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Illustrative Analysis: Fertility Preferences in Sri Lanka

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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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El proyecto está a cargo del Instituto Internacional de Estadística en cooperación con la Unión Internacional para el Estudio Científico de la Población y con la colaboración de las Naciones Unidas. Es financiado principalmente por el Fondo de las Naciones Unidas para Actividades de Población y por la Agencia para el Desarrollo Internacional de los Estados Unidos.
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Contents

FIGURES

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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 recognized, 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 entitled '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, trends and determinants, marital formation and dissolution, breastfeeding, sterilization, contraceptive use, fertility preference, 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. Such studies were conducted in close collaboration with the country concerned, where possible with the active participation of national staff.

It should perhaps be emphasized that the studies in the 'Illustrative Analysis' 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 Concepción, Gwendolyn Johnson-Acsádi 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 German Rodriguez.

Sir Maurice Kendall
May 1980 WFS Project Director

1 Background

1.1 OBJECTIVES

The present illustrative analysis concerns socio-economic differentials in stated fertility preferences and uses data from the Sri Lanka Fertility Survey of 1975.

Stated preferences for number and sex of children occupy a conspicuous role in the WFS Core Questionnaire and in the standard Tabulation Plan for the First Country Report. The numbers of questions and tables involving these preferences suggest that fertility behaviour and contraceptive knowledge and use are the only topics of greater interest. This emphasis follows in a long tradition of earlier surveys, and is based on the premise that fertility behaviour is preceded by the formulation and implementation (even if inefficiently) of fertility preferences. The creators of fertility surveys have long assumed, sometimes only implicitly, that stated preferences can be used to describe the need for efficient contraception and that they can be used to anticipate what actual levels of fertility would be in the presence of efficient contraception.

Many questions of both theoretical and methodological varieties have been raised about the use of stated preferences. We shall not attempt to review the vast and controversial literature on the topic, although a lengthy bibliography appears at the end of this paper and some of the fundamental issues will be raised in Section 1.3. Our orientation to the responses will be to take them at face value, manipulating them statistically in much the same way as if they were behavioural responses describing, for example, completed fertility or fertility in an interval of time. The responses will be treated as dependent variables only (the link between preferences and contraceptive use is almost entirely excluded from the purview of this analysis). It is recognized fully that the quality of these data, in terms of reliability, validity, and stability, is not nearly as high as the quality of the behavioural data in WFS surveys. Certainly, much of the 'unexplained variation' in our statistical models actually consists of measurement error in the dependent variables.

Although the responses will be taken at face value for statistical analysis, numerous cautions will be offered in the interpretations. These cautions are considered to be an important part of whatever contribution this paper may make to the topic. The *conclusions* of our statistical analyses should *not* be taken at face value. It is our view that some qualitative conclusions may be reached with some confidence, for example that most women in Sri Lanka 'actually' do not want another child and that Muslims prefer larger families than Tamils, but it will not be argued that specific parameter estimates, levels of significance, etc. represent anything other than the results of a thorough statistical analysis of responses to very specifically worded questions.

Stated fertility preferences, although doubtless flawed by theoretical and methodological problems, are the best available indicators of desired fertility. In the case of WFS Surveys, they are obtained in a context of relatively accurately measured behavioural data. In Sri Lanka, for example, the data were collected by the Department of Census and Statistics, which has no involvement in family planning activities. It is unlikely that the responses were biased downwards in order to comply with the perceived preferences of the interviewer. Later we shall give other reasons why Sri Lanka is a good choice of country for this analysis.

Under these circumstances, and considering that resources are simply unavailable for intensive interviewing on attitudes and motivations, the present data comprise a first approximation to the 'underlying' preferences or utilities to be postulated in Section 1.3. They are relevant to policy in the sense that most family planning programmes ostensibly seek to enable individuals to implement freely their preferences and not to have unwanted births. Therefore, data on preferences enable planners to assess the relative 'need' of subpopulations for family planning services. Stated preferences are relevant to the theoretical development of family-building models under the assumption of rational behaviour, in which intentions are systematically formulated and then implemented.

Our overall objective is to use the Sri Lanka data cautiously to estimate the levels and differentials in desired fertility. We shall attempt to control adequately for demographic variables, such as actual family size, which probably bias the response. We shall attempt to develop synthetic measures which summarize the data. The statistical methods to be used are more sophisticated than those in the Sri Lanka Country Report, but will generally be limited to methods understandable by a wide readership.

1.2 A REVIEW OF WFS QUESTIONS ON FERTILITY PREFERENCES

The Core Questionnaire of the World Fertility Survey includes a sequence of questions on the individual respondent's preferences regarding her fertility. These are somewhat expanded upon in the Fertility Regulation Module, and because this module is used by most participating countries, we shall consider them as they appear therein.

Each woman who is living with her husband and believes herself able to have (more) children is asked the following question:

a) Do you want another child sometime?

The possible responses are (1) Yes, (2) No, and (3) Undecided.

If the woman or her husband has been sterilized for contraceptive reasons, a 'No' response is imputed during the computer editing stage.

In this question two words are particularly critical. The first is 'want'; some similar surveys have used 'expect' in this position. When contraception is inefficient, the woman will generally want fewer than she expects. Some surveys have used 'intend', which we regard to be equivalent to 'want' but with a greater implication of planning. Second, the word 'sometime' is added at the end of the question to prompt the woman to give a preference for the entire remainder of her reproductive career, rather than for just the immediate future. It is possible that short-term preferences would have greater validity than long-term ones, and in a panel design the predictive power of short-term preferences can be determined in a re-interview after a year of two. In the present situation, however, a statement of long-term preference was more appropriate.

Women who respond 'Yes' to Question a) are asked:

b) Would you prefer your next child to be a boy or a girl?

with possible responses (1) Boy, (2) Girl, (3) Either. If the woman believes herself to be pregnant, this question applies to the child she is expecting. Such women are asked if they want another child beyond the one they are expecting, but not the preferred sex of that child.

Women responding 'Yes' to (a) are also asked:

c) How many more children do you want to have?

All women, regardless of fecundity and current marital status, are asked:

d) If you could choose exactly the number of children to have in your whole life, how many would that be?

The responses to (c) and (d) can include either a range or a specific number, with allowance for non-numerical responses such as 'As many as God wills' if given by the woman even after probing. Specific non-numerical responses are not pre-coded. The intent behind the last question is, of course, that the woman will give a personal ideal which is not influenced by the number she actually has; by contrast, (a) and (c) take the woman's current family size as a starting point.

The above questions are not specific as to whether the 'children' are counted at birth or as adults, which can make a substantial difference if mortality is high, or the sex composition of these children, which can be important if there is marked sex preference, or the spacing of the births, which can be important if there are opportunities for female employment outside the home, for example. They are also not specific as to possible contingencies (e.g. continued good health, a rise in income, etc.) which the woman may anticipate.

In addition, the Fertility Regulation Module includes the following question for all women with one or more children:

e) Thinking back to the time before you became pregnant with your last child, had you wanted to have any more children?

The possible responses are (1) Yes, (2) No, and (3) Undecided.

Questions (a), (c) and (e) are stated slightly differently if the woman is currently pregnant, has no children or one child, etc., but these changes only involve the relevant grammar and do not affect the basic meaning. We shall not attempt further to justify the wording of these questions, and shall regard them as fixed.

Comparisons with other surveys using differently worded questions must be undertaken carefully. A great strength of WFS is that these (and other) questions are always the same, with great care taken in the translations and uniformity of interviewing techniques.

1.3 THEORETICAL ORIENTATION

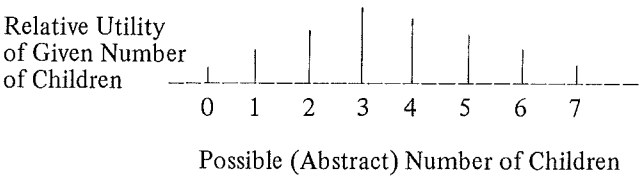
THE UNDERLYING PREFERENCE FUNCTION

As a motivation for the empirical analysis, this section will offer a brief interpretation of the underlying process. This interpretation reflects the thoughts of several researchers.

The response to those survey questions which concern numbers of births will be regarded as indicators of an underlying continuous variable at the level of the individual. In a general economic model, the underlying variable would be called the *utility* that the woman has for a particular total or incremental number of births, taking account of all her current circumstances. In order to emphasize the role of cultural, normative, and personality dimensions, as well as economic, we shall also use the term *preference.*

In brief, we assume that every woman at every time has an entire preference function, which describes the relative utility of each family size that she could possibly have (in an abstract sense). That function, together with her current family size, will generate her statements about desire for additional children. If she attaches higher utility to a greater family size than the one she currently occupies, then she will state a preference for more children. Her response to the question on ideal family size will be the modal value of the function.

Figure 1.3.1. Hypothetical Representation of An Individual Woman's Preference Function.



The preference function will be flat, or nearly so, in the vicinity of family sizes among which the woman is indifferent. The emphasis in the instrument upon a single number for an ideal size may mask flatness in the vicinity of the mode; there is no reason to believe that every woman makes a sharp distinction between the utilities of, say, her modal number, one child less than her mode, or one child more than it. Flatness in the function is a major source of apparent instability in the mode.

Flatness characterizes both uniformity and low salience in the calculation of utilities. Thus, it may be that in the implicit calculation of the costs and benefits of each possible family size, the woman may be unable to discriminate between three and four children. It may be arbitrary which one she names as her ideal at any particular interview date. On the other hand, if the woman is unable to control her fertility, or believes that she is, her preference function (at least insofar as it could be measured) may be flat because the utilities have low salience for the woman. It would be possible to represent salience, or motivation, etc., with some function distinct from the preference function. However, for our purposes the heuristic gain would not justify making these distinctions.

We have argued that preferences are dispersed across alternative outcomes, and achieve a maximum at some ideal family size but are not wholly concentrated at that value. One consequence of this conceptualization is that changes are easily interpreted as shifts in the preference function, or relative utilities, rather than as sharp changes from one goal to another. Only small shifts in relative utilities may result in a transition across one or two children in the modal value. In a general formulation of the process, the preference function would be allowed to change as the woman's circumstances changed. The most relevant of these circumstances would be actual family size, which provides the best reference against which the utility of alternatives can be calculated.

The assumption that the personal ideal is set around the time of marriage and persists thereafter, which has been argued elsewhere, is unnecessarily restrictive. A sequential model of family building is more suitable as a null model – a standard against which, rather than for which, a case need be made. We shall interprete the process to include re-assessment and re-calculation of the utilities as family building progresses.

Our inferences about the shape of the preference function – for individual women and averaged over aggregates – will be derived from two sources: the stated personal ideal and the stated preference for additional children. If the woman's

preference function and current family size are such that she has reached or exceeded the mode, then she will be assumed to state that she wants no more children.

In all WFS surveys it has been found that some women who have exceeded their stated ideal say they want more children, and some women who have not reached it say they do not want more children. These apparently contradictory findings will be described for Sri Lanka. These cases represent a small minority and do not dissuade us from the working assumption that both kinds of responses are linked to an underlying preference.

At this point we acknowledge certain types of imprecision in these concepts. 'Family size' is defined to be the number of living children that a woman has at any particular time, but it connotes some information beyond a simple number, both as defined at the interview and as a future prospect. Women of any particular age may have the same number of living children but vary in (a) the average age of these children, (b) the dispersion in ages, (c) the number and sequencing of sons and daughters, and (d) the differences between parity and family size, i.e. the number of child deaths. To be complete, the notion of a preference function should be extended to encompass all of these components. For example, a woman who foregoes some opportunities in the labor force in order to have children may prefer two children to three children – in the abstract – but if spacing were considered, she might prefer three children closely spaced to two children widely spaced. For another example, it has been argued that women implicitly take into account past levels of child mortality in calculating their preferences.

Although these factors are probably relevant when women can control the timing of their births, when there is substantial sex preference and the means to implement it, and perhaps when child mortality is high, we initially assume that they do not affect substantially the stated preference for number in Sri Lanka. The responses to 'If you could choose exactly the number of children to have in your whole life, how many would that be?' will be interpreted as the personal ideal family size, unadjusted for child deaths, etc.

THE STOCHASTIC NATURE OF THE RESPONSE

Our orientation to the statistical analysis of the responses will be briefly stated. Let U_i be the utility which the woman attaches to completed family size i. We shall assume that U_i has a systematic component which is a function of measured variables, such as family size, education, etc. If we had 'true' values of U_i and included a residual or unmeasured source of variation, e, we would be able to completely describe U_i as $U_i = f_i(x_1 \ldots x_k, e)$ with some functional form f_i.

The residual, e, itself includes two components. The first may be described as the unmeasured portion of the systematic variation. For example, the size of the woman's family of origin, her personality characteristics, community variables, etc., may have explanatory power but are not available to us. The absence of these variables from our measurements will cause (a) an increase in the importance of the error term and (b) some degree of specification error in parameter estimates. Secondly, the error term can reflect the role of influences which are, for all practical purposes, genuinely random – which are short-term, cannot be anticipated, and individually have only a small impact. It is not possible to distinguish between these two components of error; together they give the response a stochastic character.

If the woman occupies family size i and is considering moving to $i + 1$, her decision indicates the sign of $U_{i+1} - U_i$. If the difference is in the vicinity of 0, she will be 'Undecided'. Otherwise she will respond 'Yes' or 'No', accordingly as the difference is positive or negative. Because of the stochastic component of both U_i and U_{i+1}, however, there will be some degree of instability in the response to this question. There will be a similar instability in the statement of the mode.

As with most social science research, we shall find that our analyses at the level of the individual leave a great deal of variation unexplained. The purpose of these comments is simply to point out that although some of this residual variation undoubtedly results from measurement error (in the dependent variable as well as in the predictors), much of it also resides in the underlying process by which the preference function is generated, including specification error.

APPROPRIATE CONTROLS AND PREDICTORS

There are certain systematic changes in personal and family status which it is important to incorporate as controls if the impact of socio-economic variables on the responses is to be assessed. It is necessary to state explicitly how these variables are assumed to be inter-related.

The preceding discussion leads to four types of variables according to which the individual woman's preference function may be related systematically. The first of these is the woman's current number of living children. This number is assumed to be more relevant than parity because preferences are for numbers of living children rather than simply births.

The second type of relevant variable concerns changes in other demographic characteristics (broadly speaking, 'life cycle' characteristics) which might in turn lead to revisions of the utilities of the alternative family sizes. Three such variables will be included in the present analysis. They are three additive components of current age: (1) the woman's age at marriage, (2) the interval from marriage to the latest live birth, and (3) the open interval, or time since the last birth. (Minor but natural modifications are made for women with no children or women who are currently pregnant).

