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John Knodel; Etienne van de Walle

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Lessons from the Past: Policy Implications of Historical Fertility Studies

JOHN KNODEL
ETIENNE van de WALLE

The implication most frequently drawn for current population policy from the historical record of European fertility can be summed up in the slogan, "Development is the best contraceptive." It is easy to understand how a cursory reading of western experience can lead to such a conclusion. Over the long run, and at the highest level of generality, broad developmental changes that transformed Europe from a predominantly rural-agrarian to a predominantly urban-industrial society accompanied the transition from high to low levels of fertility. In the world today, there is a broad inverse relationship between the degree of development and the level of the birth rate. Much of the fertility decline in Europe took place before modern contraceptive methods or safe medical abortion were readily available, and thus couples who limited their family size must have done so through withdrawal or abstinence, that is, through methods theoretically available to everyone. If abortion was important—and there is some evidence that there were many abortions in certain countries by the beginning of the twentieth century—it was such a dangerous procedure that women probably resorted to it only in cases of extreme need, and mostly outside of wedlock.

Such impressions of the European experience, in combination with the cross-sectional differences in fertility apparent today between the developed and developing countries, have been used as evidence to support arguments that organized family planning programs in the developing world are unlikely to contribute much to the precipitation or accel-

eration of fertility declines.[1] With socioeconomic development, motivations to reduce family size will emerge and fertility decline will take care of itself. Moreover, modern birth control methods are not necessary for it to take place. "There is ample historical evidence . . . that fertility can be greatly reduced without access to modern contraception. There is no reason to assume that the same thing would not happen anywhere in the contemporary world if that is what people really wanted."[2] Or so the argument goes.

Recently there has been a marked increase in the number as well as the breadth and depth of historical studies of European fertility. As a result, a much more detailed picture of the historical record is available today than just a decade ago. Two quite different types of demographic studies have been largely responsible for the recent expansion of our knowledge of historical trends: European micro-level family reconstitution studies, which typically refer to village populations during the pre-industrial and generally pre-fertility decline period; and macro-level studies of the secular decline in fertility on the national and provincial level. The first type of study is based on the reproductive histories of individual couples reconstituted usually from the church registers of baptisms, burials, and marriages. Also included in this genre are studies based on genealogies of special subgroups of the population, particularly social elites, for whom previously compiled genealogies are readily available. Although the French developed both the technique of family reconstitution and the methodology to analyze the resultant data just two decades ago, scholars elsewhere have been quick to follow their lead. By now such studies are available from most European countries, although they cover, even in France, only a miniscule proportion of the total population. Usually such family reconstitution studies span long periods of time, extending back well before the general secular decline of fertility. They provide detailed information on reproductive behavior that can be used to test a variety of hypotheses within the framework of the family.

The second type of study is labeled macro-level because such studies are based largely on published census and vital statistics data that are typically already aggregated in the source on the basis of such administratively defined geopolitical units as districts, provinces, or states. A study of the European fertility decline based on this kind of data has been undertaken by staff and associates of the Office of Population Research at Princeton University under the direction of Professor Ansley Coale. As a result of this project, considerable information has been unearthed on both the demographic trends over the last century or so at the provincial level and the general socioeconomic context in which they occurred.[3]

In addition to the contributions made by these two types of studies, both of which provide extensive quantitative evidence, our understanding

of reproductive behavior in the past is also being increased by a third group of studies that are largely qualitative in nature. Such studies stem more out of the tradition of social history than of demography and are often based on literary evidence, including letters and novels, and on commentaries by contemporary observers such as nineteenth-century statisticians' interpretations of vital statistics and county and small-town medical doctors' reports on their patients and on local health-related conditions. These studies shed light on the extent of knowledge of birth control and attitudes toward reproduction and children in the past and help place the newly emerging quantitative results in their social, psychological, and cultural context.

Formerly, interpretations of the European fertility experience were based on a combination of hazy empirical impressions and theoretical preconceptions. As a result of the substantial increase in the amount of information available, we can no longer be content with such an approach. If policy implications are to be drawn from the European experience, they must rest on generalizations based on the wealth of detail that has newly emerged.

Our own reading of the historical evidence leads us to several observations that we believe have relevance for current discussions concerning population policy and in particular for the debate over the potential contributions of family planning programs:

1. Fertility declines took place under a wide variety of social, economic, and demographic conditions.

2. The practice of family limitation was largely absent (and probably unknown) among broad segments of the population prior to the decline in fertility, even though a substantial proportion of births may have been unwanted.

3. Increases in the practice of family limitation and the decline of marital fertility were essentially irreversible processes once under way.

4. Cultural setting influenced the onset and spread of fertility decline independently of socioeconomic conditions.

What is the evidence behind each of these conclusions, and what are their implications for current population policy in the developing world? In answering these questions, we will present what we feel are the most plausible interpretations, but we acknowledge that other interpretations are possible and that extrapolations from historical experience to the present are necessarily speculative. We also wish to underscore that most of our discussion of the historical record is based primarily on the European (especially Western European) experience. Although less numerous, historical studies of fertility are also emerging for North America, Japan, and other areas. Our focus on Europe stems from both the more extensive research on Europe and our greater familiarity with it.

