955-59	171.	.000	.009	.108	.193	.304	.436	.523	.716	.775	.816	.857	.906	.921	22.1	12.5
1960-64	315.	.000	.005	.062	.186	.314	.429	.525	.695	.783	.803	.822	.857	.887	21.3	11.7
1965-69	331.	.000	.006	.079	.178	.279	.382	.429	.541	.609	.681	.714	.757	.776	22.4	17.2
1970 +	364.	.000	.003	.041	.119	.177	.261	.331	.431	.526	.589	.629	.698		25.8	18.0

TABLE 3.5 * BIRTH FUNCTION BY DURATION SINCE PREVIOUS BIRTH (MARRIAGE FOR FIRST BIRTHS)
BY : BIRTH ORDER
AND : CALENDAR PERIOD
CONTROLLING : AGE AT START OF INTERVAL *

PANEL 1 : AGE < 01

	N OF CASES	DURATION IN MONTHS													SUMMARIES	
		1	9	12	15	18	21	24	30	36	42	48	60	72	TRIMEAN	SPREAD
FIRST BIRTH																
< 1955	258.	.081	.202	.376	.477	.548	.626	.703	.767	.831	.862	.878	.905	.919	15.2	13.3
1955-59	138.	.036	.149	.391	.500	.572	.649	.717	.786	.819	.855	.880	.928	.938	15.1	12.8
1960-64	183.	.033	.161	.391	.511	.587	.658	.727	.801	.842	.874	.891	.913	.929	14.8	12.4
1965-69	185.	.097	.241	.435	.559	.616	.689	.762	.805	.846	.876	.900	.946	.968	14.0	12.8
1970 +	206.	.044	.193	.391	.519	.626	.679	.756	.839	.879	.900	.936				
SECOND BIRTH																
< 1955	219.	.000	.002	.084	.203	.324	.454	.546	.726	.811	.858	.881	.920	.936	21.7	13.1
1955-59	121.	.000	.004	.095	.273	.364	.463	.558	.711	.769	.814	.835	.872	.917	20.6	14.4
1960-64	159.	.000	.006	.101	.292	.396	.491	.575	.711	.814	.868	.890	.928	.950	21.0	15.2
1965-69	170.	.000	.012	.059	.194	.341	.450	.553	.706	.771	.791	.829	.894	.912	21.6	13.4
1970 +	231.	.000	.005	.074	.210	.356	.445	.518	.664	.731	.801	.818	.882		21.7	14.6
THIRD BIRTH																
< 1955	169.	.000	.009	.118	.266	.388	.476	.562	.746	.825	.858	.888	.920	.947	20.5	12.7
1955-59	127.	.000	.004	.067	.291	.429	.539	.650	.756	.839	.882	.894	.913	.913	19.2	11.2
1960-64	132.	.000	.015	.098	.258	.443	.595	.705	.814	.871	.902	.947				
1965-69	168.	.000	.009	.086	.202	.321	.432	.527	.702	.801	.866	.908	.935	.958	22.2	14.2
1970 +	225.	.000	.003	.051	.145	.300	.402	.474	.605	.683	.739	.803				
FOURTH BIRTH																
< 1955	123.	.000	.008	.134	.264	.374	.520	.630	.756	.821	.894	.931	.939	.951	20.3	12.4
1955-59	121.	.000	.004	.120	.281	.388	.496	.603	.740	.781	.868	.917	.942	.959	20.5	13.7
1960-64	135.	.000	.015	.093	.244	.359	.452	.556	.704	.796	.844	.859	.896	.911	21.3	14.2
1965-69	157.	.000	.000	.038	.175	.299	.439	.529	.697	.764	.818	.844	.898	.911	22.1	13.0
1970 +	168.	.000	.000	.024	.146	.252	.320	.420	.587	.675	.706	.750				
FIFTH BIRTH																
< 1955	82.	.000	.000	.067	.250	.409	.555	.628	.750	.835	.884	.927	.939		20.0	12.7
1955-59	69.	.000	.000	.145	.333	.457	.507	.572	.703	.804	.862	.899	.913	.928	19.7	15.8
1960-64	93.	.000	.022	.134	.231	.398	.532	.629	.710	.806	.849	.882	.914	.935	20.4	13.2
1965-69	92.	.000	.000	.087	.174	.223	.293	.364	.489	.620	.707	.739	.783	.799	25.8	19.0
1970 +	105.	.000	.000	.027	.134	.239	.324	.426	.563	.600	.677	.693				
SIXTH BIRTH																
< 1955	60.	.000	.008	.150	.300	.442	.517	.567	.800	.858	.867	.867	.917		20.0	13.9
1955-59	60.	.000	.008	.175	.283	.408	.550	.608	.775	.817	.833	.858	.917		19.2	13.8
1960-64	96.	.000	.000	.083	.229	.417	.531	.589	.740	.813	.823	.823	.844	.854	19.0	10.4
1965-69	72.	.000	.014	.146	.299	.528	.632	.674	.722	.778	.813	.819	.847	.875	16.7	8.1
1970 +	99.	.000	.000	.073	.189	.233	.335	.418	.517	.625	.678					

TABLE 3.5 (CONTINUED)

PANEL 2 : AGE Q1-Q2

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
FIRST BIRTH																
< 1955	153.	.072	.242	.464	.575	.693	.758	.824	.889	.922	.928	.928	.948	.954	13.0	9.7
1955-59	103.	.083	.296	.544	.612	.699	.762	.786	.850	.879	.913	.922	.942		12.0	10.3
1960-64	114.	.114	.272	.627	.719	.803	.825	.890	.934	.969						
1965-69	128.	.082	.285	.488	.648	.699	.758	.813	.887	.914	.941	.961				
1970 +	210.	.048	.249	.506	.630	.719	.774	.845	.889	.930	.943					
SECOND BIRTH																
< 1955	143.	.000	.004	.063	.175	.325	.451	.528	.685	.762	.843	.895	.916	.944	22.1	14.1
1955-59	108.	.000	.009	.125	.343	.449	.556	.648	.736	.806	.838	.870	.917	.944	18.9	12.9
1960-64	112.	.000	.000	.107	.259	.353	.478	.580	.688	.786	.848	.848	.902	.920	21.0	15.1
1965-69	143.	.000	.000	.063	.227	.343	.465	.584	.731	.815	.853	.881	.909	.913	20.9	12.0
1970 +	259.	.000	.004	.078	.186	.299	.388	.465	.569	.725	.801	.837				
THIRD BIRTH																
< 1955	81.	.000	.012	.049	.160	.340	.488	.617	.772	.883	.914	.932				
1955-59	86.	.000	.006	.047	.250	.395	.512	.616	.756	.831	.860	.872	.884	.895	19.3	10.7
1960-64	102.	.000	.005	.088	.221	.373	.500	.608	.750	.784	.868	.897	.931	.951	20.6	12.0
1965-69	119.	.000	.004	.050	.193	.345	.429	.546	.672	.731	.769	.790	.832	.870	20.7	11.4
1970 +	174.	.000	.000	.007	.110	.240	.327	.393	.556	.601	.650	.712				
FOURTH BIRTH																
< 1955	57.	.000	.000	.035	.219	.377	.482	.553	.807	.912						
1955-59	67.	.000	.015	.060	.179	.328	.455	.604	.694	.746	.791	.836	.851	.866	20.4	10.2
1960-64	91.	.000	.000	.049	.203	.302	.407	.555	.692	.753	.824	.863	.907	.934	22.3	13.8
1965-69	86.	.000	.017	.105	.192	.314	.407	.483	.599	.733	.767	.802	.820	.849	22.1	15.3
1970 +	127.	.000	.000	.075	.157	.257	.328	.378	.537	.616	.691					
FIFTH BIRTH																
< 1955	51.	.000	.000	.039	.245	.373	.471	.578	.784	.863	.873	.902				
1955-59	78.	.000	.000	.077	.192	.314	.455	.519	.654	.763	.801	.859	.885	.923	22.1	15.6
1960-64	108.	.000	.000	.088	.264	.338	.421	.509	.630	.773	.801	.843	.861	.870	21.9	16.7
1965-69	112.	.000	.009	.076	.179	.313	.469	.558	.674	.759	.813	.817	.830	.844	20.5	10.5
1970 +	127.	.000	.000	.040	.185	.286	.405	.488	.597	.674	.742	.780				
SIXTH BIRTH																
< 1955	24.															
1955-59	55.	.000	.000	.055	.145	.264	.364	.482	.745	.791	.882	.909				
1960-64	75.	.000	.007	.060	.187	.293	.407	.547	.700	.787	.800	.813	.853	.913	21.4	10.2
1965-69	101.	.000	.005	.089	.203	.282	.411	.446	.549	.639	.752	.792	.822	.842	23.1	20.3
1970 +	105.	.000	.011	.054	.133	.187	.256	.362	.503	.651	.718					