All three intervals add up to current age. As in general, age (the total) represents a combination of two effects: first, a point in the life cycle, which affects preferences (for example, an older woman may not want any more children simply because she considers that she and her husband would be unable to care for it or because it may be unseemly for a grandmother to have a baby); and second, secular trends. Older women tend to represent earlier values in a changing culture. Similarly, marital duration, the sum of (2) and (3) above, represents both a life cycle and a cohort identification. In many societies it is a better indicator than age of position in the typical life cycle. As the variable is used here, any periods of divorce or separation are ignored.

Age at marriage, while not having the same substantive meaning for all birth cohorts, is generally correlated strongly (and negatively) with completed fertility in developing countries. This correlation arises mainly from increased exposure, but women who marry early may also have values favoring large families. In itself, of course, age at marriage does not represent life cycle changes; its value is fixed from the date at which a woman becomes eligible for inclusion in a WFS sample. The open interval indicates the age of the youngest child as well as length of time without

a birth. The former interpretation will be preferred; the latter represents a confounding of the timing of the woman's birth history with the basically arbitrary timing of the survey.

High values of the open interval and of age itself can indicate declines in fecundity even though the woman believes herself able to have more children. Fecundity is highly relevant to the woman's ability to implement her preferences but not to the formation of those preferences.

The third source of variation is contraceptive knowledge and use, summarized in a standard WFS variable called Pattern of Contraceptive Use. The role of this variable will be discussed below, but because its relationship to preferences is complex and reciprocal, little use will be made of it.

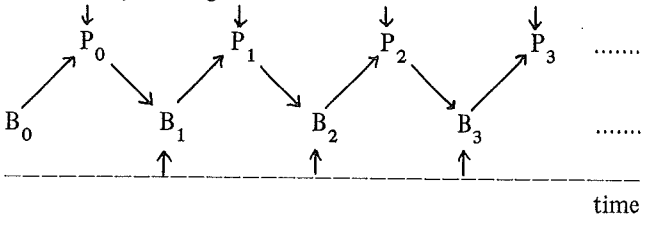
The fourth set of variables which affect preferences, and on which we have measurements, are the socio-economic or substantive predictors of interest. Some of these are invariant through a woman's life (or invariant from the date of eligibility); some are subject to change. Some are included in all WFS surveys; some are specific to a particular country.

INTER-RELATIONSHIPS AMONG PREFERENCES, THE CONTROLS, AND CONTRACEPTION

Consider now certain patterns of effects which describe the relationship over time beween (a) the underlying preference function, (b) actual family size, (c) the age-related controls, and (d) the pattern of contraceptive use.

First, the relation between (a) and (b) is to some degree mutual. On the one hand, women who want large families (more precisely, who *wanted* large families) will tend to have them, simply as a result of implementing their preferences. On the other hand, women who currently state a preference for high fertility may be partially rationalizing or justifying the fact that they have a large family. The nature of the effect depends upon whether the woman had a high fertility preference *before* or *after* her later pregnancies.

The relationship between fertility preferences and actual transitions to higher parities in the lifetime of a specific woman may be diagrammed as follows:



Here B_0 is the woman's own date of birth or some other starting event, such as date of menarche or date of marriage, and B_i is the date of her i-th childbirth. During the time interval (B_i, B_{i+1}) the woman has parity i. (If there is substantial infant mortality, it will be worthwhile to modify the process so that the index i refers to number of living children). The sequence P_0, P_1, etc., refers to the ideal family size that would be stated while the woman was at parity i or family size i. The arrows from P_i to B_{i+1} represent the impact of a preference (stated as a total desired family size or preference of another child) upon a subsequent birth event. The arrows from B_i to P_i represent the revision of a preference as as result of a birth, and include a possible upward revision of desired family size as a result of a birth previously not planned.

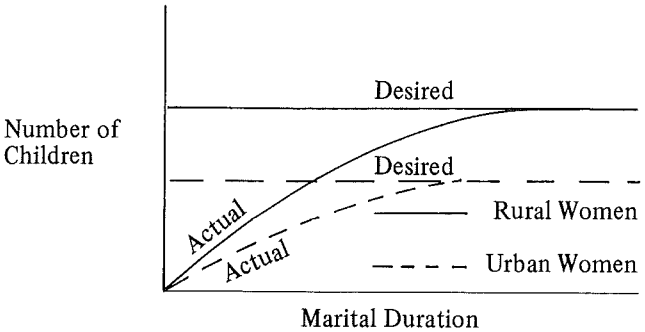
The relationship is not deterministic. Arrows directed vertically down to P_i represent the effects of other characteristics of the woman upon her stated preference, including secular trends in the norms of her reference group. These effects include 'response error' as a random component. The vertical arrows directed upward toward the B_i represent effects other than preferences which determine the transition to higher parities – for example, fecundability and contraceptive failure.

The diagram could be made much more complex. Contraceptive use is an intervening variable between preference P_i and birth event B_{i+1} and is a pre-condition for accidental contraceptive failure. Many researchers have theorized about the effects which influence the transition to higher parity, including the role of preferences. Our purpose is simply to emphasize the parallel sequencing of births and stated preferences as the woman grows older. With a cross-sectional survey it is impossible to evaluate statistically the impact of an earlier preference upon subsequent fertility.

The reciprocal relationship between (a) the preference function and (b) actual family size becomes clearer if viewed developmentally. At the very short marital durations in which women have few children and have had little opportunity to have children, there will be a low association between actual and desired family size. The two quantities will agree only for those women who wish to remain childless or to have very small families, and such women are a small minority in most developing countries.

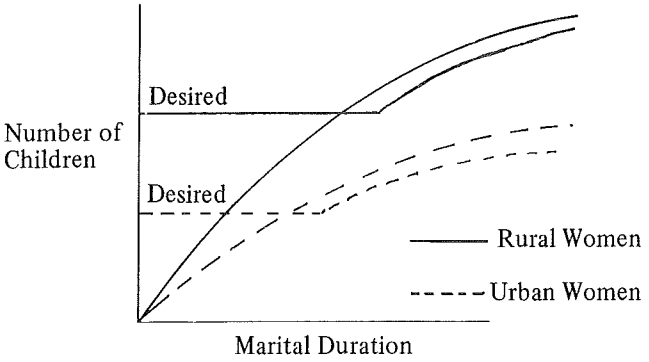
At later marital durations, a positive correlation between actual and (the simultaneously stated) desired family size should develop through a combination of two mechanisms. The first of these is implementation of preferences. To the extent that this effect operates, the actual family size will tend to be less than or equal to the desired goal, with the difference becoming smaller as the woman nears the end of her reproductive career. Secondly, to the extent that there is rationalization of actual family size, i.e. an 'adjustment' of the desired family size to correspond with actual family size, the women of later marital durations will tend to have a desired family size which is less than or equal to the actual but with which there is a correlation. Figure 1.3.2. illustrates the association for two hypothetical extremes.

Figure 1.3.2a. Hypothetical Graph of the Modal Relationships between Desired and Actual Family Size When There Is Perfect Implementation of Preferences.



If the women of late marital durations do *not* show a strong correlation between the two quantities, then it is possible that a strong norm has substantially reduced the range of the attitudinal response or that, in some other way, the respondent has tended to report a group ideal rather than an individual preference. It is also possible, of

Figure 1.3.2b. Hypothetical Graph of the Modal Relationship between Desired and Actual Family Size When There Is Heavy Rationalization of Actual Family Size.



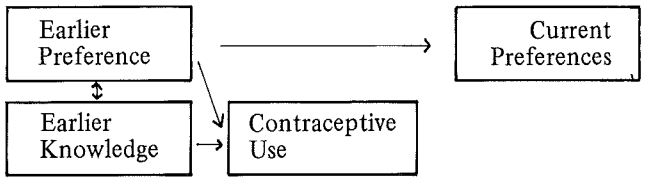
course, that *neither* implementation nor rationalization has occurred, and that the woman has maintained a goal which is statistically independent of her behaviour.

In the case of Sri Lanka, as we shall see, that above correlation is strong and increases with marital duration. At the later durations there is a great preponderence of women who want no more children; because of the correlation there appears to be an upward adjustment of the response to be nearer to actual family size.

There is a direct relationship between (a) the preference function and (d) the pattern of contraceptive use. Contraceptive use is a cumulative phenomenon, and the WFS variable refers mainly to the past, whereas any measure of preference refers to the present. The current preference will be correlated with earlier preferences; in particular, if a woman decided at an earlier point that she wanted no more children, then the current measurement is a lagged reading of the earlier transition. Such a woman may have proceeded to implement the preference by practising contraception. The causal flow is clear, but we lack a measurement from the earlier time point.

There is another sense, however, in which contraception may affect preferences. It can be argued that *knowledge* of contraception is prior to actual use and is a step in the adoption process. The knowledge that some means of fertility control is available will increase the salience of the preference function and may also cause the woman to adjust her preference downward. There is also evidence that women who want no more children seek out information about family planning, so the causal connection here is unclear.

The preceding two paragraphs may be summarized by the following chart in which arrows indicate a causal flow.



In Sri Lanka the current preference for another child 'depends' most heavily, after actual family size, upon the history of contraceptive use. We have argued against a misinterpretation of this statistical association and, in fact, often will ignore it. Thereafter, it 'depends' most heavily upon the age-related controls, particularly the length of the open interval, which is positively correlated with efficient contraceptive use. If a woman uses contraception at all effectively, then her monthly probability of conception will fall and her intervals will increase in length. Contraceptive use prior to the last live birth will tend to raise the age of the woman at that birth, and use since that birth will tend to increase the length of the open interval. And, of course, effective use will tend to reduce the woman's family size below what it would have been without use.

The actual mechanisms which link these variables are complex and beyond our reach, unfortunately. The underlying phenomena of having preferences, having additional children, and using contraception with varying levels of effectiveness operate dynamically and essentially at a micro level. The survey gives us a snapshot of thousands of women, all at somewhat different points in their childbearing histories. It can tell us of their previous behaviour, to some degree, but not of their previous attitudes, such as their fertility preferences. We cannot know, for example, how many children each woman wanted at the time she got married or at what point she decided she wanted no more. (Of course, even with such data there would be the difficulties of response error and stochastic variation). With data of the present sort we must emphasize description rather than causal inference.

To summarize, this section has had three main functions. First, it has clarified our conceptualization of an underlying preference function for which the responses on number preference are indicators. Second, the sequential family-building model has led to a choice of controls which indicate systematic influences on the preference function. Third, the complexity of inter-relationships and the cross-sectional nature of the data require that our statistical models be regarded as descriptions rather than as assertions about causality.

1.4 DESCRIPTION OF SRI LANKA AND ITS SURVEY

The following overview is taken from the Summary of the First Report on Sri Lanka's WFS Survey:

Although the island of Sri Lanka is relatively small in area, with a maximum length of 435 kms, and a width of 225 kms., and in population size (about 13 million), it shows a remarkable degree of cultural and ecological diversity. The Sinhalese, Sri Lanka Tamils, Indian Tamils and Sri Lanka Moors are the major ethnic groups, and constituted, respectively, 72, 11, 9, and 7 per cent of the population at the 1971 Census. The Sinhalese, predominantly Buddhist with a small Christian minority, are the descendants of the original settlers from North India; the Sri Lanka Tamils, mostly Hindu in religious belief, trace their origin to later settlers. The Indian Tamils, also Hindu, are descendants of recent immigrants from India since about 1850, while the Moors, exclusively Muslim, originate from early Arab traders.

The geographical features of the country warrant its division into three broad regions. The South Central Hill country is mountainous and contains all the rubber and tea estates. It has a heavy annual rainfall of over 380 cms. The South-West lowlands, in which Colombo, the capital, is situated, is also relatively wet, while the Dry Region, which stretches from the southernmost part of the country, circles the hill country on the East and extends up to the North-West coast, receives less than 190 cms. of rain annually. For the purposes of sample design and disaggregation of survey findings, the Dry Region was subdivided into three zones and Metropolitan Colombo was separated from the remainder of the South-West lowlands to form a total of six zones. In presentation of findings a three-way classification of women according to type of place of residence – urban, rural, estate (entirely Indian Tamils) –

was also used.

For the past 25 years, it has been possible to monitor demographic processes through the national registration system. Between 1960 and 1974 the crude birth rate fell from 37 to 27 births per thousand population. Most of this decline can be attributed to rising age at marriage; the singulate mean age at marriage for females, which may be interpreted as the mean age at marriage of all women who will marry by age 50, rose by almost 3 years between 1946 and 1971. Since the mid-sixties, however, there has also been a marked reduction in marital fertility rates, except for younger married women below the age of 25. This decline in marital fertility coincides with the inauguration of the National Family Planning Programme in 1965, which achieved all-island coverage in 1968. An initial emphasis on intra-uterine devices (IUDs) was followed by a shift towards oral contraceptives, and in recent years sterilization has become popular.

Between 1946 and 1960, both the crude death rate and the infant mortality rate were halved. This major achievement is associated with an effective anti-malarial campaign and the spread of public health measures. Since 1960, these rates have been more or less stable with infant mortality of about 50 infant deaths per thousand births. Recently a resurgence of malaria has occurred and there is some evidence of an increase in mortality indices.

By Asian standards, the population of Sri Lanka is highly educated. According to the 1971 census, 85 per cent of males and 70 per cent of females over the age of 10 were literate. The country, however, remains predominantly agricultural, the chief exports being tea, rubber and coconut products.

The survey was conducted in 1975 by the then Ministry of Planning and Economic Affairs in collaboration with the Department of Census and Statistics. The sample was a nationally representative probability sample, based on a two-stage design. In the first stage, a sample of 750 census blocks was drawn within six pre-determined domains (i.e., zones). In the second stage, a sample of 8834 housing units was drawn from a list of all housing units in the selected blocks. Finally, within each selected housing unit, all households were included in the sample and all ever-married women aged 12 to 49 were interviewed in detail. A total of 6812 individual interviews were completed and this represents an overall response rate of 89 per cent.

The questionnaire was an adaptation of the WFS Core with some expansion of the contents to meet national requirements. For women with experience of the pill, IUD, and condom, questions were added on duration of use, reasons for discontinuation, problems of getting supplies, etc., and sections on woman's work history and husband's background were enlarged. Interviews were conducted in two languages, Sinhala and Tamil, by 71 specially trained female interviewers working in 15 teams. Machine editing and tabulation were done by the Computer Division of the Department of Census and Statistics in Colombo, and computation of sampling errors at WFS headquarters in London.