One important difference between the Western European demo-

graphic experience and that of developing countries today, as well as non–Western European countries in the past, should be borne in mind: the difference in nuptiality patterns. Western European populations during at least the seventeenth through nineteenth centuries were characterized by relatively late ages of marriage and high proportions remaining permanently single in comparison with other populations historically and certainly in comparison with most current developing-world populations.[4] The unique Western European marriage pattern played a crucial part in the larger demographic regime of preindustrial Europe, keeping overall birth rates typically below the levels experienced in most developing countries today. Our focus is mainly on marital fertility and thus does not address this difference. Although this adds somewhat to the problems of extrapolating from the historical experience to the situation in the developing world, we do not feel that this seriously compromises the applicability of the particular lessons we draw.

The Socioeconomic Context of Fertility Decline

The most striking finding to emerge from the recent upsurge of research on the fertility transition in Europe is that it occurred under remarkably diverse socioeconomic and demographic conditions.

Evidence Table 1 lists a series of indexes of socioeconomic development at the time of the onset of the fertility decline for 17 countries of Europe and four countries in the developing world. Onset of fertility decline is defined as the year marital fertility had declined by an estimated 10 percent from its maximum recorded level in the course of a continuous decline to a much lower level.

Noncontracepting populations exhibit a broad span of fertility levels, in part because of differences in proportions married, but also because of the variability of marital fertility, even in the absence of deliberate family limitation. On a scale giving the value of 1.0 to the highest marital fertility ever recorded reliably, that of the Hutterites of North Dakota married in the 1920s, national populations are scattered at various levels between 0.6 and 0.9. This is the meaning of the index I_g in Table 1. The index I_f has a comparable structure, but refers to all women, rather than only married women, and reflects the additional effect of I_m, the proportion married, on overall fertility. It is always lower than I_g because in all populations some women in the reproductive ages are unmarried, and these women virtually always experience lower fertility than married women.

The date of decline of marital fertility can be identified from a time series of I_g. Predecline fluctuations are typically moderate, and the change in trends, from a more-or-less level plateau, is sudden and unambiguous,

Table 1
Demographic and Socioeconomic Indexes at Onset of Fertility Decline for Selected Countries

	Date of Decline in Marital Fertility by 10 Percent	Marital Fertility before Decline (I_g)	Index of Proportion Married (I_m)	Overall Fertility (I_f)	Infant Mortality (per thousand)	Percent of Male Labor Force in Agriculture	Percent Rural[d]	Percent in Cities over 20,000 Population	Percent Illiterate[e]
France	ca. 1800	.70	.51[a]	.30[a]	185[c]	70	81	7	High
Belgium	1882	.82	.44	.35	161	30	56	22	30
Switzerland	1885	.72	.44	.29	165	33	78	9	Low
Germany	1890	.76	.50	.39	221	38	68	21	Low
Hungary	ca. 1890	.63	.70	.45	250	73	84	11	49[f]
England and Wales	1892	.68	.48	.31	149	15	28	57	Low
Sweden	1892	.71	.42	.31	102	49	81	11	Low
Scotland	1894	.75	.42	.31	124	13	27	49	Low
Netherlands	1897	.85	.45	.35	153[c]	29	26	42	Low
Denmark	1900	.68	.47	.32	131	42	61	23	Low
Norway	1904	.75	.42	.30	76	37	72	18	Low
Austria	1908	.68	.51	.36	205	40	—	19	21
Finland	1910	.70	.46	.31	114	66	85	9	44
Italy	1911	.68	.54	.36	146	46	38	28	39
Bulgaria	1912	ca. .70	ca. .74	ca. .45	159	70	82	7	60
Spain	1918	.64	.51	.30	158	66	45	26	46
Ireland	1929	.71	.35	.23	69	48	73	20	Low

Table 1 (continued)

	Date of Decline in Marital Fertility by 10 Percent	Marital Fertility before Decline (I_g)	Index of Proportion Married (I_m)	Overall Fertility (I_f)	Infant Mortality (per thousand)	Percent of Male Labor Force in Agriculture	Percent Rural[d]	Percent in Cities over 20,000 Population	Percent Illiterate[e]
Costa Rica	1962	.89[b]	.50[b]	.57	74	58	66	20	14
Taiwan	1963	.70	.70	.42	49	47	42	31	30
Chile	1964	.65[b]	.50[b]	.39	103	37	29	53	15
Thailand	ca. 1970	ca. .75	.75	ca. .51	77	75	85	12	18

NOTES: Country borders are of the date of decline. All figures refer to the year estimated as the date of a 10 percent decline in marital fertility except the index of the level of marital fertility before decline. Estimates were obtained by interpolation or extrapolation when data were not directly available for the year indicated.

[a] In 1831.

[b] Excluding consensual unions.

[c] Children dead after registration only.

[d] In communities of fewer than 5,000 or legal definition.