TABLE 3.5 (CONTINUED)

PANEL 3 : AGE Q2-Q3

	N OF CASES	1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
FIRST BIRTH																
< 1955	151.	.136	.344	.606	.732	.768	.808	.844	.891	.927	.954	.960	.967		10.7	7.8
1955-59	121.	.136	.302	.525	.690	.777	.818	.860	.905	.946	.971					
1960-64	123.	.094	.276	.598	.687	.728	.821	.886	.939	.955	.959	.959				
1965-69	165.	.106	.306	.606	.691	.767	.806	.839	.879	.900	.924	.952	.958	.964	11.3	8.0
1970 +	282.	.129	.317	.559	.661	.737	.805	.879	.912	.931	.949	.962	.962		11.7	9.3
SECOND BIRTH																
< 1955	133.	.000	.000	.086	.226	.406	.485	.549	.684	.744	.816	.857	.902	.925	20.9	14.7
1955-59	127.	.000	.012	.063	.260	.366	.465	.528	.661	.732	.776	.827	.890	.921	21.4	16.1
1960-64	138.	.000	.007	.141	.337	.446	.536	.616	.721	.797	.822	.841	.891	.924	19.0	13.9
1965-69	141.	.000	.007	.110	.262	.348	.468	.585	.709	.780	.809	.837	.876	.908	20.2	13.0
1970 +	288.	.000	.006	.055	.168	.286	.380	.474	.631	.758	.816	.846	.871		23.1	15.2
THIRD BIRTH																
< 1955	97.	.000	.005	.082	.165	.294	.443	.536	.706	.753	.809	.814	.866	.918	21.5	11.7
1955-59	107.	.000	.005	.089	.182	.271	.439	.551	.701	.776	.827	.869	.897	.916	22.1	12.0
1960-64	115.	.000	.013	.087	.239	.343	.465	.561	.722	.770	.787	.843	.896	.922	20.9	13.4
1965-69	124.	.000	.004	.060	.234	.327	.399	.492	.621	.653	.706	.734	.810	.823	21.3	15.0
1970 +	218.	.000	.003	.054	.122	.190	.269	.358	.484	.574	.585	.612				
FOURTH BIRTH																
< 1955	44.															
1955-59	95.	.000	.000	.053	.163	.268	.432	.500	.689	.789	.863	.916	.942		23.2	13.6
1960-64	101.	.000	.005	.035	.168	.317	.411	.520	.639	.708	.777	.812	.842	.842	22.0	13.6
1965-69	109.	.000	.000	.050	.142	.307	.413	.486	.651	.688	.743	.780	.839	.844	22.2	12.7
1970 +	128.	.000	.004	.032	.114	.182	.274	.325	.392	.461	.509					
FIFTH BIRTH																
< 1955	10.															
1955-59	72.	.000	.000	.063	.194	.306	.389	.542	.736	.819	.861	.903	.931		22.4	12.2
1960-64	88.	.000	.000	.068	.193	.295	.375	.483	.665	.727	.778	.830	.886	.898	22.7	13.8
1965-69	82.	.000	.000	.055	.201	.341	.439	.476	.652	.683	.713	.744	.768	.817	20.0	12.0
1970 +	93.	.000	.000	.064	.125	.190	.294	.362	.489	.549	.598					
SIXTH BIRTH																
< 1955	0.															
1955-59	49.															
1960-64	81.	.000	.012	.062	.191	.315	.432	.525	.660	.765	.790	.833	.877	.926	22.1	13.7
1965-69	66.	.000	.008	.053	.129	.152	.265	.326	.500	.621	.659	.689	.750	.773	26.1	13.1
1970 +	65.	.000	.000	.019	.085	.133	.202									

TABLE 3.5 (CONTINUED)

PANEL 4 : AGE > Q3

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
FIRST BIRTH																
< 1955	75.	.147	.347	.573	.667	.780	.820	.867	.887							
1955-59	121.	.186	.368	.612	.707	.752	.814	.847	.901	.921	.926	.934	.934	.938	10.1	9.7
1960-64	134.	.231	.362	.623	.728	.802	.832	.869	.903	.925	.933	.933	.940	.948	9.0	12.4
1965-69	173.	.188	.358	.572	.650	.717	.757	.792	.827	.879	.890	.890	.913	.942	10.5	12.7
1970 +	273.	.181	.312	.539	.621	.673	.707	.756	.843	.859	.859	.874	.892		11.2	11.6
SECOND BIRTH																
< 1955	53.	.000	.009	.132	.236	.321	.434	.538	.613	.679	.717	.792	.868	.887	22.5	19.0
1955-59	125.	.000	.000	.064	.216	.380	.504	.568	.668	.732	.764	.796	.848	.888	20.2	12.8
1960-64	125.	.000	.000	.080	.248	.352	.444	.540	.640	.704	.756	.776	.816	.848	20.3	13.7
1965-69	161.	.000	.000	.087	.270	.407	.475	.531	.661	.699	.748	.770	.811	.826	19.2	12.9
1970 +	245.	.000	.000	.052	.138	.246	.370	.423	.486	.557	.636	.695	.748		23.9	20.1
THIRD BIRTH																
< 1955	22.															
1955-59	88.	.000	.000	.068	.170	.324	.420	.511	.636	.693	.756	.784	.801	.852	21.1	13.2
1960-64	142.	.000	.007	.074	.201	.282	.412	.521	.627	.690	.718	.729	.775	.817	20.5	11.8
1965-69	135.	.000	.004	.030	.130	.267	.341	.381	.496	.574	.596	.670	.726	.744	23.8	18.1
1970 +	213.	.000	.005	.031	.096	.144	.219	.304	.437	.535	.562	.614				
FOURTH BIRTH																
< 1955	3.															
1955-59	62.	.000	.000	.056	.161	.226	.331	.500	.597	.726	.790	.806	.855	.887	23.6	13.4
1960-64	111.	.000	.009	.045	.090	.185	.306	.410	.541	.635	.694	.739	.775	.793	23.9	13.6
1965-69	125.	.000	.000	.072	.148	.200	.252	.304	.400	.436	.460	.484	.524	.592	21.8	15.4
1970 +	174.	.000	.000	.027	.083	.145	.174	.235	.343	.397	.424	.487				
FIFTH BIRTH																
< 1955	0.															
1955-59	31.															
1960-64	100.	.000	.010	.065	.200	.315	.400	.470	.585	.685	.725	.750	.775	.820	21.4	14.9
1965-69	96.	.000	.010	.036	.141	.255	.318	.396	.500	.563	.625	.656	.693	.708	23.2	16.6
1970 +	123.	.000	.000	.020	.098	.165	.177	.196	.283	.316						
SIXTH BIRTH																
< 1955	0.															
1955-59	7.															
1960-64	64.	.000	.000	.031	.109	.180	.289	.398	.656	.742	.797	.820	.859	.859	24.5	10.6
1965-69	92.	.000	.000	.033	.092	.174	.239	.293	.418	.435	.516	.565	.620	.630	25.9	20.4
1970 +	95.	.000	.000	.000	.036	.124	.215	.246	.312	.357						