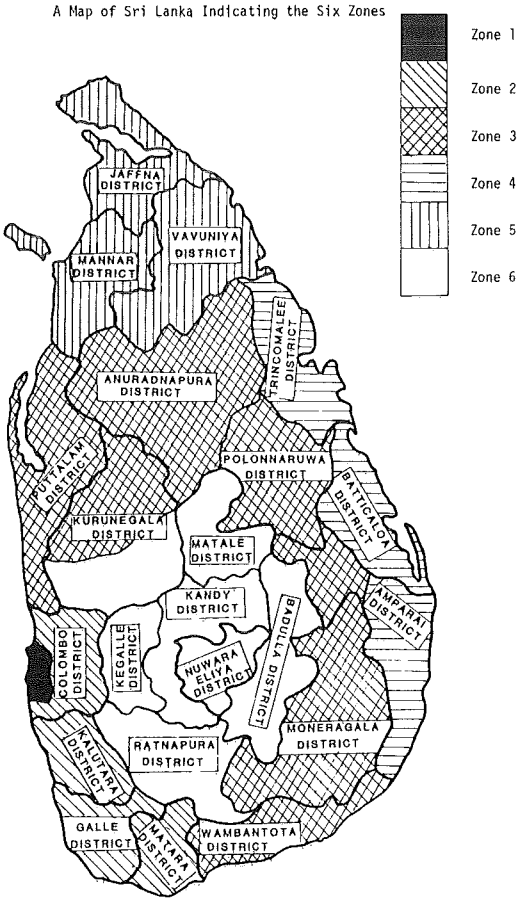
The map in Figure 1.4.1. shows the six main zones of the country and Table 1.4.1. gives the categories and percentage breakdowns of the principal socio-economic variables.

Table 1.4.1. Per Cent Distribution of The Sample (Weighted) According to Major Explanatory Variables.

Region of Residence	
Zone 1	6.3
Zone 2	27.8
Zone 3	14.1
Zone 4	5.7
Zone 5	6.9
Zone 6	39.1
Type of Place of Residence	
Urban	18.4
Rural	72.1
Estate	9.4
Level of Education	
No Schooling	22.2
Grades 1-5	39.4
Grades 6-9	25.0
Grades 10-11	9.7
Higher Education	3.6
Religion	
Buddhist	66.4
Hindu	19.0
Muslim	6.9
Christian	7.6
Other	0.1
Ethnic Group	
Sinhalese	71.2
Sri Lanka Tamil	14.5
Indian Tamil	7.2
Sri Lanka Moor	6.6
Occupation of Husband	
Professional, Technical, Managerial	7.0
Clerical	4.4
Sales	9.1
Self-Employed, Farmers, Fishermen, Hunters	26.4
Non-Self-Employed, Agriculture	15.4
Private Houshold Workers	0.1
Other Services	7.0
Craftsmen	19.4
Unskilled Manual	10.0
Undefined	1.1
Pattern of Work	
Never Worked	47.7
Worked Before Marriage Only	9.9
Worked After Marriage 'Away'	24.7
Worked After Marriage 'At Home'	17.7

Figure 1.4.1

A Map of Sri Lanka Indicating the Six Zones



Because the survey had a stratified cluster sample design, two observations must be made about all our statistical work. First, all frequencies and all other statistics required re-weighting. The weights ranged from less than 1/2 to nearly 2, resulting in considerable rounding error. In many tables, sub-totals do not quite add to totals. Second, all statistical tests are approximate. Most computer work in this project was done with the Statistical Package for the Social Sciences (SPSS), which used the sampling weights in its statistical tests but ignored the design effect due to clustering. In further tests based on SPSS output, we have simply applied tests of significance appropriate for a simple random sample, again ignoring the effect of clustering. However, we have generally relied upon a 1 per cent level of significance.

The 'Design Effect' (DEFT) is 1.22 for the overall sample, and smaller for subgroups. That is, the standard error of estimates based on the total is actually an average of about 22 per cent greater than as calculated when the clustering is ignored. In nearly all cases, we will be working with subsamples having a smaller design effect. As a rule of thumb, quoted significance at the 1 per cent level should be downgraded to significance at the 5 per cent level, and significance at the 5 percent level should be downgraded to non-significance.

The present analysis is based on 6,564 women rather than 6,812 women because of the exclusion of 258 women (weighted) who were missing the date of first marriage, and hence age at first marriage. The author is not responsible for the omission of these women; however, the effect is believed to be small.

For more detail, the reader is referred to Chapters 1, 2, 3, and Appendix VIII of Sri Lanka's First Report.

2 New Analysis

2.1 DETERMINANTS OF STATED DESIRED FAMILY SIZE

This section is based on Question (d) of Section 1.2.: If you could choose exactly the number of children to have in your whole life, how many would that be?

The response identified the mode of each woman's preference function at the date of the interview. The item is distinctive in that it refers to hypothetical births in both the past and the future, and not just the future. It has already been described how the woman's actual fertility up to the date of interview can be expected to be associated with her desired fertility up to that point. In the First Report for Sri Lanka this association was recognized by the use of direct standardization upon the overall family size distribution. In this section, somewhat more sophisticated procedures will be used with the same goal.

First some suggestions will be offered for alternative analysis strategies according to the nature of the association. Our goal is to determine socio-economic differentials in desired family size, with the notion that these would become socio-economic differentials in actual completed family size if preferences could be implemented perfectly. Let P represent the stated personal ideal, F the actual family size, S a set of socio-economic predictors and C a set of demographic controls. Postponing the eventual need to define all these terms precisely, to include an error term, and to specify a functional form and a statistical technique, we can nevertheless classify the basic possible models. It may be helpful to refer back to Figure 1.3.2.

One may have good evidence that fertility is almost entirely the result of intentions and planning. In this case, the appropriate model is $P = f\ (S,\ C)$ and the analysis would necessarily omit any reference to actual family size as a predictor or control of the response variable. Every woman's actual family size F would eventually become her completed family size, which would be the same as her stated goal, P. Therefore, the analytic objective of the preceding paragraph would be accomplished. It is logically possible that some women would fall short of their goal because of impaired fertility, but efficient planning occurs empirically in societies in which there is little biological difficulty, as such, in achieving the small family size most women want. They might fall short for other reasons, such as marital dissolution, but such reasons may be classified as failures of implementation. The point is that in such a society, women will individually give stable statements of their preferences and, on the average, will achieve those preferences.

At the opposite extreme, the stated preference steadily rises as women have more children and final fertility is far in excess of the stated ideal. The preferences may have meaning, but they are poorly implemented. The appropriate model then is $P = f\ (S,\ C,\ F)$. Actual family size (F) must be included, to be regarded as either a control or an intervening variable. The coefficients of the socio-economic variables (S) in this model would represent the effect of these variables on P *net of* the bias due to F.

As a third possibility, one may simply be unable to accept either extreme of implementation or rationalization. The safest strategy is probably to use $P = f\ (S,\ C)$ for the women of shortest marital duration, for whom little rationalization has occurred.

As mentioned before, it is impossible to establish the direction of causation without appealing to additional information. If a country's fertility rates suggest natural fertility or if the only methods in use are traditional and relatively inefficient, then it will be plausible that there is heavy rationalization. The case will be strengthened if many women claim not to have wanted their last child. In a developed country, particularly for women who have used methods such as oral contraceptives and IUD's, there should be little rationalization.

In most countries, trends and heterogeneity will eliminate either extreme. But if there are reasons to believe that one causal direction heavily dominates the other, then one may wish to take advantage of the uni-directional models because they use the entire sample. Of course, it is also possible to equivocate, to try alternatives, to compare results, and to see whether the estimated differentials actually vary across strategies. Such will be our approach in this chapter. We shall illustrate two types of models for Sri Lanka.

In order to understand the importance of this issue for Sri Lanka, in particular, the reader should inspect Table 2.1.1., shown graphically as Figure 2.1.1. This table presents stated desired family size as a function of actual family size, but can be regarded the other way around if preferred. Actual family size is far more strongly correlated with the response than is any other variable, demographic or socio-economic.

Figure 2.1.1. Graphical Representation of Table 2.1.1.

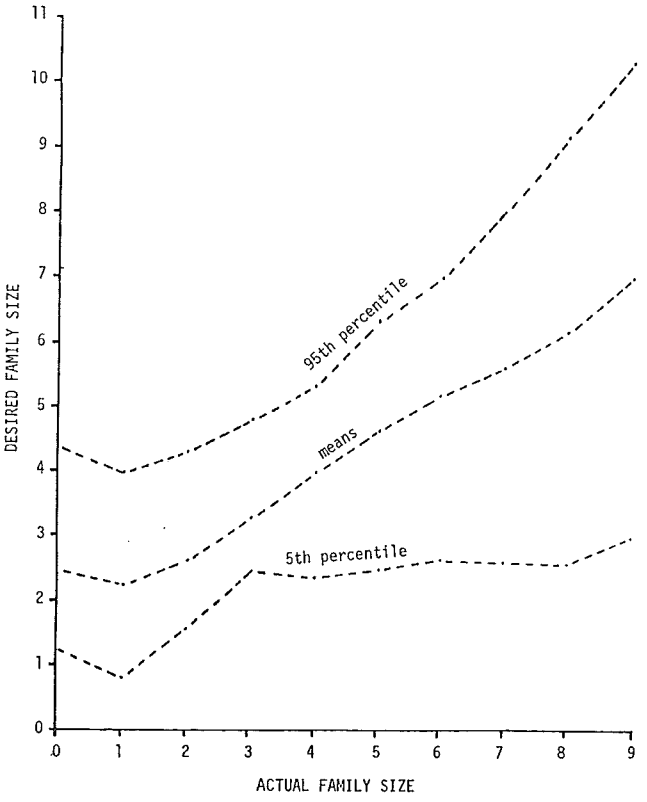


Table 2.1.1. Mean and 90 Per Cent Range of Stated Desired Family Size Within Levels of Actual Family Size (Including Any Current Pregnancy).*

Family Size	Number of Women (Weighted)	Mean Stated Ideal	90 Per Cent Range	
			Lower End	Upper End
0	452	2.503	1.28	4.35
1	1116	2.295	0.79	3.99
2	1076	2.653	1.59	4.33
3	990	3.302	2.45	4.76
4	822	3.938	2.35	5.33
5	676	4.649	2.47	6.31
6	505	5.223	2.68	6.97
7	384	5.636	2.65	7.96
8	275	6.133	2.61	9.09
9	150	6.972	2.97	10.29
10 or more	117	7.356	2.92	12.36
All	6564	3.748	1.57	7.42

* By linear interpolation, 5 per cent of the cases fall below the lower end and 5 per cent above the upper end.

It is not plausible to infer that this association developed in Sri Lanka purely or even mainly through implementation of preferences. As described in the First Report, the use of efficient contraception is recent and is not widespread. As we shall see, a large proportion of women did not want their last child. However, the total fertility rate was only 3.35 in 1975, far below natural fertility, and was declining. We shall therefore rely mainly upon strategies which are appropriate for combined effects of implementation and rationalization.

DESIRED FAMILY SIZE FOR THE TOTAL SAMPLE

The present strategy for the analysis of desired family size is appropriate if the response is strongly biassed by rationalization. In this event, actual family size may be regarded as a predictor of the response (or co-variante or control, depending upon one's choice of terminology). In the symbols described earlier, the present model is $P = f(S, C, F)$.

Family size will be represented by a set of dummy variables which distinguish family sizes 0, 2, 3, 4, 5, 6, 7, 8, 9, and 10+. When desired family size is regressed upon these binary variables (or, equivalently, a one-way analysis of variance is performed), we obtain R^2 = .560 (adjusted value .559). That is, 56 per cent of the variation in the response is accounted for by knowledge of actual family size. The magnitudes of the effects may be inferred from the first column of Table 2.1.1.

In Sri Lanka, the relation between desired and actual family sizes is nearly linear, particularly for family sizes two and above. However, R^2 is significantly larger (by a small amount) when there is full detail, so the variable will be included in this form.

The three age-related controls, which locate the woman in her life cycle, are then included. R^2 rises to .563, a rise of only .003, but highly significant. The co-efficients and standard errors are as follows:

Months of Age at First Marriage (AGEMAR);	– .0014 (.0003)
Months of Marriage at Latest Birth (DURLB):	.0006 (.0004)
Months Since Latest Birth (OPINT):	– .0012 (.0002)

The *standardized* coefficients are as follows:

Months of Age at First Marriage	– .0433
Months of Marriage at Latest Birth	.0289
Months Since Latest Birth:	– .0424

The linear effects for AGEMAR and OPINT are negative and indistinguishable in magnitude. Controlling for family size, women who married older want smaller families and women with longer open-intervals want smaller families. The linear effect for DURLB is positive but not significant. All three controls will be included because they are significant as a set and have the desirable additive property described earlier.

Each predictor, in the form of a set of binary variables, is now added into the regression of desired family size on actual family size (in full detail) and the three linear age-related controls. For each variable, the new value of R^2 and the increase in R^2 (based on unrounded values) are as follows:

Region	.569 (.005)
Type of Place of Residence	.565 (.001)
Ethnic Group	.566 (.003)
Education	.565 (.001)
Literacy	.565 (.001)
Religion	.566 (.003)
Pattern of Work	.565 (.002)
Occupation of Husband	.565 (.002)

These increases are all significant at the .01 level. However, no single variable accounts for more than half a per-cent of variation in the response beyond the contribution of the demographic controls.

Table 2.1.2 Results of Regression of Desired Family Size on Background Variables, Actual Family Size, and Age-Related Controls for All Family Sizes*

Region of Residence		
Zone 1	Omitted	
Zone 2	.0265	(.0652)
Zone 3	.3163	(.0715)
Zone 4	.3953	(.0860)
Zone 5	.4305	(.0812)
Zone 6	.2382	(.0638)
Type of Place of Residence		
Urban	– .1832	(.0390)
Rural	Omitted	
Estate	– .0797	(.0517)
Ethnic Group		
Sinhalese	Omitted	
Sri Lanka Tamil	.0893	(.0431)
Indian Tamil	.0468	(.0589)
Sri Lanka Moor	.3170	(.0613)
Education		
None	Omitted	
1-5 Years	– .0755	(.0409)
6-9 Years	– .1895	(.0465)
10 Years	– .1847	(.0626)
University	– .0992	(.1767)
Other Higher	– .1716	(.0986)
Literacy		
Not Literate	Omitted	
Literate	– .1560	(0359)
Religion		
Buddhist	Omitted	
Hindu	.0420	(.0394)
Muslim	.2664	(.0602)
Christian	– .2383	(.0568)
Pattern of Work		
Never Worked	Omitted	
Modern Work Before But Not After Marriage	– .1419	(.0600)

Other Work Before But Not After Marriage	.1116	(.0922)
Modern Work After Marriage	– .1174	(.0374)
Other Work After Marriage	.0655	(.0423)
Occupation of Husband		
Professional, Technical and Managerial	Omitted	
Clerical	.0555	(.0892)
Sales Workers	.1309	(.0748)
Farming, Fishing and Hunting	.1637	(.0644)
Non-Self-Employed in Agriculture	.0225	(.0693)
Services	.0315	(.0794)
Craftsmen	.0073	(.0656)
Unskilled	– .0075	(.0748)

* Coefficients for the controls are not shown; standard errors are given in parentheses. Each regression includes one background variable, expressed as a set of one or more binary variables. Effects are expressed as deviations from the "omitted" categories.