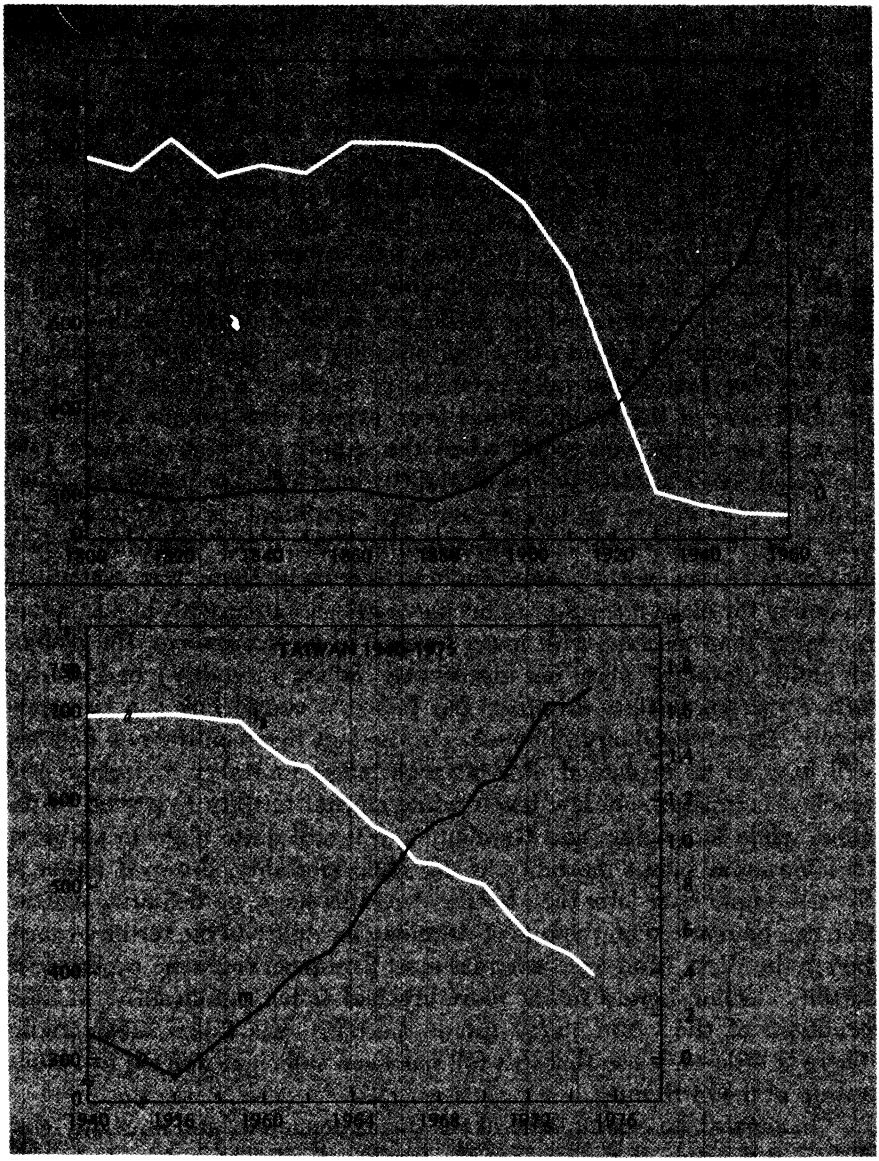
[e] Both sexes, aged 10+ or 15+; high refers to percentages of young adults unable to sign their name on the marriage certificate or of illiterate army recruits, exceeding 50 percent; low refers to percentages under 10 percent.

[f] 6+.

SOURCE: Adapted with additions and corrections from Etienne van de Walle and John Knodel, "Demographic transition and fertility decline: The European case," *Contributed Papers: Sydney Conference, International Union for the Scientific Study of Population,* 1965, p. 55.

so that an approximate date can be assigned to it (see, for example, Figure 1).

Figure 1
Index of Marital Fertility (I_g) and Index of Family Limitation (m): Sweden, 1800–1960, and Taiwan, 1940–75



Although the fertility decline began in England only after considerable urbanization and industrialization had taken place, it occurred at

about the same time in Hungary, which was at a substantially lower level of development as measured by conventional socioeconomic indexes. Indeed, the first country to show signs of fertility decline was France, where birth rates started to fall around the time of the French Revolution. France could hardly be considered very advanced at the time in terms of any standard definition of development. In addition, recent research has revealed several examples of local populations outside of France where the fertility transition began in rural settings long before there was evidence of socioeconomic development.[5]

Differences in the level of literacy reached by the western countries at the time of their fertility declines were also considerable. And within each country, no consistent relationship has been found between education and fertility. Fertility itself varied greatly in predecline Europe. Not only did very diverse combinations of birth and death rates make for a wide range of growth rates at the time of the transition, but also variations in the proportions married—typically low in Western Europe and high in Eastern Europe—influenced the predecline levels of overall fertility.

The decline of infant and child mortality has often been singled out as a decisive factor that influenced the perceptions of parents about the desirable size of the family. It has been argued that parents revise their demand for births downward when the supply of living children (the combined result of fertility and mortality) increases. Yet fertility declined under a wide variety of infant mortality conditions, as is apparent not only from the cross-national comparison in Table 1 but also from provincial comparisons within countries.[6] In Germany there was actually a tendency for marital fertility to decline earlier in areas with higher infant mortality than in areas with lower levels.[7] In most instances, the decline of child mortality (but not necessarily infant mortality) had started before marital fertility dropped. But before a causal link can be established, the extraordinary differences in the lags between the two declines will have to be explained. For instance infant mortality in Ireland had reached comparatively low levels when marital fertility I_g started to decline, while in Belgium and Germany it was still quite high. In addition, in some areas infant mortality, if not child mortality, dropped either at the same time as or later than fertility.[8] At this stage, no definitive conclusion can be reached on the role of declining mortality in the fertility transition in the West. Moreover, whereas most European countries experienced fertility decline before infant mortality had fallen significantly, in most countries of the world today infant mortality has fallen substantially. There is little evidence that this fall has been sufficient in itself to initiate a drop in the birth rate.