TABLE 4.1 * BIRTH FUNCTION BY DURATION SINCE PREVIOUS BIRTH (MARRIAGE FOR FIRST BIRTHS)

BY : BIRTH ORDER
AND : CHILDHOOD RESIDENCE

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
FIRST BIRTH																
RURAL	1419.	.140	.291	.505	.610	.678	.738	.803	.854	.891	.914	.930	.947	.959	12.6	11.8
TOWN	987.	.094	.266	.518	.630	.702	.755	.806	.861	.894	.908	.919	.941	.950	12.4	9.6
CITY	880.	.080	.253	.511	.618	.702	.756	.807	.867	.903	.922	.934	.950	.959	12.6	9.8
SECOND BIRTH																
RURAL	1429.	.000	.005	.078	.226	.352	.467	.549	.682	.760	.812	.840	.891	.916	21.2	14.3
TOWN	942.	.000	.006	.092	.238	.365	.468	.559	.682	.761	.808	.838	.886	.912	21.1	14.6
CITY	824.	.000	.002	.075	.221	.326	.413	.495	.632	.719	.771	.810	.846	.875	22.0	15.3
THIRD BIRTH																
RURAL	1229.	.000	.004	.064	.198	.329	.446	.547	.689	.760	.804	.846	.882	.910	21.3	12.2
TOWN	786.	.000	.009	.068	.180	.287	.394	.481	.641	.720	.760	.798	.843	.872	22.2	13.7
CITY	623.	.000	.004	.058	.177	.307	.392	.481	.598	.662	.708	.734	.791	.830	21.9	14.4
FOURTH BIRTH																
RURAL	990.	.000	.005	.066	.189	.301	.406	.512	.657	.735	.794	.833	.868	.892	22.3	14.0
TOWN	626.	.000	.002	.059	.159	.284	.377	.464	.625	.700	.742	.781	.814	.831	22.5	13.1
CITY	465.	.000	.006	.051	.151	.224	.322	.397	.505	.572	.636	.665	.731	.759	24.1	17.5
FIFTH BIRTH																
RURAL	819.	.000	.003	.071	.201	.311	.420	.496	.649	.739	.802	.834	.860	.897	22.0	14.5
TOWN	477.	.000	.003	.067	.200	.322	.415	.510	.633	.727	.761	.792	.823	.845	21.5	14.0
CITY	314.	.000	.003	.051	.159	.253	.330	.406	.485	.540	.590	.649	.706	.722	23.3	17.7
SIXTH BIRTH																
RURAL	662.	.000	.006	.069	.169	.278	.391	.476	.632	.711	.771	.807	.864	.886	23.0	14.9
TOWN	379.	.000	.003	.069	.179	.264	.367	.438	.586	.677	.713	.748	.794	.817	22.5	14.7
CITY	222.	.000	.005	.079	.162	.266	.349	.411	.534	.587	.626	.635	.658	.696	20.9	12.8

TABLE 4.2 * BIRTH FUNCTION BY DURATION SINCE PREVIOUS BIRTH (MARRIAGE FOR FIRST BIRTHS)

BY : BIRTH ORDER
AND : EDUCATIONAL LEVEL

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
FIRST BIRTH																
NO EDUCATION	536.	.166	.335	.503	.594	.648	.699	.756	.812	.861	.893	.912	.940	.955	12.4	15.7
< 5 YEARS	1560.	.124	.285	.532	.633	.700	.754	.815	.867	.898	.915	.928	.945	.954	12.2	10.2
5+ YEARS	1195.	.066	.233	.489	.614	.702	.765	.816	.873	.909	.925	.937	.951	.960	12.8	9.4
SECOND BIRTH																
NO EDUCATION	543.	.000	.007	.076	.220	.330	.435	.525	.652	.743	.803	.839	.892	.919	22.2	15.9
< 5 YEARS	1558.	.000	.004	.075	.225	.357	.466	.554	.689	.770	.819	.848	.894	.918	21.2	14.0
5+ YEARS	1096.	.000	.003	.096	.238	.348	.446	.523	.649	.723	.770	.801	.845	.873	20.9	14.8
THIRD BIRTH																
NO EDUCATION	491.	.000	.006	.066	.185	.340	.450	.545	.682	.780	.823	.859	.896	.916	21.8	13.6
< 5 YEARS	1323.	.000	.006	.075	.212	.330	.439	.533	.687	.757	.799	.836	.868	.898	21.2	12.8
5+ YEARS	826.	.000	.005	.044	.149	.261	.363	.457	.579	.634	.677	.716	.783	.821	22.6	14.2
FOURTH BIRTH																
NO EDUCATION	426.	.000	.004	.080	.188	.287	.365	.478	.642	.732	.795	.839	.869	.886	23.0	14.5
< 5 YEARS	1071.	.000	.002	.059	.178	.301	.414	.514	.657	.717	.772	.809	.849	.870	21.9	13.0
5+ YEARS	585.	.000	.007	.048	.146	.232	.325	.393	.512	.600	.651	.680	.732	.765	23.7	15.9
FIFTH BIRTH																
NO EDUCATION	359.	.000	.003	.070	.204	.327	.433	.503	.659	.754	.826	.850	.884	.907	22.1	14.8
< 5 YEARS	850.	.000	.002	.066	.192	.307	.404	.495	.638	.724	.772	.820	.846	.880	22.1	14.4
5+ YEARS	402.	.000	.005	.062	.182	.270	.363	.436	.517	.588	.626	.654	.704	.727	21.7	15.8
SIXTH BIRTH																
NO EDUCATION	310.	.000	.007	.081	.181	.297	.403	.470	.625	.709	.772	.816	.874	.892	23.4	17.0
< 5 YEARS	670.	.000	.005	.075	.184	.286	.403	.489	.637	.713	.759	.790	.833	.860	22.0	13.7
5+ YEARS	285.	.000	.004	.051	.127	.211	.286	.352	.491	.567	.609	.622	.671	.700	23.3	14.4