The magnitudes and standard errors of the estimated effects are given in Table 2.1.2. This table may be summarized briefly with the following observations:

1) The main contrast is between Zones 1 and 2 and all other zones. The effects are lowest for Zones 1 and 2 and highest for Zones 4 and 5; Zones 3 and 6 are intermediate but closer to Zones 4 and 5. The range in effects is .43 of a child.
2) For type of place of residence, the urban women are significantly below the rural and estate women, who are indistinguished; the range in effect is .18 of a child.
3) The Sinhalese and Indian Tamils cannot be distinguished; the Sri Lanka Tamils are significantly higher and the Sri Lanka Moors are much higher yet. The range in effects is .32.
4) Regarding education the main contrast is between those with five years or less and those with six or more years. The range in effects is .19 of a child. As expected, the desired number is negatively related to level of education.
5) The effect for literate women is .16 of a child less than that for literate women, producing a range nearly equivalent to that for education.
6) By religion, Muslim women have an effect .50 greater than that for Christian women, with Buddhists and Hindus halfway in between and indistinguishable from each other.
7) The effects for pattern of work are in keeping with theoretically based expectations. Women who did modern work either before or after marriage have significantly lower effects than any of the other three categories, which cannot be distinguished from one another. The range in effects is .25 of a child.
8) By occupation of husband, the sales workers and (self-employed) farmers, fishermen, and hunters have significantly larger effects than the other categories. The range is .17 of a child.

To summarize, the most important socio-economic predictors of desired family size, after actual family size and life-cycle position have been included, are region, religion, and ethnic group. These variables have their impact mainly through the low effects for Colombo and the Southwest, the low effect for Christians, and the high effects of the Moors/Muslims. The response also tends to be lower for women who ever did modern work, for women who are literate, and for women whose husbands are not farmers or sales workers.

Although most of these results could have been anticipated by a familiarity with Sri Lankan society, we would have expected that these variables would account for more of the variation in the response. The main conclusion is that the socio-economic variables are of definable but trivial importance in the identification of women who want large or small families once the controls are known. If they were more important, they would be examined next in combinations, such as region *and* ethnic group (checking for probable interaction effects). Under the circumstances, this would be little more than a mechanical exercise, of very limited interest, and will not be undertaken.

DESIRED FAMILY SIZE FOR EARLY MARITAL DURATIONS

The present strategy is also intended to cope with a substantial amount of rationalization in stated preferences. It has some advantage over the synthesis of several family sizes, which was attempted in the preceding section, in that women who have small families because of infecundity will be omitted. There will also be greater homogeneity. We shall deal with a subsample of women who are mostly young, better educated than the older women, and generally more modern in outlook. These women have a high probability of eventually using family planning, and their preference functions may be assumed to have greatest salience for them. Their current preferences do not necessarily represent the earlier preferences of the older women, but it is likely that their socio-economic differentials resemble those of the past and will persist in the future.

We shall consider women married less than five years. This interval is selected for convenience; the results would not be affected if it were shortened or increased by a few years. This is the largest marriage cohort and contains 1,295 women, a sufficient number for statistical analysis.

Before examining this marriage cohort in detail, consider how the relation between actual and desired family size varies with marital duration in Sri Lanka. Table 2.1.3. gives the proportion of women in each cohort whose desired family size is less than, equal to, or greater than their actual family size. Initially, the great majority of women want more children than they have, but in the later cohorts about half have exactly the number they want and most of the remainder have more. The correlation between the two variables, which is .737 for the aggregate, rises from .168 to about .700 in the later cohorts. Following the reasoning in Section 1.3., there is evidence of both rationalization and implementation, but neither can be said with certainty to be more important than the other. The women married less than five years show a markedly lower correlation between the two variables, however, and for them the effects can be overlooked.

Table 2.1.3. Proportion of Women Whose Desired Family Size Is Less Than, Equal To, or Greater Than Their Actual Family Size, and the Product-Moment Correlation Between the Two Variables, within Levels of Marital Duration, Sri Lanka: 1975.

Marital Duration	Desired Less than Actual	Desired Equals Actual	Desired Greater than Actual	Number of Women	Correlation
0- 4	.002	.173	.826	1296	.168
5- 9	.051	.497	.452	1196	.593
10-14	.152	.582	.266	1072	.702
15-19	.247	.537	.216	1021	.712
20-24	.276	.570	.155	841	.706
25-29	.320	.504	.176	726	.649
30-34	.366	.416	.218	344	.622
35+	.20	.50	.30	52	.617
All	.165	.459	.376	6546	.737

Consider, now, the youngest marriage cohort. The overall mean number of children desired by these women is 2.54. As before, the attitudinal response is first regressed on the three age-related controls, with a highly significant R^2 = *.0250*. The socio-economic variables are then added as sets of binary variables, with results given in Table 2.1.4. Region, Ethnic Group, Religion, and Occupation all add significantly to the regression at the .01 level, with (unadjusted) R^2 values thus ordered from Region downwards: Region is the most important single predictor of the response. It is somewhat disappointing that characteristics which are generally achieved rather than ascribed and which are more susceptible to policy intervention, such as level of education, literacy, and work history, do not show a significant relation to the response for this group.

Table 2.1.4. Multiple Correlation Coefficients for Selected Regressions of Desired Family Size on Socio-economic Variables, Women Married 0–4 years. Sri Lanka: 1975.

	Age-related Controls			
	Omitted		Included	
Variable	R^2	*df*	R^2	*df*
Region	.0336	1289	.0564	1286
Type of Place	.0073	1292	.0314	1289
Ethnic Group	.0218	1290	.0461	1287
Education	.0052	1289	.0297	1286
Literacy	.0021	1293	.0263	1290
Religion	.0196	1291	.0436	1288
Pattern of Work	.0088	1290	.0323	1287
Occupation of Husband	.0198	1286	.0415	1283
Region, Ethnic Group			.0668	1282
Region, Religion			.0706	1283
Region, Occupation			.0695	1278
Region, Ethnic Group, Religion			.0760	1279
Region, Ethnic Group, Occupation			.0797	1274
Region, Religion, Occupation			.0831	1275
Region, Ethnic Group, Religion, Occupation			.0880	1271

Of all pairs of variables which include Region, Table 2.1.4. shows that Region and Religion are most useful. Ethnicity does not add significantly to this pair (because of the high association between Religion and Ethnic Group); the addition of occupation is significant at the .05 level but not at the .01 level which we are using because of the design effect.

Region and Religion, plus the age-related controls, account for 7.06 per cent of the variance in the response. This relatively high percentage gives us more confidence in the estimates of effects. The estimates for Region, expressed as deviations from Zone 1, are as follows (standard errors are given in parentheses:

Zone 2:	−.0369	(.1019)
Zone 3:	.1626	(.1093)
Zone 4:	.2087	(.1373)
Zone 5:	.5425	(.1305)
Zone 6:	.2243	(.0994)

The effects for Religion, expressed as deviations from the Buddhists, are as follows:

Hindus:	−.0662	(.0742)
Muslims:	.3070	(.0962)
Christians:	−.2081	(.0878)

The effects of Region and Religion are additive and the contribution (to explained variance) of one is not affected by the presence of the other. The individual estimated effects also are nearly the same in the one-variable and two-variable models. They indicate that:

1) Region classifies the country into three general areas: Colombo and the Southwest (Zones 1 and 2) which have the smallest effects; the Northern tip (Zone 5), which includes large numbers of Sri Lanka Tamils, and has an effect half a child larger; and the remainder of the country, which is intermediate.
2) Religion also divides the population into three main types: first, the Christians, who have the lowest effects; second, the Muslims, who have an effect half a child greater; third, the Buddhists and Hindus, who are intermediate and are indistinguishable from one another.

Although the range in effects is considerable – half a child for each variable, or a fifth of the overal mean – it is easy to determine why the variables do not account for more of the variance in the response. In the case of Region, the three indistinguishable intermediate zones account for 59 per cent of the overall population of Sri Lanka. In the case of Religion, the range of half a child involves the small populations of Christians and Muslims. The bulk of the population, the 85 per cent who are Buddhists and Hindus, are intermediate. Thus, for both variables, the main contrast is between small sub-populations with the bulk of the population remaining undifferentiated.

SUMMARY

It is natural to ask now whether the conclusions of these two procedures are compatible. We have attempted to evaluate the effect of the socio-economic variables upon stated desired family size for the youngest marital duration group and in our analysis of covariance, for the entire sample depending upon whether some or much rationalizations, was assumed.

With few exceptions, the results agree as to the importance of the variables: Region and Religion/Ethnic Group are most important; Type of Place and Education/Literacy are least important; Pattern of Work and Husband's Occupation are intermediate. We had not expected Education/Literacy to have so little impact.

The corresponding categories of these variables generally group together in the same way, to the extent that differentials are statistically significant. This is especially true of the most important predictors.

The actual numerical estimates of coefficients do not agree so completely. However, if a careful comparison is made between the two strategies, nearly all the coefficients will be seen to agree within sampling variability. Therefore, in the case of Sri Lanka, both seem equally able to cope with the biassing effect of rationalization in describing what would be the differentials in completed fertility if stated preferences could be implemented.

It will be remarked, but not demonstrated, that quite different – and probably misleading – results are obtained if this bias is ignored and desired family size is simply regressed on the predictors. Different and misleading results are also obtained if such a regression is done *within* levels of actual family size.

2.2 PREFERENCES FOR ADDITIONAL CHILDREN

When child mortality is low, as in Sri Lanka, there should be close agreement between the stated personal ideal and the sum of (a) the current family size and (b) the additional number wanted. Discrepancies will partially reflect the subtler aspects of the questions and partially

reflect problems of reliability and validity.

In Sri Lanka, 61 per cent of the women said that they wanted no more children. The women are cross-tabulated in Table 2.2.1 according to their stated ideal and their actual family size. Twenty-five per cent of them are above the main diagonal, that is, already had more than their stated ideal, and many had at least three children more than their stated ideal. Differences of this sort, if taken at face value, imply substantial unwanted fertility but not inconsistency between the responses.

However, of these women who want no more children, 8 per cent are *below* the main diagonal, that is, have not yet reached their personal ideal. We hypothesize that these women want to stop before achieving their ideal because of subtle differences in the questions. Briefly stated, the question 'If you could choose exactly the number of children to have in your life, how many would that be?' may suggest to the woman that related characteristics are also subject to control or revision. If these related contingencies could be modified, then she might, say, be able to afford more children.

Of the women who *do* want more children, 90 per cent want exactly the additional number that would bring them up to their stated ideal, i.e., are on the main diagonal of Table 2.2.2 which tabulates the stated ideal versus (a) + (b). Most of the remaining 10 per cent have a discrepancy of only one child, which more often than not is a shortfall of the preceding type.

At any rate, regardless of possible explanations, a maximum of 9 per cent of all women show a deviation between the two preferences which could be interpreted as indicating cognitive inconsistency, or unreliability, etc., and nearly all of these cases amount to a difference of only one child.

Because of the close agreement between these two readings of the woman's preference function, it would be superfluous to do a separate analysis of the additional number of children desired. Hence we turn directly to the dichotomy of whether the woman does or does not want another child (coded 1, 0, respectively).

Table 2.2.1 For Women Who Want No More Children, the Frequency Distribution According to Stated Ideal Family Size and Actual Family Size (Including Any Current Pregnancy), Sri Lanka: 1975.

	Actual Family Size										
Ideal Family Size	0	1	2	3	4	5	6	7	8	9	10+
1	0	90	1	1	1	0	0	0	2	0	0
2	0	29	383	37	33	19	11	8	8	0	0
3	2	12	44	510	80	67	52	27	23	10	9
4	0	0	10	48	414	44	41	48	30	7	10
5	0	1	2	9	24	307	36	42	27	20	6
6	0	0	0	0	6	14	190	12	6	3	6
7	0	0	0	0	2	4	10	113	7	2	2
8	0	0	0	0	0	1	4	8	66	6	3
9	0	0	0	0	0	0	1	4	4	41	0
10+	0	0	0	0	0	1	0	1	1	8	24

Table 2.2.2. For Women Who Want More Children (or Are Undecided), the Frequency Distribution According to the Stated Ideal Family Size and the Sum of Actual Family Size (Including Any Current Pregnancy) and Additional Number of Children Wanted, Sri Lanka: 1975.

	Actual Family Size Plus Additional Number Wanted									
Ideal Family Size	1	2	3	4	5	6	7	8	9	10+
1	9	2	1	0	0	0	0	0	0	0
2	10	597	13	2	2	1	0	0	0	0
3	0	43	559	28	9	0	0	0	0	0
4	0	3	22	260	8	1	1	0	0	0
5	0	1	4	12	93	2	0	0	0	0
6	0	0	0	3	3	31	1	2	0	1
7	0	0	0	1	0	2	14	0	0	0
8	0	0	0	0	0	0	0	4	2	0
9	0	0	0	0	1	0	0	1	5	0
10+	0	0	0	0	0	0	0	0	2	2

DESIRE TO CONTINUE CHILDBEARING: THE CONTROLS

Only 4 per cent of the Sri Lankan respondents were undecided about whether they wanted another child, and they will be grouped with those who said they did want more, in order to avoid underestimating desired levels of fertility. To reduce some of the statistical problems associated with a binary dependent variable, our strategy here is limited to separate analyses within levels of current family size. Another reason for doing this is that the determinants of the desire to stop childbearing are of more interest at certain current family sizes then at others. In Sri Lanka, the critical current size is two; 53 per cent of the women with two children want no more, and the percentage rises steeply for larger families. This discussion will deal exclusively with the subsample of women with two children. In all categories of two-child women the percentage wanting no more is well within the range of 10 per cent to 90 per cent for which it is generally assumed that a linear model is acceptable and the standard statistical tests are sufficiently robust to be used.

All three additive components of age will again be used as linear controls. Among two-child women (counting a current pregnancy as equivalent to a living child), all three components are significantly (at the .01 level) related to the desire to continue. The coefficients from the multiple regression on the three, with standard errors in parentheses, are as follows:

AGEMAR:	−.00076	(.00029)
DURLB:	−.00142	(.00039)
OPINT:	−.00204	(.00031)

The standardized coefficients are −.088, −.123, and −.213, respectively; R^2 = .066 for the regression, based on 885 (weighted) cases.