In general, an examination of the social, economic, and mortality conditions at the time of the onset of the fertility decline in various European countries reveals no consistency in the level of development. Of course,

it would be unrealistic to expect absolute consistency in these measures, even if some threshold of socioeconomic development were the critical prerequisite for fertility decline. The measures are crude and suffer from varying degrees of noncomparability across countries. Also, varying combinations of development might be interchangeable with respect to initiating the fertility transition. It seems highly unlikely, however, that such considerations could explain away the remarkable extent of diversity evident in Table 1. In an extreme case, such as Bulgaria, fertility began to fall at a time when the population was almost entirely rural, agrarian, and largely illiterate. Clearly, large genuine differences in the level of development existed among European populations at the start of their fertility declines. It seems safe to conclude that there was no clear threshold of social and economic development required for the fertility transition to begin.

Table 1 also gives several examples of recent fertility declines outside of Europe. Countries undergoing the demographic transition since 1960 show a diversity in socioeconomic levels of development (according to the indicators used in the table) similar to that which characterized the western nations in the nineteenth century. Moreover, it would not be difficult to cite countries that are now considerably more industrialized and urbanized and have lower illiteracy and infant mortality than many nineteenth-century European countries, but where marital fertility has not yet started to decline. A particularly interesting example is provided by the non-European republics of the Soviet Union, especially the central Asian republics, where high levels of marital fertility have persisted and even increased, at least until quite recently, despite major advances in the level of development over the previous half-century.[9]

Implications Although a high level of social and economic development (as measured by the usual indexes) may often accompany a fall of fertility, it is clearly not a precondition. Thus, the introduction of a family planning program in a developing country at an early stage of development does not necessarily foreclose its success. After all, the initiation of fertility decline based on voluntary use of relatively inefficient means of fertility control occurred in some European populations at a time when their level of socioeconomic structural development was remarkably low. Whether or not a family planning program will meet with success will be determined by how receptive couples are to reducing their fertility once the knowledge and means of birth control are available. Their motivations in this respect are apparently only loosely linked to the level of development, at least as conventionally defined.

Conversely, the mere attainment of a certain threshold of socioeconomic development appears an uncertain predictor of the trend of fertility. Apparently the level of development necessary to provoke a

change in reproductive behavior is so variable that there is no telling, except after the fact, whether modernization was advanced enough for fertility to decline. Thus, the historical record provides little assurance that efforts to reduce fertility or hasten a decline through raising the level of socioeconomic development will meet with early success.

Pretransition Fertility Behavior

Three propositions are advanced concerning fertility behavior in Western Europe prior to the onset of decline: the practice of family limitation was largely absent; it was probably unknown to large segments of the population; and there was latent motivation for reduced fertility among substantial portions of the population before fertility began to fall.

Evidence Direct evidence on the use of birth control is generally lacking for historical European populations. One of the important advances in modern historical demography has been the development of indirect techniques to determine whether couples were practicing some form of family limitation within marriage.[10] These techniques involve measures that can easily be derived from family reconstitution data, such as age-specific marital fertility rates and the age of mother at last birth. They are based on the observation that couples generally terminate childbearing earlier and marital fertility declines more rapidly with age in populations in which family size is deliberately limited than in populations characterized by natural fertility, the term used to describe fertility in the absence of family limitation. The reason for this difference is that most married couples who wish to limit their family size concentrate their childbearing in the earlier part of the wife's fertile period. Once the number of children considered sufficient is reached, efforts are made to stop childbearing, thereby reducing marital fertility rates disproportionately at older ages and lowering the average age of the mother at last birth.

Recently, Ansley Coale and James Trussell have developed an index of family limitation, called m, based solely on the age structure of marital fertility and independent of the level of fertility.[11] It is calculated by comparing the age pattern of the observed marital fertility schedule with a "standard" natural fertility schedule, based on a series of populations that are presumed to practice little or no contraception. The more the observed age pattern deviates from that of the standard schedule in a predicted fashion (i.e., proportionately more at older ages), the higher the value of m. In addition, m is constructed so that it will equal zero if the shape of the observed fertility schedule is identical with that of the

standard natural fertility schedule. The greater the value of m, the greater the deviation of the schedule in question from the standard, and hence the greater the amount of fertility control implied.[12]

Application of this technique to the results of the many family reconstitution studies, as well as to official statistics when available, indicates that family limitation in Western Europe was either absent or quite minimal (perhaps limited only to special segments of society, such as the social elites) prior to the onset of the long-term decline in marital fertility. When the index m of fertility limitation can be computed prior to the secular decline of fertility, it is usually close to zero and unchanging. When m begins to increase, the change is typically marked, as is the change in the trend of fertility (see, for example, Figure 1). Whenever age-specific marital fertility rates are available, for countries or provinces as a whole, m indexes can be calculated. It is, however, with micro-level data that the study of the patterns of fertility using this index has most applications.

Family limitation emerges among some groups of the population much earlier than among others and long before any urban-industrial transformation is evident. This is especially true among certain groups of social elites, such as the Genevan bourgeoisie or the French and Italian nobility, although early signs of family limitation are found in some village populations as well, especially in France, where it is common to detect family limitation in the rural population by the end of the eighteenth century.[13] The same populations that are characterized by early evidence of family limitation also experience early fertility decline, and when the data extend back to the predecline period in these populations, signs of family limitation are lacking. In other words, the evidence does not suggest that family limitation was practiced at some moderate but constant level prior to the secular fall in marital fertility rates. Instead, its incidence seems to have been quite minimal and in many cases completely absent.