TABLE 4.3 * BIRTH FUNCTION BY DURATION SINCE PREVIOUS BIRTH (MARRIAGE FOR FIRST BIRTHS)

BY : BIRTH ORDER
AND : EDUCATIONAL LEVEL
CONTROLLING : AGE AT START OF INTERVAL *

PANEL 1 : AGE < Q1

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
FIRST BIRTH																
NO EDUCATION	222.	.095	.228	.386	.467	.526	.579	.652	.707	.776	.820	.848	.902	.930	15.7	16.8
< 5 YEARS	492.	.070	.208	.424	.523	.592	.659	.733	.805	.847	.871	.893	.920	.933	14.3	12.8
5+ YEARS	256.	.014	.128	.347	.528	.635	.729	.800	.865	.897	.926	.942	.968	.973	15.0	10.4
SECOND BIRTH																
NO EDUCATION	204.	.000	.010	.070	.208	.306	.416	.535	.694	.805	.846	.874	.922	.948	22.5	14.3
< 5 YEARS	456.	.000	.004	.073	.242	.382	.487	.576	.725	.791	.833	.860	.911	.934	20.7	13.2
5+ YEARS	240.	.000	.004	.108	.221	.337	.442	.506	.673	.740	.804	.820	.861	.887	21.3	14.5
THIRD BIRTH																
NO EDUCATION	186.	.000	.008	.085	.224	.373	.495	.592	.719	.810	.852	.906	.926	.952	20.8	12.3
< 5 YEARS	434.	.000	.006	.089	.227	.364	.473	.572	.751	.834	.879	.908	.938	.953	21.0	11.9
5+ YEARS	201.	.000	.011	.072	.230	.377	.485	.565	.660	.727	.783	.826	.874	.902	20.7	14.8
FOURTH BIRTH																
NO EDUCATION	164.	.000	.006	.101	.231	.346	.442	.587	.729	.810	.872	.892	.940	.957	21.7	13.5
< 5 YEARS	384.	.000	.003	.074	.221	.338	.464	.565	.726	.780	.847	.882	.903	.926	21.2	13.1
5+ YEARS	156.	.000	.010	.062	.196	.299	.395	.455	.594	.693	.745	.793	.860	.868	23.7	17.2
FIFTH BIRTH																
NO EDUCATION	117.	.000	.004	.078	.204	.344	.476	.564	.701	.823	.909	.927	.936	.945	21.8	14.5
< 5 YEARS	234.	.000	.004	.089	.207	.330	.407	.503	.635	.723	.791	.836	.880	.916	22.5	16.3
5+ YEARS	90.	.000	.006	.107	.265	.350	.464	.504	.567	.636	.659	.684	.720	.734	19.4	14.5
SIXTH BIRTH																
NO EDUCATION	113.	.000	.009	.150	.279	.425	.497	.537	.675	.788	.828	.838	.875	.898	20.0	15.4
< 5 YEARS	203.	.000	.005	.122	.269	.415	.557	.630	.766	.815	.833	.844	.896	.917	19.2	11.1
5+ YEARS	71.	.000	.000	.049	.162	.300	.373	.424	.581	.641	.656	.656	.718	.753	21.1	12.8

TABLE 4.3 (CONTINUED)

PANEL 2 : AGE Q1-Q2

	N OF CASES	1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
						DURATION IN MONTHS										
FIRST BIRTH																
NO EDUCATION	103.	.136	.307	.509	.612	.695	.735	.794	.872	.902	.921	.931	.951		12.8	12.1
< 5 YEARS	372.	.065	.265	.540	.640	.716	.769	.838	.896	.929	.946	.953	.965	.968	12.4	9.6
5+ YEARS	231.	.065	.247	.494	.636	.740	.802	.843	.893	.928	.948	.955				
SECOND BIRTH																
NO EDUCATION	127.	.000	.012	.095	.198	.342	.427	.513	.617	.709	.785	.823	.892	.937	23.0	17.1
< 5 YEARS	410.	.000	.001	.061	.205	.327	.458	.547	.677	.786	.847	.878	.915	.932	22.0	15.0
5+ YEARS	227.	.000	.002	.118	.282	.373	.466	.572	.696	.784	.835	.864	.891	.899	20.8	14.6
THIRD BIRTH																
NO EDUCATION	98.	.000	.005	.060	.170	.368	.489	.577	.678	.818	.869	.876	.907	.907	21.5	14.2
< 5 YEARS	297.	.000	.002	.040	.207	.345	.453	.564	.719	.767	.813	.849	.879	.910	20.8	11.6
5+ YEARS	167.	.000	.010	.045	.139	.282	.385	.490	.646	.693	.746	.772	.818	.848	21.9	11.5
FOURTH BIRTH																
NO EDUCATION	75.	.000	.007	.085	.197	.310	.368	.483	.705	.792	.878	.928				
< 5 YEARS	226.	.000	.002	.064	.190	.323	.440	.535	.684	.772	.813	.839	.877	.901	21.6	13.1
5+ YEARS	127.	.000	.013	.064	.176	.280	.371	.470	.567	.656	.707	.744	.777	.809	22.4	15.0
FIFTH BIRTH																
NO EDUCATION	96.	.000	.000	.032	.158	.289	.424	.468	.637	.739	.793	.828	.897	.910	23.5	15.4
< 5 YEARS	260.	.000	.000	.081	.239	.355	.481	.575	.705	.802	.852	.889	.894	.915	20.7	13.3
5+ YEARS	120.	.000	.009	.061	.189	.263	.364	.466	.569	.688	.703	.727	.763	.779	22.1	15.1
SIXTH BIRTH																
NO EDUCATION	77.	.000	.000	.028	.168	.284	.393	.488	.620	.704	.833	.878	.911		24.6	18.6
< 5 YEARS	207.	.000	.007	.080	.168	.239	.360	.486	.649	.742	.795	.823	.863	.882	23.3	12.6
5+ YEARS	76.	.000	.007	.061	.150	.253	.315	.379	.553	.648	.722	.722	.754	.828	23.6	14.4

TABLE 4.3 (CONTINUED)