The most important control here is on the length of the open interval. Of two-child women, the ones who want more children have a mean open interval of 30 months; for those who do not want more the mean is twice as long, 60 months. Of course, some of those not wanting more have been using contraception effectively, and this has lengthened their open interval. Yet, even among non-users, women who want no more children tend to have long intervals. This association suggests (but cannot prove) that a long open interval, even if only the result of chance and not of planning, can incline a woman to want no more children: that is, a long but unplanned interval without a birth may lead to a desire to have no more births.

Focusing, for example, on the two-child women who have never used a method and do not even *intend* to use one, the open interval is 27.86 months for those wanting more and 46.83 for those wanting no more. The standard errors are 2.58 and 4.34 months, respectively. The difference is highly significant. (For women intending future use, the difference is in the same direction but is not significant. The above means exclude women who have gone ten years or longer without a birth).

In contrast with the analysis of desired family size (see Table 2.1.2.), here the marital duration at last birth is highly significant (in a negative direction). The quicker the woman had her two children, the more likely she is to want to continue. Thus all three components of age operate in the same negative direction. All three coefficients are somewhat different because of the change in dependent variables.

DESIRE TO CONTINUE CHILDBEARING: SOCIO-ECONOMIC DETERMINANTS

As before, the background variables may now be entered into the above regression in the form of sets of binary variables. For each background variable we now give the value of R^2 for these regressions, and the increment above the R^2 for the regression on the controls only. (These Differences are calculated prior to rounding.)

Region	.081	.015
Type of Place of Residence	.068	.003
Ethnic Group	.073	.008
Education	.074	.008
Literacy	.066	.001
Religion	.072	.007
Pattern of Work	.082	.019
Occupation of Husband	.090	.024

Region is a statistically significant predictor at the .05 level (which thus far we have found declined to consider significant); Pattern of Work and Occupation of Husband are significant at the .01 level. These are the only variables which add more than 1 per cent to the explained variance. The effects for these three variables, represented as deviations from the effect for the omitted category, are given in Tables 2.2.3. The major contrast by Region is between Zones 1 and 5, with a range of .26 in their effects. According to Pattern of Work, categories 2 and 5 have effects which are significantly greater than for those who never worked, but this pattern is not easily interpreted and disagrees with earlier findings for this variable. The range is .12. Finally, for Occupation of Husband, the Sales Workers have a significantly larger effect than any of the other occupational categories, with no other notable contrasts; the range is .30.

Table 2.2.3 Results of the Statistically Significant Regressions of Desire for Another Child on Background Variables and Age-Related Controls for Two-Child Families*

Region of Residence		
Zone 1	Omitted	
Zone 2	.0409	(.0627)
Zone 3	.0879	(.0725)
Zone 4	.0720	(.0892)
Zone 5	.2589	(.0863)
Zone 6	.1332	(.0615)
Pattern of Work		
Never Worked	Omitted	
Modern Work Before But Not After Marriage	.1149	(.0595)
Other Work Before But Not After Marriage	.0250	(.0819)
Modern Work After Marriage	.0757	(.0423)
Other Work After Marriage	.1184	(.0493)
Occupation of Husband		
Professional, Technical, and Managerial	Omitted	
Clerical	− .1285	(.0818)
Sales Workers	.1703	(.0758)
Farming, Fishing, and Hunting	− .0194	(.0634)
Non-Self Employed in Agriculture	− .0067	(.0686)
Services	− .1021	(.0775)
Craftsmen	.0313	(.0614)
Unskilled	− .0492	(.0769)

* Coefficients for the controls are not shown; standard errors are given in parentheses. Each regression includes only one background variable, expressed as a set of one or more binary variables. Effects are expressed as deviations from the omitted categories.

As Table 2.2.3. shows, our earlier examination of two-child women produced a highly significant role for Religion, which is not found significant here. Otherwise, Region, Pattern of Work, and Occupation of Husband are the most important variables in both analyses. The coefficients are in general agreement for Region and Occupation of Husband, but do not correspond (in rank order) for Pattern of Work. Thus, there is mixed agreement between the two analyses regarding the impact of the predictors on the fertility preferences of two-child women.

In order to achieve a full correspondence between these two readings of the preference function, the statistical analysis of the desire for more children should be repeated for women married less than five years. However, the proportion of such women who want another child is too high to justify regression, and too few of them have two (or more) children. The analysis should also be extended to the full sample, as was the analysis of desired family size. Unfortunately, the analysis of covariance is not adaptable to a binary dependent variable which varies as much as the desire to continue childbearing varies across actual family sizes. (The Additional Number Wanted is not defined as a binary variable, but because the great majority of responses are 0 or 1, it is subject to the same limitations as a binary variable). There are only two possible approaches for which statistical tests would be defensible. The first would be a log-linear model based on the cross-tabulation of the binary dependent variable, actual family size, and a (categorical) predictor variable. But such an approach could not permit inclusion of the age-related controls in linear form; as seen for the two-child women, these controls are essential and their omission would distort the role of the predictors. Second, it would be possible to use logit regression. This is, to the author's knowledge, the only technique which would permit inclusion of all the controls and tests for significance.

Logit regression procedures are not available generally, and they are not available specifically to the author at this time. This section must end with these unsatisfying conclusions: (a) For the two-child women, who are critical in the sense that nearly half want no more children, the background variables play a role which is only roughly similar to their role in the ideal family size of two-child women – in brief, low effects for Colombo and the Southwest and a high effect for the Sales Workers (many of whom are Muslims). (b) A satisfactory statistical analysis which combines all family sizes for comparison with the last part of Section 2.1 is not presently possible.

2.3 A SYNTHETIC COHORT APPROACH

It would be desirable to analyse the desire for another child in such a way that the different actual family sizes could be combined. In the last section a method for doing this was described (but not carried out). That method, logit regression, would be statistically valid but would not take into account the actual demographic or family-building process. Instead, this section will develop an adaptation of the life table or synthetic cohort approach.

In brief, the proportion of women at each actual family size who state they would like to continue childbearing will be treated as a parity progression ratio. These estimated ratios are used to generate the family size distribution which would result if an artificial cohort passed through the family-building process. The mean and variance of this distribution will be of particular interest.

This approach also requires the use of responses to the question, 'Thinking back to the time before you became pregnant with your last child, had you wanted to have any more children?' These responses are required because the desired parity progression ratios should be based only on the women who wanted to achieve their current family size. The goal is to determine the family size distribution which would result if cross-sectional preferences were implemented; in this hypothetical situation some women would not have as large a family as they actually have, and the synthetic distribution would be biassed upwards if this effect were ignored.

Regardless of the theoretical model one has in mind, the two questions about desire for another child and desire for the youngest child (as it is carefully worded) must come closest to the micro-level process. The former question, in particular, has maximum immediacy and requires only a simple comparison of the utility of the current family size with that of the next higher size. If the woman has formulated any preferences at all, they will as a minimum have implications for these two adjacent family sizes. And if this variable is regarded as simply a forced dichotomization of the question on additional number wanted, there must, on simple statistical grounds, be a reduction of response error.

Most of the previous literature inclines to the sequential decision-making model for the underlying process. Even if the notion of a preference function as described in Section 1.3 is discarded, the responses to the present question can be interpreted as defining the most elementary level of decision-making. If the woman cannot plan her fertility at all, then this question may be meaningless to her; but in Sri Lanka, at least, there is good evidence that the woman is prepared with a response. Only 4 per cent of the women responded 'Undecided'.

The question about desire for the latest pregnancy also involves a comparison of adjacent utilities. However, it may be argued (as in the previous discussion of the correlation between desired and actual family sizes) that the woman will tend to rationalize her latest birth. If this is the case, the effect will be to bias downwards the estimated parity progression ratios. The amount of bias may vary from one group to another.

In defense of using this response (and this is the only place in this paper where it is used) we offer two comments. First, it may easily be shown mathematically that the estimated parameters of the synthetic distribution are far more sensitive to the responses on future fertility than to the responses on the latest child. Second, for Sri Lanka in particular, the distribution of responses to the retrospective question corresponds well with the pattern for the prospective question. For example, here too only 4 per cent of the responses were 'Undecided'. The percentages at each family size who stated they did not want their last pregnancy (limited to the same women for whom the prospective question has been used) were as follows: 1 child, 1.4 per cent; 2 children, 15.1 per cent; 3 children, 28.1 per cent; 4 children, 50 per cent; 5 children, 68.4 per cent; 6 children, 74.2 per cent; etc. (For larger family sizes, the responses are unstable; more relevant, virtually all calculations in this section will be unaffected by the larger sizes because of the small proportion wanting another child).

The procedure may be described as follows. First the parity progression ratio p_i, referring to transitions from family size i to $i + 1$, is estimated as the proportion of (a) those women who wanted their latest child or pregnancy, (b) who want another child. These ratios are defined for $i = 0, 1 \ldots, I$, where I is the maximum observed parity for which $p_i > 0$. The women who are undecided about an-

other child are again classified with those who want more. However, those undecided about their latest child are classified with those who did *not* want latest child. This allocation of the 'undecided' cases slightly raises the estimated parity progression ratio. The upward shift is quite small for Sri Lanka.

Let P_i be the expected proportion of women in the synthetic cohort who will have completed family size i. These women will start their reproductive careers with no children and will progress sequentially to their i-th child, stopping there, so that

$$P_i = (1 - p_i) \prod_{j=0}^{i-1} p_j. \qquad (1)$$

The mean completed family size will then be

$$M = \sum_i i P_i \qquad (2)$$

This measure is comparable to the mean age of a stationary population which is subjected to a specific regime of mortality. Just as that mean age is free of the observed age structure and reflects only the age specific probabilities of dying in an interval of age, M is free of the parity composition of the sample. The variance of the distribution is given by

$$\sum_i i^2 P_i - M^2 \qquad (3)$$

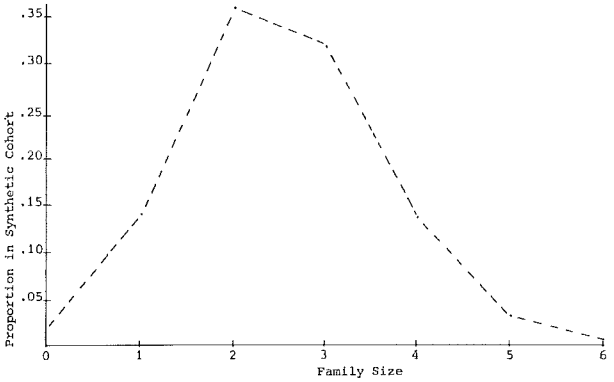
Table 2.3.1. Calculation of the Synthetic Family Size Distribution for the Entire Sample of Women Who Are Married and Fecund or Sterilized for Contraceptive Purposes*, Sri Lanka: 1975.

Actual or Synthetic Family Size, i	Sample Size (Weighted)	p_i	P_i
0	356	.983	.017
1	933	.862	.136
2	754	.581	.355
3	600	.358	.316
4	323	.225	.137
5	214	.195	.032
6	115	.111	.007
7	72	.123	.001
8	35	.329	.000
9	32	.108	.000
10	11	.000	.000

Mean of synthetic distribution: 2.547; Standard deviation, 1.089.
* See text for definition of symbols.

Table 2.3.1. gives the estimated parity progression ratios and the synthetic family size distribution if stated preferences were implemented in Sri Lanka. The distribution is also shown graphically in Figure 2.3.1. There is relatively little dispersion in the distribution, with about a third of the synthetic families at size 2, a third at size 3, and the remaining third nearly evenly divided between the sizes above and below this range. Nearly 95 per cent of the women would have families with one through four children. Because the number of families above six children would be negligible, the remaining calculations of this section have this upper limit.

Figure 2.3.1. The Completed Family Size Distribution of the Synthetic Cohort, Sri Lanka: 1975.



It may be noted that the synthetic distribution is similar to the distribution of stated desired family size for women married less than five years but is less concentrated. For that subgroup, the proportions wanting 0, 1, 2, 3, 4, 5+ children are .000, .045, .485, .347, .095, and 0.24, respectively. There are two reasons for this. First, it may be assumed that rationalization was not a major factor in the statements of desired family size for women married recently. Second, the synthetic distribution is most affected by the estimated parity progression ratios for the smallest family sizes, as may be seen from an examination of equation (1).

When the synthetic cohort approach is applied to socio-economic subgroups, the principal differences seen earlier appear again. The categories of Region, Type of Place of Residence, Ethnic Group and Region, are ordered essentially as with stated desired family size. However, there are some changes in the ordering of the categories of Education, Literacy, Pattern of Work, and Husband's Occupation. This discrepancy between measures is not troublesome because the latter, achieved variables, are less important predictors and most differences between their categories are statistically insignificant by any measure.

Alternative estimates of the parity progression ratio in a synthetic cohort can be developed using the data on current family size, desire for the latest birth, and desire for another child. All of these synthetic estimates, including the procedure described above, must be used cautiously, recognizing that these three types of data cannot possibly tell us with certainty the first parity at which each woman would have stated (or will state) that she wants no more children. The present procedure, for example, may be shown under plausible assumptions to be unbiased if there is no implementation of preferences. But if preferences are being implemented, then each current parity will include a large accumulation of women who intentionally stopped at that parity long before the date of the survey. These accumulations will inflate the denominator of each p_i and will bias downwards each estimated parity progression ratio. In Sri Lanka there is little evidence of an accumulation of women who stopped at their desired family size many years before the survey, and the bias is not believed to be substantial, at least not for the total and not for most socio-economic subgroups.

As stated above, other synthetic procedures can be developed, with varying degrees of bias across the range from no implementation to full implementation of preferences. Despite their weakness these procedures are more sensitive to the underlying demographic, family building process than are the coefficients of standard statistical techniques such as multiple regression, and their careful use is encouraged.

2.4 IMPLICATIONS OF SEX COMPOSITION FOR NUMBER PREFERENCE

Preferences for certain combinations of sons and daughters can be measured in two rather different ways using WFS data. First, the sex composition of the current family may be viewed as a partial determinant of stated desired family size and the desire to continue childbearing. In this case, no use is made of the question on preferred sex of the next child and the objective is to find whether, and how, preferences for number depend upon sex composition. If, for example, women with fewer sons than daughters regularly want larger families than would be expected from actual family size alone, one may infer a cultural bias which favors either equal numbers of sons and daughters or an excess of males. The former composition, described as 'balanced', is implied if women who have a shortage of daughters also want more children than would be expected; otherwise, a preference for sons is suggested. Another logical possibility would imply a preference for daughters, but in a largely agricultural society with a dowry system this would be an unlikely cultural bias. The statistical impact of sex composition on desired family size or on the desire to continue childbearing can be evaluated by a straignt-forward extension of the earlier discussion of these variables, in which the impact of current family size was evaluated. There are several related ways in which to perform such an analysis, some of which will be offered in this section.