Evidence that family limitation was not practiced to any great extent prior to the fertility decline does not necessarily mean that it was unknown. It is possible that couples had little motivation to use birth control techniques to limit childbearing because desired family sizes were large and typically exceeded the number of surviving children actually achieved. Indeed, the lack of motivation to reduce fertility is often given as the reason why fertility remained high for as long as it did. Although such an interpretation cannot be definitely ruled out, indirect evidence leads us to conclude that family limitation was not a form of behavior known to the majority prior to the fertility transition period and thus was not a real option for couples. Moreover, additional evidence suggests that births were frequently unwanted, especially among women, and thus at least latent motivation to reduce fertility existed.

First, in pretransition populations, couples did not adjust their reproductive behavior to their own experience with infant and child mortality.[14] Couples whose children all survived continued childbearing just as long as couples whose children had died early. Thus, couples who would seem to have had the greatest incentive to practice family limitation—those whose children all survived—did not do so.

Second, a comparison of trends in marital and nonmarital fertility indicates that both declined more or less simultaneously in most European countries.[15] It seems unlikely that motivation to avoid out-of-wedlock births was absent before the fertility decline period and that by mere coincidence such motivation emerged at the same time as married couples were deciding to have fewer children in response to new social, economic, and demographic conditions. The large number of foundlings apparently deserted by unwed mothers in the eighteenth and nineteenth centuries underscores how unwanted many illegitimate births were.[16] A more plausible interpretation is that birth control practices were not widely diffused prior to the parallel declines in legitimate and illegitimate fertility and that the spread of the knowledge and skills to avoid unwanted births enabled both married and unmarried couples to reduce their fertility simultaneously.

Two arguments have been invoked to demonstrate that methods of birth control were widely available to the population at large before the onset of fertility decline. First, reference to such methods has appeared in many different cultural contexts since antiquity. And second, the technique that is most likely to have been responsible for the decline of fertility in the West, withdrawal, requires no special knowledge or implements and is available to every couple having the barest understanding of the mechanism of reproduction. These two arguments are formidable, and we shall discuss them in turn.

References to birth control methods, ranging from the magical to the potentially effective, abound in the literature prior to the contemporary era.[17] Forms of intercourse that might reduce fertility are presented as perversions that aim at heightening sexual pleasure; the loss of fertility is often presented more as a penalty for the perversion of nature's ends than as an intended goal. References to birth control, moreover, are far more numerous than references to family limitation; that is, extramarital relations are the privileged locus of contraception. This is not necessarily because motivations to avoid the child did not exist within wedlock, as we shall argue below. Rather, contraception is presented as the specialized knowledge of rakes and seducers, who advertise their skills as a way to persuade their intended partners.

We see no reason to believe that withdrawal was widely acceptable or even known before the onset of fertility decline, or that it can be "reinvented by every couple" when need arises. References to withdrawal are

scarce in the West before 1700 (although they abound in Islam from medieval times). Although the Bible makes reference to "the sin of Onan," onanism had come to assume a different meaning, that of masturbation. Withdrawal is often referred to as learned behavior in the literature.[18] While it seems likely that abstinence was generally recognized as a means of avoiding pregnancy, this is a uniquely costly technique requiring great self-control. Permanent abstinence for the purpose of limiting family size requires the repeated denial of immediate pleasure for the much more distant benefits that may be perceived in connection with avoiding childbirth. In brief, it seems unrealistic to assume that just because people may know "where babies come from," they automatically have a viable means of family limitation at their disposal.[19]

Analysis of literary evidence and other qualitative material also supports the contention that the very concept of family limitation was alien to the mentalities of much of the population in the pretransition era. Either techniques of birth control were unknown or the use of them, particularly within marriage, was simply "unthinkable."[20] Malthus, for one, believed that restrictions on marriage were the only means to reduce fertility. Of allusions to contraception made by the French writer Condorcet, Malthus said, "I profess not to understand . . . he alludes, either to a promiscuous concubinage, which would prevent breeding, or to something else as unnatural."[21] Although he had missed the exact meaning of Condorcet, Malthus said that this would "destroy virtue and purity of manner" and was clearly to be rejected. Other writers shared his belief that fertility could not or should not be controlled within marriage. For example, Diderot wrote:

> The act of propagation is so much in conformity with the wish of Nature, and she invites to perform it by such a powerful, such a repeated, such a constant attraction, that it is impossible for the largest number of people to evade it. . . . In spite of all the contrary resolutions and systems, it is impossible for men to cheat the wish of Nature in such a way as to influence population ever so little.[22]

It is the many references to Nature, in such texts, that have led to the use of the term natural fertility to refer to a mode of behavior, common in those times, and still common in many developing parts of the world today, in which couples make no deliberate attempt to control marital fertility.

Can we assume that family limitation was not practiced prior to the decline in fertility because couples welcomed as many children as natural fertility would bring? Is it true that "the age-old attitude toward high fertility was always similar to the attitude toward longer life: high fertility was considered a blessing"?[23] The answer seems to be no, especially when viewed from the mother's vantage point. Direct evidence on the motivations of couples in centuries past is at least as difficult to come by as is

evidence on the practice and knowledge of birth control. Nevertheless, accumulating indirect evidence suggests that in many areas of Europe during the eighteenth and nineteenth centuries significant numbers of legitimate as well as illegitimate births were unwanted, especially by their mothers.