PANEL 3 : AGE Q2-Q3

	N OF CASES	1	9	12	15	18	21	24	30	36	42	48	60	72	TRIMEAN	SPREAD
						DURATION IN MONTHS									SUMMARIES	
FIRST BIRTH																
NO EDUCATION	103.	.218	.466	.600	.706	.721	.783	.840	.892	.923						
< 5 YEARS	365.	.134	.308	.591	.718	.783	.836	.888	.916	.932	.950	.959	.972	.978	11.2	7.5
5+ YEARS	373.	.083	.273	.559	.655	.733	.790	.839	.895	.929	.944	.957	.957	.961	11.9	8.6
SECOND BIRTH																
NO EDUCATION	102.	.000	.005	.045	.242	.374	.471	.523	.659	.722	.777	.837	.886	.904	21.3	16.4
< 5 YEARS	385.	.000	.008	.095	.231	.358	.455	.545	.694	.777	.826	.858	.898	.930	21.4	14.1
5+ YEARS	338.	.000	.005	.092	.253	.360	.457	.549	.664	.751	.788	.815	.866	.901	20.7	14.7
THIRD BIRTH																
NO EDUCATION	106.	.000	.005	.070	.173	.332	.446	.529	.669	.726	.777	.788	.865	.908	21.5	12.9
< 5 YEARS	317.	.000	.010	.094	.225	.304	.421	.520	.658	.723	.769	.811	.853	.885	21.5	14.6
5+ YEARS	237.	.000	.000	.036	.125	.209	.318	.418	.582	.634	.661	.701	.774	.807	23.4	12.4
FOURTH BIRTH																
NO EDUCATION	87.	.000	.000	.062	.187	.318	.388	.464	.614	.729	.776	.864	.895	.895	23.6	17.1
< 5 YEARS	249.	.000	.002	.037	.147	.295	.423	.518	.658	.713	.777	.825	.872	.886	22.4	13.1
5+ YEARS	140.	.000	.004	.033	.115	.191	.295	.357	.525	.587	.649	.649	.707	.719	23.9	13.1
FIFTH BIRTH																
NO EDUCATION	70.	.000	.000	.087	.261	.391	.464	.551	.768	.798	.845	.860	.884		20.2	12.9
< 5 YEARS	182.	.000	.000	.050	.154	.257	.361	.460	.664	.736	.776	.830	.853	.886	23.1	11.8
5+ YEARS	92.	.000	.000	.062	.147	.240	.345	.426	.498	.547	.591	.650	.734	.778	24.4	22.5
SIXTH BIRTH																
NO EDUCATION	60.	.000	.017	.078	.139	.227	.359	.421	.647	.710	.728	.837	.891	.909	24.6	13.6
< 5 YEARS	136.	.000	.008	.038	.142	.227	.328	.411	.563	.677	.730	.765	.824	.878	24.3	14.5
5+ YEARS	65.	.000	.008	.073	.147	.188	.303	.364	.426	.528	.547	.596	.646	.646	23.2	16.4

TABLE 4.3 (CONTINUED)

PANEL 4 : AGE > Q3

	N OF CASES	1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
FIRST BIRTH																
NO EDUCATION	108.	.292	.455	.643	.732	.784	.831	.854	.897	.939	.944	.944	.953	.958	7.5	17.1
< 5 YEARS	331.	.258	.395	.619	.697	.756	.792	.833	.876	.901	.909	.915	.926	.941	8.1	16.8
5+ YEARS	335.	.088	.259	.518	.617	.694	.736	.781	.841	.881	.885	.896	.916	.934	12.1	9.2
SECOND BIRTH																
NO EDUCATION	110.	.000	.000	.094	.248	.320	.448	.524	.605	.681	.767	.792	.838	.858	21.7	18.5
< 5 YEARS	307.	.000	.002	.069	.216	.358	.456	.541	.644	.704	.752	.777	.832	.858	20.8	13.9
5+ YEARS	291.	.000	.000	.072	.202	.325	.420	.470	.572	.625	.664	.718	.769	.806	21.2	15.9
THIRD BIRTH																
NO EDUCATION	101.	.000	.005	.035	.143	.263	.336	.446	.634	.746	.775	.828	.858	.858	23.4	13.8
< 5 YEARS	275.	.000	.006	.066	.179	.290	.390	.451	.581	.658	.687	.733	.760	.813	21.4	14.2
5+ YEARS	221.	.000	.002	.025	.108	.194	.283	.374	.444	.494	.535	.576	.671	.730	24.9	20.3
FOURTH BIRTH																
NO EDUCATION	100.	.000	.000	.057	.109	.146	.218	.301	.470	.555	.613	.655	.668	.709	25.1	11.9
< 5 YEARS	212.	.000	.002	.052	.126	.220	.284	.391	.498	.546	.582	.626	.691	.713	23.3	14.0
5+ YEARS	162.	.000	.003	.034	.099	.159	.240	.296	.366	.464	.502	.524	.563	.654	24.5	16.4
FIFTH BIRTH																
NO EDUCATION	76.	.000	.007	.093	.208	.288	.346	.405	.508	.610	.706	.727	.769	.792	23.2	18.3
< 5 YEARS	174.	.000	.006	.027	.137	.253	.324	.394	.506	.588	.617	.679	.710	.767	23.5	17.2
5+ YEARS	100.	.000	.005	.022	.127	.229	.280	.339	.418	.449	.532	.532	.579	.596	22.8	16.3
SIXTH BIRTH																
NO EDUCATION	60.	.000	.000	.017	.052	.132	.275	.364	.512	.559	.632	.665				
< 5 YEARS	124.	.000	.000	.023	.109	.211	.295	.337	.475	.523	.595	.662	.685	.709	24.8	17.3
5+ YEARS	73.	.000	.000	.023	.045	.092	.146	.232	.385	.435	.494	.503	.552		25.8	11.2

TABLE 4.4 * BIRTH FUNCTION BY DURATION SINCE PREVIOUS BIRTH (MARRIAGE FOR FIRST BIRTHS)
BY : BIRTH ORDER
AND : CALENDAR PERIOD
CONTROLLING : EDUCATIONAL LEVEL