Second, for those women who want another child (and for those currently pregnant), the stated preferred sex of the next child can be used as a dependent variable. It, too, may be partially determined by the sex composition of the current family. This variable will be deferred to Section 2.5.

Some fertility surveys include explicit questions on the preferences for different sex compositions. Such items are not included in the WFS Core Questionnaire, but some cautious speculations about preferred combinations will be made. Other surveys have used the so-called Coombs' Scale, based on unfolding techniques, which produce a hierarchy of preferences for each respondent. This scale is also not in the WFS Core Questionnaire, and it is impossible to infer the individual woman's preference hierarchy from our data. Our comments must be limited to the aggregate pattern of preferences, based on the individual's first preference, as in the earlier sections.

This section will go into considerable detail because the possible impact of sex composition on preferences for numbers is substantively much more important (in the context of fertility research in developing countries) than stated sex preference as a dependent variable. In this section, the evidence of sex preference will in fact be identified with the indications of such an impact. This emphasis is based on the premise that preferences for numbers are being implemented, or in the future will be implemented, by contraceptive use, whereas explicitly stated sex preferences are *not* being implemented. If techniques were available for the implementation of stated sex preferences (and eventually they may well be) then greater substantive importance would be attached to them.

STATED DESIRED FAMILY SIZE

In the first part of this section the dependent variable is stated desired family size. In examining the distribution across all possible responses to this variable, it is initially convenient to restrict attention to a subset of women with differing sex composition but the same actual family size. Two-child families will be used for this purpose because the three possible sex compositions which they include represent clearly the extremes of imbalance as well as perfect balance. Moreover, in Sri Lanka the two-child family has the critical property that about half the women at that level want to stop childbearing.

Two-child families may be subdivided into those with two sons, one son and one daughter, and two daughters. Table 2.4.1. gives the complete desired family size distribution for women with these types of families in Sri Lanka. This table includes women who were pregnant with a third child, a fact which may have altered their stated ideal but which should not have affected the relationship between current sex composition and the response.

Table 2.4.1 Per Cent Distribution of Stated Desired Family Size for Women Having Two Sons, One Son and One Daughter, or Two Daughters, Sri Lanka 1975.

	Stated Desired Family Size								
Sex Composition	1	2	3	4	5	6	7+	Mean	Number of Cases
2 boys	0.4	40.7	43.5	11.6	3.2	0.7	0.0	2.79	285
1 boy, 1 girl	0.2	55.6	31.5	9.7	2.8	0.2	0.0	2.60	536
2 girls	1.7	38.0	46.0	10.1	3.4	0.4	0.4	2.78	237

The mean desired family sizes are 2.79, 2.60 and 2.78, for the three types, respectively; the standard deviations are .82, .79 and .86, respectively. The mean is .19 less for balanced families than for the two imbalanced types grouped together. The t statistic for this difference is 3.71, which is highly significant. On the other hand, the difference between two-son and two-daughter families is negligible and not statistically significant.

The interpretation of this pattern is simply that the respondents tend to prefer balanced families. Women with two sons or two daughters want an average of one-fifth of a child more than those who already have one of each. Since approximately half of all two-child families are imbalanced, it may be roughly estimated that if preferences for numbers at this stage were implemented, about one-seventh of all children beyond two would be the result of sex imbalance. (The excess in ideal family size is 2.79 – 2.60 = .19 for the unbalanced families, and the average ideal family size for all two-child women is 2.69, i.e., .69 more than they have. Therefore a fraction (.19/2)/.69 = .14 of additional children would be a result of sex imbalance. Note that in this calculation, pregnant women are counted with the two-child women, whereas they would have been counted with three-child women in earlier sections).

The variances of the desired family size distributions differ significantly from one another for the three types of two-child families, according to Bartlett's test for the homogeneity of variances. This observation is simply made in passing; the differences are believed to result simply from the skew in the responses and the differences in means.

It would be possible to repeat the above type of analysis for women with three children, four children, etc., but a mechanism for combining or synthesizing the various family sizes would be preferable. Therefore, we pass to Table 2.4.2., which provides the mean desired family size of women having any combination up to four sons and up to four daughters. Women who are currently pregnant are omitted. Table 2.4.2. encompasses 62 per cent of all ever-married women in the Sri Lanka sample.

Women who are currently pregnant will be omitted because of the difficulty of describing their current sex composition. Earlier it was noted that a pregnancy has the same statistical effect upon the response as an additional birth. However, since the sex of the unborn child is not known, the inclusion of pregnant women would cause the family size to differ from the number of sons plus the number of daughters. The easiest way to avoid this anomaly is to confine the analysis to non-pregnant women.

The standard tabulation plan for the First Country Report includes a version of Table 2.4.2. Here, however, more decimal places are provided and, more important, the cell means were obtained through a one-way analysis of variance procedure, which yields E^2, the proportion of variance in the response accounted for by full detail on sex composition, and thus the equivalent of R^2. (Women with five or more sons or five or more daughters were grouped into eleven other categories, not presented in Table 2.4.2., but included in the calculations. Comparisons will be made between methods using different definitions of upper open-ended categories because the effect of these differences on the results is negligible).

With this amount of detail, $E^2 = R^2 = .565$ (adjusted value .562) with 5872 degrees of freedom. That is, 56.5 per cent of the variance in desired family size is accounted for by the detailed sex composition.

The interest is in whether sex composition adds information beyond knowledge of family size. Therefore, a similar one-way analysis of variance was performed using all ever-married non-pregnant women (in Section 2.1., a similar analysis of variance included pregnant women). The observed mean in the response is then as follows: No children, 2.504; one child, 2.276; two children, 2.634; three children, 3.307; four children, 3.946; five children, 4.629; six children, 5.236; seven children, 5.606; eight children, 6.172. For this analysis (including a 9+ category), $E^2 = R^2 = .559$ (adjusted value .559) with 5987 degrees of freedom. The increase in the proportion of variance explained is .565 − .559 = .006 when sex composition is known. The increase is statistically significant at the .01 level, but is quite small.

On the average, those women in the twelve 'balanced' cells want a fraction .034 of a child less than their actual family size would suggest. Those with an excess of sons want a fraction .071 more than would be expected, and those with an excess of daughters want .074 more than would be expected. These quantities are obtained by weighting the deviations in Table 2.4.3. according to the number of women in each cell. The inferences from the two-child families are thus bolstered. There are not enough cases to justify a detailed discussion or comparison of specific means or deviations.

Table 2.4.3. The Difference Between Observed Mean Desired Family Size in Table 2.4.2. and Expected Mean Implied by Family Size (Sons plus Daughters) Alone. Sri Lanka, 1975.

Number of Daughters	Number of Sons 0	1	2	3	4
0	0	.046	.111	.023	.126
1	− .050	− .101	− .085	.075	.033
2	.097	− .031	− .057	− .003	.037
3	.341	− .038	.021	.003	− .203
4	.037	− .090	.111	.015	.207

The deviations between the simpler and more complex models are given in Table 2.4.3. There are similarities to the findings for the two-child families discussed above. Ignoring the cell for no children, for which the two models must agree, eight of the twelve cells on or adjacent to the main diagonal are negative. These are the women who are as near as possible to equal numbers of sons and daughters, and they tend to want smaller families than the total alone would imply. Ten of the remaining twelve, somewhat unbalanced, want larger families, the complement of this finding. The six cells in the upper right triangle, referring to women with an excess of sons, are all positive, whereas only four of the six cells representing an excess of daughters are positive; moreover, the mean deviation is greater in the upper right triangle.

DESIRE FOR MORE CHILDREN

Now consider as a dependent variable the woman's desire to continue childbearing. The wording of this question makes the response clearly conditional upon the woman's current family status, implicitly including the sex composition of her present family. If the woman is dissatisfied with her present sex composition, the greater specificity of this question as compared with the one on ideal family size may well result in a clearer indication of her desire to have more children in hopes of achieving a preferred composition.

Currently pregnant women will again be omitted as will be women who were not currently married or who believed themselves unable to have more children. Women sterilized for contraceptive purposes will be included as wanting no more children.

Table 2.4.2. Mean Stated Desired Family Size for All Ever-Married Non-Pregnant Women, According to Number of Living Sons and Number of Living Daughters, Sri Lanka: 1975.

Number of Daughters	Number of Sons 0	1	2	3	4
0	2.504 (352)	2.322 (389)	2.745 (202)	3.330 (102)	4.072 (39)
1	2.226 (375)	2.533 (387)	3.222 (279)	4.021 (138)	4.662 (68)
2	2.731 (174)	3.276 (254)	3.895 (217)	4.626 (143)	5.273 (90)
3	3.648 (89)	3.908 (148)	4.650 (163)	5.239 (109)	5.403 (73)
4	3.983 (33)	4.539 (74)	5.347 (65)	5.621 (69)	6.379 (40)

Note: Frequencies are shown in parentheses.

Among this subset of the Sri Lanka sample, Table 2.4.4. gives the percentage of women with each current sex composition who want another child. For any given total, the composition having the smallest percentage who want to continue may be considered the preferred composition. For example, among women having only one child, the percentages wanting more are 64.1. per cent if the child is a girl and 69.3 per cent if the child is a boy, so we would infer that one daughter is preferred to one boy. Using this simple procedure the following preferences are found within family sizes one through five:

Actual Number of Children	Preferred Number of Sons	Preferred Number of Daughters
1	0	1
2	1	1
3	2	1
4	3	1
5	4	1

A pattern emerges which is compatible with the earlier inferences in this section but is also a refinement. The desire to have a daughter dominates the desire to have a son at low parities. As family size increases, the desire for sons increases (relative to that for daughters), *so long as* there is one daughter. Within each current total (i.e. diagonal of Table 2.4.4.), the principal contrast is between (a) women who have one sex only and (b) women who have at least one child of each sex.

Table 2.4.4 may be used to respond to the following question: Of the women who want another child, what fraction can be attributed to the condition of extreme imbalance? Consider, for example, women with three children. Of these women (restricted as above), 17.7 per cent want another child. However, of those with at least one boy and one girl, only 12.2 per cent want another child. Women with extreme imbalance are (relatively) much more likely to want another child. Of the 230 women with three boys or three girls, 77 want another child (33.5 per cent). If extreme imbalance were not an undesirable condition, we infer that only (.122) (230) = 28.1 would want another child. Therefore an excess of 77–28.1 = 48.9 women want another child simply for compositional reasons. They comprise a substantial portion of the 156 three-child women who want to continue, namely 48.9/156 = .313. To sum up, 31.3 per cent of the three-child women who want another child can be attributed to the condition of extreme imbalance.

In similar fashion, analogous percentages may be calculated for other family sizes. (Beyond family size four, the percentage who want another child is negligible and the frequencies with specific compositions become too small to support stable percentages). Of those women wanting more children, a substantial fraction appear to do so because they are dissatisfied with their present composition. For family sizes 2, 3, and 4, percentages of 27.5 per cent, 31.3 per cent and 32.1 per cent, respectively, may be inferred to want more children simply because they have no sons or no daughters. Aggregating family sizes two through four, 29.1 per cent of the women who want another child appear in the form of an excess in the categories of extreme imbalance, and therefore may be attributed to dissatisfaction with imbalance.

The responses on desire for another child will now be used to determine whether there are differentials in sex or composition preferences between socio-economic subgroups. Initially, consider only those women with two living children at the date of interview, classified according to type of place of residence. The proportions who want another child within each of the three possible sex compositions are given in Table 2.4.5. (The 'totals' row and column of this table are included in the tabulation plan for the First Country Report).

Table 2.4.5. The Percentage of Non-Pregnant Women with Two Children Who Want More, According to Sex Composition and Type of Place of Residence, Sri Lanka: 1975.

Sex Composition	Urban	Rural	Estate	Total
2 boys	63.6 (33)	58.7 (155)	* (15)	58.9 (202)
1 boy/1 girl	37.9 (87)	41.4 (261)	39.5 (38)	40.5 (388)
2 girls	40.5 (42)	72.0 (118)	* (13)	62.1 (174)
Total	44.1 (161)	53.3 (535)	40.3 (67)	50.3 (763)

Note: Base frequencies are shown in parentheses.
* Percentage not calculated because base is less than 20.

Overall, as seen before, women with only one sex of child are half again as likely to want another child as those with one boy and one girl, and there is not a significant

Table 2.4.4. Percentage of Women at Each Composition Who Want Another Child, Sri Lanka: 1975.*

Number of Daughters	Number of Sons 0	1	2	3	4	5+
0	76.8 (447)	69.3 (473)	40.9 (253)	25.2 (127)	22.8 (45)	16.0 (36)
1	64.1 (461)	24.6 (482)	11.0 (331)	3.5 (188)	0.9 (100)	3.1 (78)
2	46.5 (215)	13.7 (319)	4.0 (283)	2.1 (195)	0.6 (119)	1.3 (105)
3	43.9 (103)	5.8 (186)	4.6 (201)	2.3 (150)	0.0 (99)	1.0 (79)
4	21.0 (46)	7.4 (94)	0.8 (97)	0.0 (103)	1.2 (63)	0.0 (56)
5+	1.9 (23)	3.1 (84)	1.7 (83)	3.7 (96)	0.0 (56)	0.0 (42)

* Confined to ever-married, non-pregnant women.
Note: Base frequencies are shown in parentheses.

Table 2.4.6. Coefficients of the Five Main Types of Current Sex Composition (SEXBAL), from the Regressions of Desire for Another Child (Yes or Undecided = 1, No = 0) on These Categories Plus Dummy Variables for Each Family Size within Each Socio-Economic Category, Sri Lanka: 1975.