The lay and religious literature of the time contains frequent references to economic motives for small families and even more to non-economic motives (e.g., to preserve the health and beauty of the wife) to avoid excessive childbearing within marriage; but such references do not usually mention the need for fertility control. In his classical discussion of the subject, Norman Himes concluded that the health (or medical) motive for birth control was very old.[24] But it was the woman who had a stake in avoiding the dangers of childbearing and the debilitating effects of closely spaced pregnancies, whereas intercourse was traditionally thought of as the husband's prerogative. For women, there was no real option to practice family limitation since viable methods were either unknown, considered unacceptable for use within marriage, or required initiation by the husband.

The contemporary literature on infant mortality and childrearing sheds light on underlying attitudes toward reproduction and family size during the period prior to the fertility transition. Abusive child care practices and general neglect appear to have been commonplace in much of Europe, suggesting that children were not necessarily welcome additions to the household. While outright infanticide was not unknown, especially among unwed mothers, far more common were traditional practices of infant hygiene and childrearing in various parts of Europe that led to what social historians today label "concealed infanticide" or "infanticide by neglect." Such practices included sending the baby out to a wet nurse; dosing the infant with gin or opiates to keep it quiet; having the baby sleep in the same bed with the parents, thus risking "overlaying" and consequently suffocating it; leaving the infant unattended lying in its own filth—often in stifling swaddling clothes—for hours on end; feeding the baby unwholesome "pap" from an early age instead of breastfeeding it; and rocking the infant violently in its cradle until it was virtually knocked into a sleep of insensibility. Not all these practices were common everywhere, of course, but collectively they surely contributed to the high infant and child mortality that characterized much of Europe in the eighteenth and nineteenth centuries.[25]

Even more to the point, contemporary observers report that parents, particularly mothers, were frequently indifferent to the departure or loss of a child and in some cases welcomed the death of a child as an easing of their burden.[26] They appear not to be describing isolated incidences but rather pervasive attitudes among a poverty-stricken populace. Such evidence is hard to reconcile with the contention that couples declined to use birth control because they wanted to maximize their family size.

Rather it suggests that many women continued having unwelcome births because there was little option to do otherwise.

The custom of hand feeding, rather than breastfeeding, young infants was common through much of central Europe and had a devastating effect on infant mortality, given the deficient nutritional content of the infant's food and the appalling hygienic conditions of the day.[27] It is not difficult to understand why mothers chose such a course within the context of a society where women were expected to labor all day alongside their husbands as well as to have primary responsibility for child care and where the loss of infants was met with ambivalence or indifference. Paradoxically, for areas where breastfeeding was common and prolonged there is scattered evidence that in some cases this was also related to the fact that children were not always welcome. A number of contemporary observers mention that women purposely prolonged breastfeeding in order to delay their next pregnancy. Indeed, this is one of the few actions women themselves could take to reduce their fertility, however ineffective and inconvenient it was.[28]

In some respects, it seems reasonable to argue that negligent child-rearing practices and the resulting infant and child deaths served as a way to limit family size in the absence of birth control, particularly in view of the apparent unwillingness of parents to change their ways despite the frequent decrying of these practices by authorities. From this perspective, the high infant and child mortality rates found in much of Europe prior to the fertility decline can be considered as much an accommodation to high fertility as the opposite. In other words, the conventional argument that couples maintained high fertility in part to counteract high infant and child mortality may have the causal ordering reversed.[29] High mortality among the very young may have in part reflected couples' reactions to unwanted births. Such an interpretation helps explain why a prior decline in infant mortality was not a necessary precondition for marital fertility to start to decline in a number of areas of Europe.

Literary evidence and scattered commentaries by contemporary observers are an unreliable basis for establishing facts about fertility in the past. But there is little else to go on. For whatever it is worth, this evidence is consistent with the idea that family limitation was not widely available or acceptable prior to a radical change in attitudes; and although such a change cannot be dated with precision, the statistical record is consistent with the suggestion that the adoption of contraception within marriage occurred suddenly, and massively, in large segments of the population where its use had been previously extremely limited because it was either unknown or objectionable.

Implications If family limitation was an innovation in Europe at the time of the onset of the fertility transition and its diffusion contributed to the pace of fertility decline there, the same process can occur in devel-

oping countries today, where in many cases family planning also represents a new type of behavior. Organized family planning programs that provide both information and services, as well as propaganda efforts, designed to legitimate family planning practices may well help initiate or accelerate the adoption of family planning practices. The "legitimation" function of a government program may be of considerable importance if existing birth control techniques are primarily associated with extramarital sex, as they appear to have been for a long time in Europe and reportedly are in parts of Africa today, possibly contributing to their unacceptability or "unthinkableness" within marriage. Naturally, the success of a family planning program depends on the receptivity of the couples to fertility reduction. But the absence of practice prior to campaigns to disseminate information and services does not necessarily indicate the lack of such receptivity. It may just as well reflect an unfamiliarity with the concept and methods of family limitation.

If we are correct that women were more receptive to birth prevention than their husbands, then the methods of birth control available are also of some importance. The argument that withdrawal is always an option not only ignores the real possibility that it may be unknown or culturally unacceptable, but also overlooks the possibility that it may be the wife who is most interested in preventing births. The fact that a variety of modern methods are promoted by family planning programs today, including many "female methods," such as the pill, IUD, injection, and tubal ligation, should contribute to an acceleration of fertility decline.