PANEL 1 : NO EDUCATION

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
FIRST BIRTH																
< 1955	180.	.175	.347	.483	.569	.622	.683	.747	.794	.856	.892	.906	.933	.944	12.4	16.9
1955-59	99.	.157	.343	.485	.530	.586	.641	.682	.758	.813	.869	.899	.929	.944	12.9	20.1
1960-64	92.	.163	.299	.505	.592	.674	.712	.772	.821	.886	.902	.908	.924	.935	11.7	13.8
1965-69	78.	.218	.385	.513	.622	.647	.705	.724	.782	.821	.846	.885	.936		11.6	17.6
1970 +	87.	.115	.293	.560	.707	.761	.787	.887								
SECOND BIRTH																
< 1955	155.	.000	.000	.071	.174	.303	.432	.510	.658	.761	.813	.865	.900	.942	22.6	14.7
1955-59	100.	.000	.010	.095	.235	.335	.445	.525	.645	.750	.790	.825	.890	.920	22.1	16.9
1960-64	101.	.000	.005	.089	.252	.332	.446	.540	.649	.738	.807	.827	.881	.901	21.7	17.3
1965-69	81.	.000	.012	.043	.204	.321	.395	.481	.617	.710	.784	.802	.870	.877	23.3	16.5
1970 +	106.	.000	.015	.078	.259	.378	.452	.579	.687	.731						
THIRD BIRTH																
< 1955	116.	.000	.009	.069	.159	.315	.418	.513	.711	.828	.858	.897	.927		22.9	12.8
1955-59	90.	.000	.000	.050	.183	.361	.461	.550	.667	.767	.833	.867	.889	.889	21.4	13.9
1960-64	92.	.000	.011	.114	.245	.402	.505	.598	.723	.804	.870	.897	.935	.946	20.1	12.8
1965-69	83.	.000	.012	.054	.181	.301	.428	.524	.639	.735	.765	.807	.855	.867	22.0	14.4
1970 +	110.	.000	.000	.042	.162	.322	.444	.546	.653	.735						
FOURTH BIRTH																
< 1955	82.	.000	.000	.085	.220	.396	.506	.628	.768	.829	.884	.933				
1955-59	79.	.000	.000	.101	.228	.297	.392	.513	.677	.772	.848	.886	.899	.937	22.3	14.9
1960-64	93.	.000	.011	.081	.156	.247	.306	.409	.570	.694	.774	.817	.849	.849	24.9	16.2
1965-69	84.	.000	.006	.083	.208	.286	.375	.488	.637	.702	.756	.804	.845	.857	22.2	14.6
1970 +	88.	.000	.000	.044	.119	.196	.222	.321	.546							
FIFTH BIRTH																
< 1955	52.	.000	.000	.058	.212	.356	.490	.529	.731	.827	.865	.885	.904		20.5	13.1
1955-59	61.	.000	.000	.066	.164	.303	.385	.492	.680	.787	.836	.869	.902	.918	22.7	13.6
1960-64	92.	.000	.005	.120	.304	.424	.565	.630	.761	.853	.875	.891	.940	.946	20.0	14.4
1965-69	79.	.000	.006	.070	.177	.304	.367	.443	.570	.684	.810	.842	.861	.873	24.4	18.7
1970 +	75.	.000	.000	.015	.125	.219	.325	.384	.537							
SIXTH BIRTH																
< 1955	33.															
1955-59	47.															
1960-64	80.	.000	.006	.075	.181	.331	.444	.519	.663	.737	.775	.813	.875	.900	21.6	13.3
1965-69	74.	.000	.007	.068	.243	.399	.480	.520	.649	.730	.797	.858	.905	.919	21.8	18.5
1970 +	76.	.000	.000	.081	.134	.166	.276	.371	.459							

TABLE 4.4 (CONTINUED)

PANEL 2 : < 5 YEARS

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
FIRST BIRTH																
< 1955	299.	.100	.259	.482	.580	.667	.722	.779	.836	.883	.903	.913	.935	.940	13.0	11.1
1955-59	230.	.122	.257	.528	.650	.720	.776	.822	.885	.911	.930	.939	.957	.963	12.4	9.2
1960-64	280.	.134	.282	.568	.668	.727	.773	.836	.880	.907	.925	.934	.950	.957	11.7	8.9
1965-69	349.	.122	.309	.539	.628	.685	.745	.808	.854	.883	.904	.921	.943	.957	12.1	11.8
1970 +	402.	.137	.302	.542	.644	.710	.761	.835	.887	.910	.917	.934	.934		11.8	9.5
SECOND BIRTH																
< 1955	258.	.000	.004	.087	.207	.343	.459	.545	.703	.762	.841	.876	.915	.930	21.7	13.8
1955-59	238.	.000	.006	.067	.248	.384	.487	.563	.685	.737	.769	.819	.863	.908	20.2	13.4
1960-64	273.	.000	.005	.099	.271	.368	.469	.566	.696	.788	.841	.853	.897	.923	21.0	14.9
1965-69	306.	.000	.005	.083	.263	.410	.523	.629	.766	.824	.843	.869	.913	.925	19.7	11.7
1970 +	482.	.000	.001	.049	.162	.302	.409	.486	.611	.744	.807	.827	.880		23.1	16.1
THIRD BIRTH																
< 1955	166.	.000	.006	.111	.256	.373	.485	.566	.747	.822	.873	.895	.934	.952	20.8	13.2
1955-59	194.	.000	.005	.080	.255	.369	.536	.655	.781	.835	.866	.884	.892	.923	19.4	10.1
1960-64	262.	.000	.008	.086	.248	.378	.492	.599	.723	.769	.802	.836	.874	.905	19.9	11.6
1965-69	285.	.000	.005	.074	.205	.330	.407	.495	.663	.740	.793	.835	.865	.889	22.0	14.1
1970 +	416.	.000	.005	.048	.147	.251	.344	.419	.583	.674	.709	.772	.812		23.6	14.5
FOURTH BIRTH																
< 1955	96.	.000	.000	.073	.193	.271	.401	.516	.734	.813	.854	.896	.911	.932	22.5	11.8
1955-59	175.	.000	.006	.077	.211	.343	.469	.574	.723	.786	.851	.891	.914	.926	21.4	13.3
1960-64	213.	.000	.005	.054	.211	.336	.455	.592	.711	.756	.815	.850	.876	.897	20.6	10.6
1965-69	253.	.000	.000	.057	.146	.298	.415	.494	.638	.696	.743	.777	.822	.842	21.8	12.5
1970 +	334.	.000	.002	.049	.158	.262	.347	.423	.544	.609	.656	.690	.772		23.6	17.1
FIFTH BIRTH																
< 1955	65.	.000	.000	.046	.208	.369	.485	.585	.700	.792	.831	.892	.908		21.2	13.9
1955-59	130.	.000	.000	.088	.254	.385	.477	.577	.727	.808	.862	.915	.923	.938	20.9	13.8
1960-64	186.	.000	.008	.086	.218	.325	.392	.495	.634	.766	.815	.871	.892	.930	22.8	16.1
1965-69	201.	.000	.002	.067	.162	.274	.405	.490	.649	.709	.746	.776	.803	.828	21.3	11.7
1970 +	267.	.000	.000	.041	.158	.256	.341	.417	.541	.602	.662	.704	.756		23.2	16.8
SIXTH BIRTH																
< 1955	35.															
1955-59	89.	.000	.011	.118	.213	.331	.444	.562	.764	.848	.871	.899	.921	.938	21.8	12.5
1960-64	155.	.000	.000	.048	.210	.339	.471	.574	.735	.819	.839	.852	.877	.913	20.4	10.7
1965-69	181.	.000	.008	.094	.182	.287	.417	.470	.575	.646	.732	.762	.809	.829	22.3	16.8
1970 +	210.	.000	.005	.041	.137	.205	.291	.367	.496	.566	.603	.670	.741		25.2	18.0

TABLE 4.4 (CONTINUED)