Variables	Categories of SEXBAL				
	– 2 (All Boys)	– 1	0	1	2 (All Girls)
Total	+ .200**	– .012	0	+ .024	+ .222**
Type of Place of Residence					
Urban	+ .269**	– .061	0	– .012	* 148**
Rural	+ .173**	+ .010	0	+ .041	+ 272**
Estate	+ .244**	– .045	0	– .035	+ .056
Region					
Zone 1	+ .351**	+ .016	0	+ .086	+ .388**
Zone 2	+ .212**	– .062	0	– .031	+ .220**
Zone 3	+ .203**	– .035	0	+ .092	+ .212**
Zone 4	+ .295**	+ .078	0	+ .124	+ .307**
Zone 5	+ .180*	– .028	0	+ .071	+ .100**
Zone 6	+ .144**	+ .010	0	+ .004	+ .197**
Ethnicity					
Sinhalese	+ .181**	– .010	0	+ .009	+ .239**
S.L. Tamils	+ .225**	– .052	0	+ .053	+ .178**
Ind. Tamils	+ .241**	+ .042	0	+ .039	+ .080
S.L. Moors	+ .342**	– .011	0	+ .118	+ .334**
Religion					
Buddhist	+ .180**	– .012	0	+ .014	+ .276**
Hindu	+ .191**	– .037	0	+ .018	+ .132**
Muslim	+ .345**	– .003	0	+ .119	+ .328**
Christian	+ .278**	+ .029	0	+ .053	– .051
Education					
None	+ .213**	– .004	0	– .048	+ .158**
1-5 years	+ .199**	+ .036	0	+ .075*	+ .270**
6-9 years	+ .199**	– .053	0	+ .027	+ .172**
10 or more	+ .148**	– .129*	0	– .075	+ .219**

Note: Coefficient for SEXBAL = 0 is constrained to zero. Pregnant women are omitted. Significance indicated by '*' for 0.5 level and by '**' for 0.1 level.

difference between those with two boys and those with two girls. In the urban and rural areas, those with one of each are again least likely to want another, but sharp differences between the extremes emerge. Of the rural women with two sons, 58.7 per cent want to continue, but of those with two daughters, a very high percentage, 72.0 per cent, want to continue. There is a clear preference for sons (significant at the .01 level) in these areas.

By contrast, the urban areas show a statistically significant preference for *daughters* (at the .01 level), despite the small sample size. We shall defer speculation on the reasons for an apparent preference for daughters over sons in these areas, pending further evidence that this is a real finding. Estate women will not be discussed because of their small number.

In order to synthesize the different family sizes, the preference for more children may be treated as a binary dependent variable and regressed upon various representations of sex composition and standard controls. As is well known, a dichotomous dependent variable does not satisfy the assumptions for testing regressions and regression coefficients. The tests to be referred to below are approximate (even beyond the extent of other tests in this paper, which have used the inappropriate assumption of simple random sampling). Some justifications for applying regression to the present response were given in Section 2.2.

First, just the controls for actual family size are included in the form of a set of binary variables giving full detail. In this regression, 44.7 per cent of the variance in the response is accounted for. (This figure differs slightly from that given in Section 2.2. because the pattern of missing cases is slightly different here). A set of four binary variables representing five categories of sex compositions are then added to the regression raising R^2 from .447 to .461. Although substantively small, the increase is statistically significant (at the .01 level).

The five categories of sex composition will be described in terms of five codes for a categorical variable, SEXBAL:

SEXBAL = 2 if the woman has no sons at all and at least one daughter.

SEXBAL = 1 if the woman has exactly one son and at least two daughters.

SEXBAL = −1 if the woman has exactly one daughter and at least two sons.

SEXBAL = −2 if the woman has no daughters at all and at least one son.

SEXBAL = 0 Otherwise.

The following chart shows the values of SEXBAL for most observed combinations of sons and daughters.

Number of Daughters	Number of Sons 0	1	2	3	4	5	6
0	0	−2	−2	−2	−2	−2	−2
1	+2	0	−1	−1	−1	−1	−1
2	+2	+1	0	0	0	0	0
3	+2	+1	0	0	0	0	0
4	+2	+1	0	0	0	0	0
5	+2	+1	0	0	0	0	0
6	+2	+1	0	0	0	0	0

The interpretation of this variable is that 'balance' exists (SEXBAL = 0) not just when the numbers of sons and daughters are exactly equal, but also whenever there are at least two sons and two daughters. Extreme imbalance exists (SEXBAL = ± 2) when there are no sons or no daughters. The other possible combinations comprise intermediate balance (SEXBAL = ± 1). Positive values correspond to a 'shortage' of sons and negative values to a 'shortage' of daughters. These categories were defined after detailed examination of the data and might not be appropriate for other countries. Relative to the women for whom SEXBAL = 0, the coefficients representing the sex balance effect in the previous regression are as follows:

a) Women for whom SEXBAL = 2 (strongly girl-dominated) average an increase of .159 in the estimated probability of wanting another child.
b) If SEXBAL = 1 (moderate girl-domination) the effect is +.017.
c) If SEXBAL = −1 (moderate boy-domination) the effect is −.031.
d) If SEXBAL = −2 (strong boy-domination) the effect is +.133.

These effects are based on 4562 women, with percentages 16.5, 11.6, 45.15, 11.7, and 15.1 having values +2, +1, 0, −1, and −2, respectively, of SEXBAL.

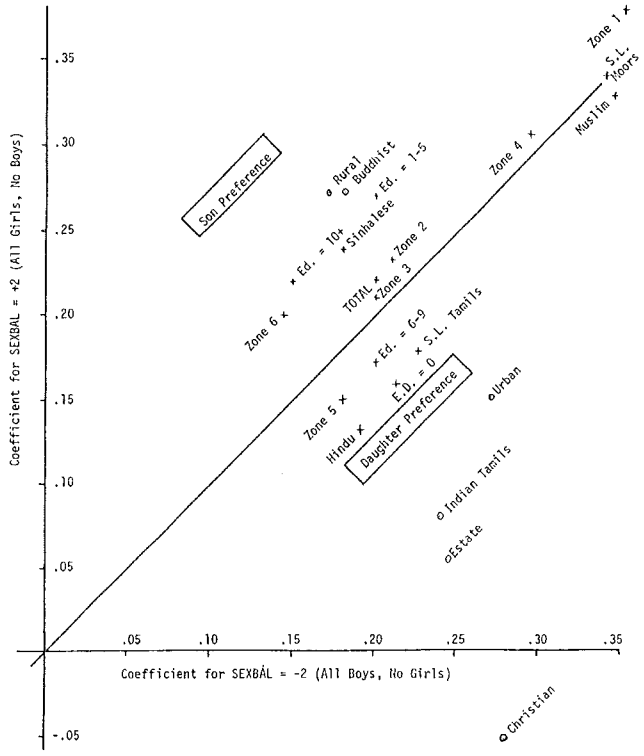
The coefficients for the extreme types of imbalance (SEXBAL = ± 2) are the only ones which are significant, and they are highly so (at the .01 level). They are not, however, significantly different from one another. There is a consistent U-shape to the pattern of coefficients, reaching a minimum for SEXBAL = −1, i.e., for those women having one daughter and two or more sons. In the sample, this is the preferred sex composition under the specified controls, but not by an amount which permits us to conclude the same for the population. Once again, a desire for sex balance dominates, with only small secondary evidence for son preference in the overall population of women in Sri Lanka.

This approach will also be used to evaluate the impact of composition on preferences within various socio-economic subgroups. A more direct and thus preferable approach would be to examine the proportions wanting to continue within all combinations of sons and daughters and within each category of the socio-economic variables. Although this simpler method was applied to the total, the subsamples within categories are not large enough to permit the calculation of statistically stable proportions; a technique which makes more efficient use of the available cases is required. The remaining analysis will therefore be based on the coefficients of the categories of SEXBAL derived from separate regressions within each socio-economic group. These coefficients are given in Table 2.4.6.

For virtually all categories, extreme imbalance is the only composition which significantly raises the probability of wanting another child. Out of 42 coefficients representing partial imbalance, only two are significant at the .05 level and they are considered to have arisen by chance. An extreme shortage of daughters *always* raises the probability significantly at the .01 level. An extreme shortage of sons *usually* has a significant impact; it does not on the Estates, among the Indian Tamils, and among the Christians.

The coefficients for SEXBAL = ± 2 are graphed in Figure 2.4.1., in which each point corresponds to a socio-economic category. Roughly speaking, distance from the origin is greater for categories in which the resolution of imbalance is more important. Distance below the 45-degree line increases as it becomes more important to have at least one daughter than to have at least one son. If it is more important to resolve an extreme son shortage than

Figure 2.4.1. Graphical Representation of the Coefficients for Extremely Unbalanced Sex Compositions (SEXBAL = ± 2). When Desired Family Size is Regressed Upon a Set of Binary Variables for Actual Family Size and a Set of Binary Variables for Sex Balance (SEXBAL), within Categories of the Socio-Economic Predictors.



an extreme shortage of daughters, the category is located above the 45-degree line. A point is circled if one of the two coefficients is significantly different from the other at the .05 level. (It is emphasized that all tests are approximate).

Only a few observations will be made about Figure 2.4.1. First, Zone 1 (Colombo) shows a very strong but symmetric disapproval of extreme imbalance, with coefficients nearly twice those of the country as a whole. The Moors/Muslims have a similar pattern, as does Zone 4 (the East Coast) where many of the Sri Lankan Moors are found. The finding that the Moors/Muslims disapprove of all-boy families as much as all-girl families was not expected.

Second, all other categories are roughly equal in their disapproval of extreme imbalance (as measured by distance from the origin in Figure 2.4.1.). Third, the Indian Tamils/Estate residents, Urban women, and Christian women are significantly more affected by not having any daughters than by not having any sons, in terms of wanting to correct their imbalance. The Rural women and Buddhist women are significantly affected in the opposite direction.

Type of Place of Residence, Region, Religion, and Ethnicity all show wide variation; that is, the results differ substantially between different categories of these variables. Education is not a source of variation; there is no consistent pattern distinguishing the levels of this variable.

We shall now briefly summarize the findings of this section. The fundamental question has been this: Is there evidence that certain types of sex compositions are disfavored to the point that they affect preferences for numbers? As stated in the beginning, in this section 'sex preference' refers simply to this possible impact. The meaning of the term will be different in the next section. Most of the analysis has included a specific control for family size.

In Sri Lanka as a whole, and in nearly all socio-economic subgroups, the only significant sex preference is for balance interpreted very broadly as at least one child of each sex. A preference specifically for sons or specifically for daughters emerges only when all-girl and all-boy families are compared with respect to desire for another child. Even under this extreme test, significant son preference is only found in the rural areas and among the Buddhists. The importance of having a daughter dominates in Colombo and the urban areas, and among the Indian Tamils and Estates. We have estimated that beyond the point of achieving parity two, the first parity at which sex balance or imbalance can become a concern, about one-seventh of desired future fertility is generated by a desire to achieve balance – i.e. by women with two daughters wishing to have a son and women with two sons wishing to have a daughter. (This inference is based simply on the stated desire for number, not for sex of child). Of women with 2 to 4 children who want another, nearly a third do so because they have an extremely unbalanced composition.

It may seem paradoxical that in our analyses of variance (or regression), sex composition added a trivial amount to F^2 (or R^2) beyond the information contained in actual family size, yet nearly a third of the women with 2 to 4 children who want another may be attributed to imbalance. There might appear to be a contradiction as to whether sex composition is an important or an unimportant predictor of desire for more children.

In the analysis of variance, individual differences were expressed as deviations from the overall mean. In the alternative, differences were expressed as deviations from the mean in the most preferred sex composition. This shift in reference point necessarily increased the apparent importance of sex composition.

In Section 2.2., when desire for another child was examined according to socio-economic variables, it would also have been possible to re-phrase the reference to be the category with the lowest mean rather than the overall mean. We could then, for example, have expressed the importance of Ethnicity in terms of the excess proportion of women who wanted another child 'because' they were not classified as Indian Tamils (the ethnic group with the lowest proportion wanting more). However, this procedure would have been both unconventional and not sensible for a socio-economic variable. It has been applied to sex composition, as a predictor, simply because current sex composition (given the total family size) is completely random in the absence of sex predetermination.

Therefore, when the same statistical procedures are applied to the effect of sex composition on preferences for number that were applied to the effect of socio-economic variables, sex composition appears as another statistically significant but trivial predictor. We have offered an alternative quantification of the importance of composition because this variable has a special character, but must not give the impression that sex composition is more important than Region, for example, in accounting for the total variance in the response, for it is not.

With each increase in parity, of course, the number of women with extreme compositions is cut approximately in half. Therefore, the effect of imbalance on overall desired future fertility becomes progressively smaller as progressively fewer and fewer women have families with the undesired property of extreme imbalance. In terms of the growth of families, a desire for balance is statistically easy to achieve: extreme imbalance is an infrequent composition. By contrast, if the goal were a predominance of sons, say, then about half of all families, regardless of size, would necessarily be inconsistent with that goal. A norm for balance is more compatible with a norm for a small family than is a norm for a majority of sons or for a majority of daughters.

2.5 EXPLICIT STATEMENTS OF SEX PREFERENCE

Those women who wanted more children were asked the preferred sex of the next child, with possible responses 'Boy', 'Girl' or 'Either'. Although these responses are considered by some researchers to be of primary interest, in the context of Sri Lanka we have argued that the implication of current sex composition for number preference has more demographic importance.

There is also a statistical reason for de-emphasizing the explicit responses. In Sri Lanka, relatively few women stated a desire for another child. Therefore, the base frequencies for the proportions wanting a boy, girl, or either sex are unstable at higher parities or within subgroups. This is particularly serious because, as before, a control for current sex composition is essential. Currently pregnant women must again be omitted because their sex composition is ambiguous.

Table 2.5.1. The Number of Women Who (a) Want No More Children, (b) Want a Boy, (c) Want a Girl, or (d) Want Either, Within All Sex Compositions Out to Three Children, Sri Lanka, 1975.*

Number of Daughters	Number of Sons			
	0	1	2	3
0	a. 104	145	150	95
	b. 175	22	1	0
	c. 62	267	99	30
	d. 106	39	4	1
1	a. 165	364	295	
	b. 270	72	12	
	c. 5	10	13	
	d. 21	36	12	
2	a. 115	276		
	b. 98	37		
	c. 2	0		
	d. 0	7		
3	a. 58			
	b. 43			
	c. 0			
	d. 2			

*Note: Pregnant women are omitted.

The basic data for this section are presented in Table 2.5.1. In each sex composition above three children, fewer than 20 women want another child, so these compositions are dropped. Frequencies are presented to permit alternative analyses by other researchers.

These data could be re-arranged in several ways. Great care is required in the interpretation of percentages based on the frequencies in Table 2.5.1. (a) not wanting more, (b) wanting a boy, (c) wanting a girl, or (d) wanting either sex. Ideally, the four categories, (a), (b), (c) and (d) would be analyzed jointly as a vector response variable. Log-linear models would be appropriate, with sex composition represented as a categorical control variable. A predictor of interest, such as ethnicity, could be included as the third variable in a three-way layout.

In the case of Sri Lanka, such methods are unnecessarily sophisticated. The data will be briefly discussed at the national level and predictor variables will not be considered at all.