Finally, the historical evidence suggests that high infant and child mortality may have been as much a reaction to high fertility as vice versa. If, in the absence of birth control, dissatisfaction with excessive fertility led to significant numbers of infant deaths through neglect or abusive child care, this suggests that high infant and child mortality rates are not necessarily contraindications to readiness for family planning programs, as has been generally assumed. Indeed, just the opposite may be true.[30]

The Irreversibility of Family Limitation and Fertility Decline

Increases in the practice of family limitation and the decline of marital fertility were largely coincident and, once under way, were largely irreversible and gained momentum.

Evidence Examination of the time series of the index of family limitation, m, and the index of the level of marital fertility, I_g, for Sweden, a country that entered the fertility transition in the late nineteenth cen-

tury, and for Taiwan, a country in which fertility began to fall only two decades ago, reveals remarkable similarities, as shown in Figure 1.[31] In both countries, once the m index starts to rise above a minimal level and once the I_g index starts to fall below the predecline level, these trends continue virtually uninterrupted until radically different levels are achieved. Although the pace of these changes was far more rapid in Taiwan than in Sweden, both countries show the same irreversibility in the fall of marital fertility and the concomitant increase in the practice of family limitation.

The association of rising m values with the decline in marital fertility helps confirm that the fertility transition results from a new form of reproductive behavior rather than from an extension of previously established patterns. Recall that the m index is based solely on the age pattern of marital fertility and is entirely independent of the fertility level. The rising m values associated with the fertility transition indicate that an earlier termination of childbearing and a disproportionate reduction in fertility at older ages contributed to the fall in fertility. In contrast, any deliberate control of marital fertility prior to the transition must have been through lengthening the period between births. We know this from the results of a large number of family reconstitution studies, which make clear that, historically over long periods of time and across diverse populations, the average age of women at last birth was remarkably consistent prior to the fertility decline, generally being close to 40. It seems reasonable to assume that this average was largely biologically determined. Thus, the substantial differences in predecline levels of marital fertility are attributable to differences in the average birth interval, whether due in part to deliberate spacing or otherwise, and not to differences in the age at which couples stopped having children. Not only was stopping behavior new for most couples; its increasing practice appears to account almost entirely for the initial phase of the fertility decline, since the average birth interval remained fairly constant as fertility started to drop.[32] Only later in the transition do increases in the average birth interval make an important contribution to lower fertility levels. Thus, whether or not deliberate birth spacing was practiced prior to the decline, a new and different type of fertility control—stopping behavior, or what we call family limitation—was responsible for precipitating the fall of fertility to modern levels.

While the m index is an indirect measure of family limitation, direct evidence from a series of surveys in Taiwan substantiates the increasing use of birth control during the period of rising m values in that country.[33] Direct historical evidence on the prevalence of birth control for Sweden or other western countries during the equivalent stage of the fertility transition does not exist, but it seems safe to conclude that the shifts in the age pattern of marital fertility reflected by the rising values of m similarly

signified a major increase in the deliberate practice of birth control there as well. The particular mix of methods practiced would naturally have been quite different, with withdrawal and possibly abortion assuming major importance. Indeed, the difference in the type of methods used may have contributed to the strikingly different pace at which family limitation was adopted in Sweden and Taiwan. But the main point is that the trend toward terminating childbearing at increasingly earlier ages was similar despite the differences in the methods of birth control used and the pace at which they were adopted.

Sweden is not an isolated case in the historical record. Examination of the changes in the age pattern of marital fertility in European populations over time, evident in both official statistics and family reconstitution studies, indicates that throughout Europe once the practice of family limitation rose above minimal levels, it continued to increase in a virtually uninterrupted fashion until much higher levels of control prevailed. Likewise, examination of time series of the level of marital fertility indicates that once a decline began, it continued steadily until much lower fertility, typically well below 50 percent of the predecline level, was achieved. This irreversibility is apparent on the national, provincial, and even village levels, as well as for special subgroups such as the social elites covered in some family reconstitution studies. Moreover, the trends in increasing family limitation and declining marital fertility are largely coincident. This generalization holds for virtually all populations including those that experienced unusually early signs of family limitation and fertility decline, although in such cases the pace of change was generally slower. The evidence from Taiwan and indeed from an increasing number of other developing nations (most of which are at an earlier stage of their fertility decline) suggests the same experience is being repeated in present-day developing countries but at a greatly accelerated pace.[34] In brief, the increase in the practice of family limitation and the decline of marital fertility seem to be one-way processes that generate a "momentum" of their own.[35]

Implications The steady and irreversible increase in the practice of family limitation under a diversity of social and economic conditions in Europe suggests that the idea of controlling the number of children born rather than leaving it to fate has a wide appeal, once the possibility of control is realized. The steady decline in marital fertility may reflect a combination of increasing efficiency in the practice of family limitation and falling desired family sizes. Indeed, these two factors may interact. Only after the possibility of effectively limiting childbearing becomes a reality and its advantages become fully appreciated does it make sense to couples to aim for even smaller family sizes.

If our hypothesis is correct, the high and relatively constant fertility that characterizes predecline societies corresponds essentially to a period

in which it is not widely acknowledged that reproduction can be manipulated by individual couples within marriage. Couples do not have target family sizes. They accept, in some cases reluctantly, as many children "as God sends." Questions on desired family size asked in surveys taken in Tropical Africa often elicit giggles and meaningless responses, presumably because people believe it is not in their power to affect the outcome of a natural process.[36] In the absence of a choice, societies often have characteristics that accommodate high fertility: large families are welcomed or at least unquestioned. The appearance of articulated desires concerning family size may coincide with or shortly precede the realization that reproduction can be manipulated; and once methods are on hand by which smaller and smaller family sizes can be attained by successive cohorts of couples, the norm about size starts to evolve downward.