PANEL 3 : 5+ YEARS

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
FIRST BIRTH																
< 1955	157.	.013	.172	.455	.608	.704	.777	.844	.904	.946	.955	.962	.962		13.3	9.1
1955-59	154.	.058	.253	.506	.643	.731	.802	.844	.883	.906	.919	.938	.948	.955	12.3	8.4
1960-64	181.	.050	.202	.517	.635	.715	.796	.851	.920	.936	.950	.950	.961	.967	12.6	8.9
1965-69	223.	.085	.249	.511	.652	.738	.778	.816	.859	.906	.926	.937	.955	.964	12.3	8.5
1970 +	480.	.083	.251	.468	.571	.663	.721	.775	.842	.882	.901	.921	.940		13.2	11.3
SECOND BIRTH																
< 1955	134.	.000	.004	.093	.235	.396	.493	.575	.724	.799	.836	.873	.910	.918	20.8	13.9
1955-59	143.	.000	.004	.108	.332	.430	.542	.622	.738	.797	.846	.853	.902	.930	19.4	13.9
1960-64	159.	.000	.000	.135	.336	.465	.553	.629	.717	.786	.811	.830	.871	.903	18.5	13.2
1965-69	228.	.000	.002	.086	.215	.307	.410	.500	.643	.704	.743	.781	.816	.844	21.2	13.7
1970 +	432.	.000	.004	.080	.171	.267	.358	.418	.536	.626	.702	.748	.781		23.5	17.1
THIRD BIRTH																
< 1955	86.	.000	.012	.064	.203	.378	.512	.634	.744	.779	.802	.814	.872	.907	19.6	9.6
1955-59	124.	.000	.004	.065	.218	.339	.411	.508	.649	.734	.790	.815	.851	.863	21.8	14.7
1960-64	136.	.000	.015	.063	.176	.287	.478	.592	.728	.772	.801	.842	.890	.912	21.0	10.3
1965-69	178.	.000	.003	.037	.169	.295	.379	.458	.562	.607	.649	.691	.770	.795	22.2	15.7
1970 +	302.	.000	.000	.021	.063	.134	.192	.267	.378	.432	.481	.531	.606		27.4	20.2
FOURTH BIRTH																
< 1955	49.															
1955-59	91.	.000	.005	.055	.170	.275	.429	.560	.643	.725	.802	.857	.907	.923	23.6	15.5
1960-64	132.	.000	.011	.049	.144	.258	.364	.451	.591	.701	.750	.769	.826	.841	23.4	14.6
1965-69	139.	.000	.007	.058	.169	.237	.317	.356	.475	.550	.579	.590	.637	.691	21.8	15.4
1970 +	174.	.000	.000	.011	.054	.101	.138	.176	.268	.340	.380	.437				
FIFTH BIRTH																
< 1955	26.															
1955-59	58.	.000	.000	.103	.250	.319	.448	.526	.603	.724	.741	.776	.810	.845	21.1	16.4
1960-64	111.	.000	.009	.068	.167	.284	.387	.477	.568	.631	.671	.694	.730	.739	21.0	13.0
1965-69	101.	.000	.010	.054	.193	.287	.351	.391	.460	.549	.599	.604	.644	.668	21.3	16.8
1970 +	106.	.000	.000	.040	.099	.148	.199	.258	.317	.348	.396					
SIXTH BIRTH																
< 1955	16.															
1955-59	35.															
1960-64	80.	.000	.012	.069	.131	.238	.319	.425	.638	.744	.763	.775	.800	.825	22.8	11.4
1965-69	76.	.000	.000	.053	.105	.145	.204	.243	.355	.401	.447	.461	.487	.513	24.1	16.0
1970 +	78.	.000	.000	.000	.055	.112	.163	.190								

TABLE 4.5 * BIRTH FUNCTION BY DURATION SINCE PREVIOUS BIRTH (MARRIAGE FOR FIRST BIRTHS)

BY : BIRTH ORDER
AND : WORK STATUS BEFORE MARRIAGE

	N OF CASES	1	9	12	15	18	21	24	30	36	42	48	60	72	TRIMEAN	SPREAD
		DURATION IN MONTHS													SUMMARIES	
FIRST BIRTH																
NO WORK	1601.	.101	.253	.504	.608	.686	.752	.817	.869	.898	.922	.931	.948	.957	12.8	10.5
WORKED	1694.	.117	.293	.518	.628	.696	.743	.792	.849	.891	.907	.926	.944	.956	12.3	10.6
SECOND BIRTH																
NO WORK	1503.	.000	.003	.090	.247	.381	.493	.587	.718	.796	.839	.866	.909	.932	20.6	13.5
WORKED	1523.	.000	.005	.081	.228	.346	.450	.532	.665	.750	.805	.841	.885	.913	21.6	15.1

BY : BIRTH ORDER
AND : WORK STATUS IN FIRST INTERVAL

	N OF CASES	1	9	12	15	18	21	24	30	36	42	48	60	72	TRIMEAN	SPREAD
FIRST BIRTH																
NO WORK	2408.	.117	.280	.542	.653	.727	.786	.846	.897	.929	.949	.960	.976	.983	12.3	9.8
WORKED	636.	.123	.335	.524	.631	.706	.754	.803	.867	.912	.925	.945	.963	.977	12.2	11.6
SECOND BIRTH																
NO WORK	2394.	.000	.004	.089	.243	.372	.481	.572	.708	.792	.834	.864	.905	.930	20.8	13.9
WORKED	632.	.000	.005	.070	.214	.326	.432	.507	.627	.700	.776	.812	.867	.896	22.1	16.3

TABLE 5.1 * BIRTH FUNCTION BY DURATION SINCE PREVIOUS BIRTH

BY : BIRTH ORDER
AND : SURVIVAL OF PREVIOUS BIRTH

	N OF	DURATION IN MONTHS													SUMMARIES	
	CASES	1	9	12	15	18	21	24	30	36	42	48	60	72	TRIMEAN	SPREAD
SECOND BIRTH																
LIVED	2980.	.000	.004	.078	.220	.342	.447	.533	.663	.744	.796	.828	.877	.904	21.5	14.7
DIED	222.	.000	.009	.127	.332	.451	.543	.619	.756	.821	.860	.877	.908	.921	19.0	12.9
THIRD BIRTH																
LIVED	2412.	.000	.004	.057	.173	.291	.399	.498	.643	.717	.762	.799	.843	.874	22.2	13.4
DIED	232.	.000	.020	.134	.346	.516	.612	.658	.754	.801	.830	.867	.901	.929	18.1	11.8
FOURTH BIRTH																
LIVED	1927.	.000	.003	.049	.155	.262	.365	.462	.606	.683	.738	.775	.818	.842	22.9	13.9
DIED	158.	.000	.016	.195	.362	.478	.546	.591	.711	.753	.810	.850	.861	.879	17.8	13.3
FIFTH BIRTH																
LIVED	1511.	.000	.003	.059	.178	.288	.387	.472	.600	.688	.742	.780	.815	.845	22.4	15.1
DIED	102.	.000	.000	.163	.397	.508	.590	.622	.782	.815	.826	.850	.862	.875	17.3	12.3
SIXTH BIRTH																
LIVED	1173.	.000	.005	.063	.153	.257	.360	.438	.588	.670	.720	.753	.804	.829	23.1	14.4
DIED	93.	.000	.005	.174	.397	.467	.582	.641	.766	.793	.830	.830	.843	.863	16.7	10.7