First, women who responded 'either' will be equally allocated to the responses 'boy' and 'girl'. (It could be argued that they should be distributed in proportion to the latter two responses, but a better case can be made for an equal division as a literal interpretation of the response). Avoiding the question of the appropriate denominator for percentaging, we shall simply examine the ratio of the two revised frequencies – i.e. the odds of wanting a boy rather than a girl. The reciprocal of this number is the odds of wanting a girl rather than a boy. As is conventional for log-linear models, the natural logarithm of this ratio, i.e. the log-odds, is easier to work with because the log of the reciprocal of a number is simply the negative of the log of the number, and the log of a 50-50 division is zero. Table 2.5.2. gives the logs of these adjusted odds of desired boys to desired girls from Table 2.5.1. These quantities show that

1) When there are more boys than girls, the dominant preference is for a girl.
2) When there are more girls than boys, or equal numbers, the dominant preference is for a boy.
3) When there are no boys and one girl, the desire for a son is greater than the corresponding desire for a daughter when there is one boy and no girl. However, for other extremely unbalanced pairs, the pressures toward balance are the same.
4) The desire for a boy is even stronger when there are one boy and one girl then when there are no children at all.

All of these findings are significant at the .01 level. The optimal family building pattern suggested here is that the first child should be a son and the second child a daughter; it is important to have one daughter but otherwise the preference is for sons. In the earlier section it was not possible to infer preferences leading out of the critical combinations of no children or of one son and one daughter. A clear preference for sons is now seen at those compositions. There is maximum indifference as to the sex of the next child, among compositions considered here, when there are two sons and one daughter.

These findings are generally consistent with those based ont the desire for another child, except that the stated preference for sons is stronger here than was implied earlier.

Although the 'either' sex responses were pooled with the 'boy' and 'girl' responses above, they are of particular interest and will now be focused on. A relatively high frequency of 'either' responses is the most direct indication of indifference about sex composition; women giving this response have a pure preference for number only and may be presumed to be relatively satisfied not only with their current composition, but also with either of the two compositions at the next higher parity.

Table 2.5.3. gives the natural logarithm of the ratio of "either" responses to the sum of "boy" and "girl" responses.

Tables 2.5.2. and 2.5.3. show similar patterns in the following sense. Compositions for which the preferences for sons and for daughters are nearly equal are also compositions for which the response 'either' is relatively common. For example, the composition of one daughter and two sons has the largest entry in Table 2.5.3., i.e., the largest ratio of 'either' responses to 'boy' or 'girl' responses (out to three-child families). This was also the composition which

Table 2.5.2. Log-Odds of the Ratio of Desired Sons to Desired Daughters (with the 'Either' Category Allocated Equally to Both), Sri Lanka: 1975.

Number of Daughters	Number of Sons			
	0	1	2	3
0	.41	−1.92	−3.50	(indet.)*
1	2.93	1.17	(0.05)*	
2	3.89	(2.62)*		
3	(3.78)*			

Note: This table is based on Table 2.5.1.
* Compositions totalling three children all involve fewer than 50 cases and are shown in parentheses.

Table 2.5.3. Log-Odds of the Ratio of 'Either' Responses to the Sum of 'Boy' and 'Girl' Responses, Sri Lanka: 1975.

Number of Daughters	Number of Sons			
	0	1	2	3
0	− .81	− 2.00	−3.22	(−3.40)*
1	− 2.57	− .82	(−.73)*	
2	indet.	(−1.67)*		
3	(−3.07)*			

Note: This table is based on Table 2.5.1.
* Compositions totalling three children all involve fewer than 50 cases and are shown in parentheses.

had the most nearly equal numbers of specific preferences for boys and girls in Table 2.5.2. Similarly for the favored one-child composition (one boy) and the favored two-child composition (one boy and one girl).

It is certainly not surprising that there are relatively more 'either' responses as the numbers of 'boy' and 'girl' responses approach equality; both circumstances indicate normative indifference as to the sex of the next child. These are also the compositions for which we would expect relatively high instability of responses at the level of the individual women.

A comparison with Table 2.4.5. of the last section shows that these categories of relative indifference are also the categories for which the fewest women want to have another child. We are led to the following empirical generalizations for Sri Lanka, which we would expect to hold elsewhere as well: at any specific parity, a desirable sex composition will be indicated by (a) a low proportion of women wanting another child, (b) nearly equal proportions wanting a boy and wanting a girl, and (c) a large proportion indicating satisfaction with either sex. These relationships have been inferred from the data, but could have been anticipated in terms of their mutual compatibility with norms favoring specific compositions.

Because of the small numbers of women in Sri Lanka who want another child, breakdowns by socio-economic variables are not possible.

3 Conclusions

3.1 COMPARISON OF INITIAL AND LATER ANALYSIS

The initial analysis of fertility preferences in Sri Lanka was given in the First Country Report for that country. It was based exclusively on the standard tabulations.

In this Illustrative Analysis the earlier work has been extended both theoretically and methodologically. A theoretical context was judged to be particularly important because fertility preferences are attitudinal rather than behavioural, and their link with the behavioural data in WFS surveys needed to be clarified. This discussion could not in itself generate testable hypotheses with cross-sectional data. However, it did help in the specification of meaningful statistical models.

The methodological advance resulted primarily from the availability of individual level data. Differences between groups could be re-assessed relative to within-group variation, so that tests of significance and coefficients of determination could be computed. These computations generally confirm the differentials given in the First Report, but indicate that socio-economic variables account for an extremely small fraction of the variability in preferences. Omitted variables – perhaps psychological or micro-economic – are more important.

A synthetic cohort was proposed to model the family-building process which would ensue if preferences could be implemented. This appears to be a new application of the concept of a synthetic cohort, which has been applied usefully to many other demographic topics.

It could happen elsewhere that the results of a second-stage analysis do not support the earlier First Country Report. In the present instance, however, the two are in basic agreement. The more advanced techniques of this document have not uncovered any apparent errors at the earlier stage.

3.2 IMPLICATIONS FOR THEORY AND POLICY

Although Sri Lanka is a small country, it has been studied repeatedly by demographers and other social scientists. Its 1975 fertility survey is becoming one of the most thoroughly analyzed rounds of WFS. A major reason for this interest in Sri Lanka is its ethnic and religious diversity. Buddhists, Hindus, Muslims, and Christians co-exist on a relatively small land mass and have retained distinctive characteristics. This diversity has resulted historically, of course, from the very fact that Sri Lanka is an island with a strategic location. Demographers have also had a special interest in describing and understanding the rapid decline in infant and child mortality a generation ago, the recent rapid rise in age at marriage, and the current rapid decline in fertility.

Fertility preferences are a useful subject in this context for two parallel reasons. First, the ethnic and religious diversity (as well as a range of variation in other socio-economic characteristics) provide an opportunity to evaluate the importance of group norms in the establishment of individual-level preferences. Second, because fertility appears to be declining and is certainly below the level of all other countries in South Asia, the familiar problems of validity of stated preferences are reduced.

We have found the largest differentials in preferences for Region, Religion, and Ethnic Group (the latter two are strongly associated). For the vast majority of the population, these variables are ascribed, or fixed at birth. There has consistently been less variability according to those characteristics which are achieved, such as Education, Occupation of Husband, and Pattern of Work. It appears that the ascribed variables, which were determined by the respondent's family of orientation (because, of course, the achieved variables were not even defined until her adolescence or later) have greater salience for her own family-building preferences.

As remarked above, the explanatory value of all of these variables is small. Also, the Country Report for Sri Lanka observed that all subgroups (except perhaps the Muslims/Moors) have shown a rise in age at marriage and a decline in fertility during the past decade. This would suggest that those factors which affect the utility of children tend to cut accross subgroups and to have their origin either at the national level or at the other extreme, in the very specific circumstances of the individual woman and her household. The great diversity of preferences within subgroups suggests to us that most of the cross-sectional variation is indeed at the micro-level, i.e. that the woman's preference function reflects her individual assessment of the costs and benefits of children, mediated by her own personality. Her group membership provides a relatively minor overlay or adjustment.

There are two possible mechanisms by which group membership may affect utilities. First, it may be that the group serves as a reference by which the woman identifies herself, and group pressure, crudely speaking, modifies the woman's preference function. For example, a religious group may be pro-natalist as part of its orthodoxy, and a woman in this group will be negatively sanctioned if she ignores this norm. Secondly, a socio-economic variable may simply sort together individuals whose micro-level determinants of fertility are similar; in this case the notions of reference group influences or norms are irrelevant. For example, a classification of women into geographical regions may encompass a wide range of associated variables, such as standard of living, aspirations for the achievement of one's children, opportunities for work outside the home, etc., all of which have their impact essentially at the micro level. A woman may (consciously or sub-consciously) refer to the fact that she is Muslim, say, in formulating her attitudes, and her family and contacts may expect certain things of her because she is Muslim. However, it is unlikely that residence on the East Coast (Zone 4), say, defines membership in a group with the same kind of social significance – except to the extent that the East Coast is largely Muslim.

A moment ago a distinction was made between ascribed and achieved variables, and it was remarked that in Sri Lanka the former were better predictors of fertility preferences. A distinction between variables which define reference groups and variables which are simply assortative, however, is not so clean. Region and Ethnic Group appear to be normative and Region assortative, but Education, Occupation, and Pattern of Work are ambiguous. They could be of one type in some cultures and of the other type elsewhere and could vary for individual women. For instance, there are several possible reasons why a well-educated woman may want a smaller family, including such factors as these: (a) education may serve to indicate social class, and exposure to class-related norms; (b) more education may lead to a more modern outlook, and to

identification with women who have modern attitudes and practices; (c) more education may simply lead to improved access to contraceptive knowledge; (d) education may affect the woman's options for economic activity and the opportunity costs of childbearing – in short, her micro-economic situation.

Lacking questions in the WFS instrument which bear directly on the alternative mechanisms through which variables have their impact, we cannot claim to have advanced our understanding of how preferences are actually formed in Sri Lanka. It is hoped, however, that the descriptive results and the presence of a theoretical model, at least, will lead to further research.

The relevance of this analysis to the formulation of population policies will be only briefly discussed. Policies can be developed which will alter the distribution of achieved variables. For example, educational levels and female labor force participation can be raised, and an expected by-product of such a distributional shift whould be a decline in mean desired family size. Ascribed variables, by contrast, are not easily subjected to such shifts. For them, the role of this research has been to identify subgroups whose preferences depart farthest from policy objectives. Thus, for example, preferences are already lowest in Colombo and the Southwest, and population education programs to reduce preferences are more needed elsewhere.

Policies can also be based on inferences about levels of unwanted fertility. Our dominant theme has been the use of stated preferences to infer differentials that would exist in actual completed family size if preferences could be implemented perfectly. In this pursuit, the most serious complication was an adequate interpretation of the observed association between desired and actual family size. At this point two of the procedures for 'removing' that association will be compared with one another and with actual fertility for categories of Region and Religion, the principal predictors.

Table 3.2.1. Actual Family Size and Three Measures of Desired Family Size, Sri Lanka: 1975. (Ranks in Parentheses).

	Mean of Actual Family Size	Desired Family Size for Total Sample	Desired Family Size for Marital Duration 0 - 4	Mean Completed Family Size of Synthetic Cohort
Mean:	3.57	3.75	2.54	2.55
Deviations:				
Zone 1	– .24 (6)	– .37 (6)	– .15 (5)	– .22 (6)
Zone 2	– .23 (5)	– .32 (5)	– .19 (6)	– .20 (5)
Zone 3	+ .34 (1.5)	+ .32 (2)	+ .03 (4)	+ .20 (3)
Zone 4	+ .34 (1.5)	+ .42 (1)	+ .09 (2)	+ .22 (2)
Zone 5	– .03 (4)	+ .25 (3)	+ .36 (1)	+ .69 (1)
Zone 6	+ .03 (3)	+ .07 (4)	+ .08 (3)	+ .05 (4)
Buddhist	+ .05 (2)	+ .01 (2)	– .03 (3)	– .01 (3)
Hindu	– .23 (4)	– .05 (3)	+ .10 (2)	+ .10 (2)
Muslim	+ .34 (1)	+ .49 (1)	+ .34 (1)	+ .45 (1)
Christian	– .15 (3)	– .36 (4)	– .22 (4)	– .29 (4)

Table 3.2.1. shows the means and the category-specific deviations from these means for actual family size, stated desired family size for the total sample, stated desired size for the women married 0-4 years, and the completed family size of the synthetic cohort. The latter two columns are proposed as adjustments of the second column. Within each column and predictor variable, the categories are ranked (with ranks given in parentheses).

The means for the two procedures, 2.54 and 2.55, are virtually indistinguishable. They also agree remarkably well within categories of Region and Religion. For no category do they disgree by more than one rank, and they agree perfectly in their ranking of the religious categories.

The first two columns of the table are also in very close agreement with one another – as would be expected from the high correlation at the individual level between actual and desired family size. The overall means, 3.57 and 3.75, are within 5 per cent of each other and for no categories do the ranks differ by more than one.

If the first two columns are compared with the last two, as a pair, some notable differences emerge. (If there were no differences, then there would be little value in the adjustment procedures). Of special interest for policy purposes is the contrast between actual family size and our two estimates of what completed family size would be if preferences could be implemented. (At the aggregate level, actual family size is assumed to be highly correlated with eventual completed family size of the sampled women). In particular, we note a reversal between Zone 3 and 4, on the one hand, and Zone 5 on the other. The women in Zone 3 have .37 more children than those in Zone 5, but their (adjusted) preferences indicate that they would prefer from .33 to .49 *fewer* than those in Zone 5. Similarly, the women in Zone 4, have .37 more than Zone 5 but would prefer .27 to .46 fewer. It appears that the women in Zone 5 have been relatively successful in implementing their preferences. They want fewer children than they have, as a group, but by the smallest amount of all regions. The women in Zones 3 and 4 have been *least* successful in achieving their (adjusted) preferences. Insofar as population policies are intended to enable the free implementation of personal preferences, these two zones appear to require assistance.

In view of the geographic distribution of ethnic groups, the previous reversal anticipates a shift in the position of the Hindus when actual and desired family size are compared. Zone 5, the Northern Tip, is composed largely of Hindus (Sri Lankan Tamils). The Hindus have the smallest actual family size, and if their preferences could be implemented, they would be ranked second of the four religious groups. They have been relatively successful in achieving their goals. The Buddhists, Muslims and Christians would not change appreciably in their relative fertility levels, and have all been less successful in achieving their goals.

The above approach could be extended to other socio-economic variables to identify subgroups with the largest levels of unwanted fertility, which is essentially what Table 3.2.1. indicates. Some socio-economic breakdowns do not identify categories which are easily made the focus of family planning programs; Region is probably most useful in this sense. To be complete, policy inferences should also be based on a consideration of reported levels of knowledge and use of contraception. However, the purpose of the present paper is to be suggestive rather then exhaustive, and we shall not push further in this direction.

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