TABLE 5.2 * BIRTH FUNCTION BY DURATION SINCE PREVIOUS BIRTH

BY : BIRTH ORDER
AND : SUBSET OF RECENT BIRTHS
CONTROLLING : PERIOD RESTRICTION

PANEL 1 : 1965+

	N OF CASES	1	9	12	15	18	21	24	30	36	42	48	60	72	TRIMEAN	SPREAD
SECOND BIRTH																
LAST TWO	902.	.000	.001	.022	.092	.168	.246	.303	.408	.501	.579	.623	.682	.714	26.7	18.9
ALL BIRTHS	1638.	.000	.004	.071	.202	.324	.425	.511	.642	.728	.779	.811	.860	.881	21.9	14.8
THIRD BIRTH																
LAST TWO	828.	.000	.000	.017	.068	.132	.171	.235	.342	.407	.449	.497	.566	.636	27.4	19.7
ALL BIRTHS	1376.	.000	.004	.047	.151	.262	.348	.431	.571	.646	.690	.739	.793	.829	23.1	15.0
FOURTH BIRTH																
LAST TWO	655.	.000	.001	.020	.060	.117	.152	.188	.287	.344	.380	.419	.484	.540	28.2	21.7
ALL BIRTHS	1074.	.000	.002	.049	.143	.242	.326	.397	.533	.601	.646	.680	.734	.768	23.4	15.0
FIFTH BIRTH																
LAST TWO	494.	.000	.003	.022	.066	.105	.161	.206	.285	.341	.407	.445	.497	.566	27.9	20.0
ALL BIRTHS	830.	.000	.003	.050	.156	.254	.345	.415	.538	.607	.671	.701	.743	.779	22.9	15.7
SIXTH BIRTH																
LAST TWO	398.	.000	.000	.016	.050	.068	.109	.147	.218	.285	.348	.394	.450	.495	30.7	19.5
ALL BIRTHS	695.	.000	.005	.060	.150	.231	.325	.382	.490	.570	.641	.677	.728	.751	24.0	18.3

TABLE 5.2 (CONTINUED)

PANEL 2 : 1970+

	N OF CASES	1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
SECOND BIRTH																
LAST TWO	763.	.000	.001	.025	.104	.188	.267	.331	.439	.545	.636	.687	.759		27.3	20.2
ALL BIRTHS	1023.	.000	.004	.065	.176	.297	.395	.471	.592	.698	.769	.803	.853	.887	23.2	16.7
THIRD BIRTH																
LAST TWO	659.	.000	.000	.020	.072	.136	.180	.250	.374	.438	.484	.546	.616		27.8	19.9
ALL BIRTHS	830.	.000	.003	.037	.119	.218	.303	.382	.520	.599	.635	.689	.743		24.0	14.9
FOURTH BIRTH																
LAST TWO	483.	.000	.000	.021	.061	.120	.151	.195	.308	.376	.425	.482	.564		29.5	22.1
ALL BIRTHS	597.	.000	.001	.037	.123	.207	.270	.338	.467	.539	.582	.623	.689		24.8	16.9
FIFTH BIRTH																
LAST TWO	339.	.000	.000	.011	.050	.088	.145	.205	.296	.352	.431	.476	.561		29.7	20.5
ALL BIRTHS	448.	.000	.000	.037	.138	.224	.305	.374	.488	.539	.609	.650	.717		24.5	19.5
SIXTH BIRTH																
LAST TWO	280.	.000	.000	.019	.049	.068	.110	.159	.240	.336	.406	.459	.556		32.6	20.1
ALL BIRTHS	364.	.000	.003	.041	.119	.177	.261	.331	.431	.526	.589	.629	.698		25.8	18.0

TABLE 5.2 (CONTINUED)

PANEL 3 : 1973+

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
SECOND BIRTH																
LAST TWO	539.	.000	.001	.031	.129	.233	.341	.412	.559	.617						
ALL BIRTHS	577.	.000	.004	.048	.167	.293	.404	.472	.606	.661						
THIRD BIRTH																
LAST TWO	436.	.000	.000	.032	.086	.147	.189	.301	.426							
ALL BIRTHS	458.	.000	.000	.037	.105	.185	.255	.367	.480	.563						
FOURTH BIRTH																
LAST TWO	315.	.000	.000	.026	.070	.121	.174	.218	.404							
ALL BIRTHS	327.	.000	.000	.031	.088	.163	.224	.266	.440							
FIFTH BIRTH																
LAST TWO	209.	.000	.000	.007	.055	.114	.156	.224	.349							
ALL BIRTHS	227.	.000	.000	.009	.089	.193	.259	.321	.440							
SIXTH BIRTH																
LAST TWO	172.	.000	.000	.016	.056	.071	.142	.203	.303							
ALL BIRTHS	186.	.000	.000	.029	.100	.143	.220	.290	.391							

TABLE 5.3 * BIRTH FUNCTION BY DURATION SINCE PREVIOUS BIRTH

BY : BIRTH ORDER
AND : BREASTFEEDING

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
SECOND BIRTH																
<12 MONTHS	525.	.000	.001	.034	.137	.239	.313	.365	.468	.558	.632	.687	.739		25.1	19.4
12+ MONTHS	238.	.000	.000	.000	.010	.040	.134	.234	.356	.505	.647					
THIRD BIRTH																
<12 MONTHS	442.	.000	.000	.028	.091	.168	.211	.262	.373	.432	.458	.512	.587		26.8	21.5
12+ MONTHS	217.	.000	.000	.000	.023	.052	.096	.219	.376	.453	.542					
FOURTH BIRTH																
<12 MONTHS	298.	.000	.000	.029	.083	.153	.192	.230	.326	.358	.406	.469				
12+ MONTHS	185.	.000	.000	.007	.019	.053	.067	.126	.274	.421	.472					
FIFTH BIRTH																
<12 MONTHS	194.	.000	.000	.017	.051	.092	.146	.203	.262	.318	.368	.409				
12+ MONTHS	145.	.000	.000	.000	.048	.081	.145	.209	.354	.408	.530					
SIXTH BIRTH																
<12 MONTHS	148.	.000	.000	.027	.071	.095	.143	.180	.225	.299	.357	.420				
12+ MONTHS	132.	.000	.000	.010	.021	.032	.067	.132	.267	.396						

TABLE 5.4 * BIRTH FUNCTION BY DURATION SINCE PREVIOUS BIRTH

BY : BIRTH ORDER
AND : USE OF CONTRACEPTION

	N OF CASES	DURATION IN MONTHS 1	9	12	15	18	21	24	30	36	42	48	60	72	SUMMARIES TRIMEAN	SPREAD
SECOND BIRTH																
NO USE	353.	.000	.002	.044	.145	.247	.357	.454	.541	.644	.740	.781				
USE	308.	.000	.000	.009	.075	.155	.204	.241	.376	.483	.569	.634				
THIRD BIRTH																
NO USE	352.	.000	.000	.031	.099	.186	.231	.299	.444	.505	.536	.593	.628		24.4	14.7
USE	267.	.000	.000	.005	.039	.065	.111	.198	.300	.369	.438	.513				
FOURTH BIRTH																
NO USE	277.	.000	.000	.033	.088	.154	.191	.255	.398	.468	.500	.541				
USE	194.	.000	.000	.004	.015	.059	.082	.092	.148	.217	.301					
FIFTH BIRTH																
NO USE	196.	.000	.000	.011	.062	.114	.175	.231	.344	.401	.493	.518				
USE	137.	.000	.000	.010	.028	.040	.092	.162	.215							
SIXTH BIRTH																
NO USE	167.	.000	.000	.031	.062	.085	.134	.191	.294	.393	.458	.481				
USE	110.	.000	.000	.000	.027	.040	.071	.089	.125							