The pattern of steady increase in family limitation and steady decline in fertility is indicative of a "diffusion process." Once some couples in a community adopt the new behavior patterns, it becomes relatively easy for other couples to imitate. In addition, the cost of going against religious proscriptions or other norms that may have served as barriers to the use of family limitation in the pretransition period rapidly diminishes as couples become aware that others in the community are violating the old norms as well.

This interpretation of the European experience clearly contradicts the assumption sometimes made that family planning programs can only skim the cream off the top and that after initial success, demand for their services will dry up.[37] The historical record suggests that, once started, the decline of fertility does not stop easily.

The Influence of Cultural Setting

Cultural setting influenced the onset and spread of fertility decline independently of socioeconomic conditions. Proximate areas with similar socioeconomic conditions but dissimilar cultures entered the transition period at different times, whereas areas differing in the level of socioeconomic development but with similar cultures entered the transition at similar times.

Evidence Despite the great diversity of their socioeconomic characteristics, the striking factor that the countries of Europe had in common when fertility declined was time itself. This is the main finding emerging from Table 1. With the exception of the forerunner, France, and a few stragglers, such as Ireland and Albania, the dates of decline were remarkably concentrated. The momentous revolution of family limitation began in two-thirds of the province-sized administrative areas of Europe during

a 30-year period, from 1880 to 1910. Moreover, the fertility decline took hold at much the same time in areas of western culture overseas, from English-speaking Canada to New Zealand. We doubt this remarkable homogeneity can be explained by the influence of economic development on the independent motivations of millions of couples. Instead, we see this as evidence that some diffusion of information on contraception as well as some communication of normative beliefs must have occurred within the larger European (or western) cultural sphere.

There are of course differences of timing among areas. A persistent finding of the recent research on fertility decline in Europe is that the onset and spread of the fertility decline appears to cluster regionally in a way that cannot be explained through common socioeconomic characteristics. There is greater similarity in fertility trends among provinces within the same region but with different socioeconomic characteristics than is true among provinces with similar socioeconomic characteristics but located in different regions. Provinces within regions typically share similar cultural characteristics, such as a common dialect or common customs. Regional boundaries often coincide with cultural boundaries, which in turn impede the flow of information and the process of diffusion. In addition, there are undoubtedly differences between cultures in terms of traditions, customs, and values that can either impede or facilitate the adoption of family limitation behavior and small-family norms.

The importance of cultural and language boundaries in differentiating the timing and pace of the fertility transition is made starkly clear by the historical experience of Belgium, which is divided into Walloon (French-speaking) and Flemish (Dutch-speaking) areas. Maps plotting fertility during the transition period make clear that "the areas with high marital fertility and a late decline are nearly all on the Flemish side, and those with an early and faster decline are on the Walloon side."[38] Moreover, physical proximity was of no importance in areas where the two cultures met. An examination of a sample of paired communities, never more than ten kilometers apart but on opposite sides of the language border, reveals that although there were no significant measurable social and economic differences between the communities, the language boundary was "a real demarcation line between two obviously non-interacting demographic regimes."[39]

While the Belgian experience is impressive in indicating how the existence of a language border within even a small country can serve as a cultural barrier to the spread of the fertility transition, the experience of English-language countries overseas demonstrates the importance of language and culture in the fertility transition in a different way. The "extraordinary similarity between the course of birth rates in Australia and the United States, and the similarity between the fertility of these two societies over time and those of Britain, New Zealand, and English-

speaking Canada" serve as one of the most striking manifestations of "the diffusion of fertility control practices within single language groups" despite the quite different social and economic situations that characterized these countries.[40]

Recent analysis of the fertility decline in Russia also underscores the importance of culture and tradition in determining the fertility response of a population to social and economic change.[41] The persistence of customs and attitudes unfavorable to family limitation and reduced fertility appears to be the most likely explanation of why eastern minorities in European Russia were so slow to reduce their fertility despite many decades of postrevolutionary social change, including the extension of education, the reduction of mortality rates, and massive indoctrination efforts. Similarly, long-standing cultural features seem to underlie the continuing persistence of high marital fertility and the absence of family limitation in the rural populations of Central Asia. Although a direct connection remains to be established, the subordinate position of women, which appears to be an entrenched part of the dominant Muslim culture of Central Asia, is probably a factor.[42]

Implications Cultural setting and tradition are likely to exert an independent influence on the response of populations to organized family planning efforts as well as to general development. While family planning programs may elicit a very favorable response in some populations even at quite low initial levels of development, in others we might expect such efforts to be quite unsuccessful at considerably higher levels of development. Under the latter circumstances, it is hard to be optimistic about the potential of either organized family planning or general development efforts for lowering population growth until these cultural barriers are broken down. Family planners would be offering their message and wares to an unreceptive, even, perhaps, largely inaccessible audience (particularly in situations where women's roles are highly segregated and male domination is extreme), whereas general development programs would be most likely to increase population growth by reducing mortality while fertility remains high.

Matters would be far simpler if those particular cultural characteristics that are favorable or unfavorable to family limitation were readily identifiable. If the presence of certain characteristics in a society were a sure indication of a special receptivity to policy efforts, this society could then be singled out for special programs. If, on the contrary, a particular cultural trait were identified as counter to the diffusion of contraceptive practice or the small-family norm, the focus of information and propaganda campaigns might especially address this point. Unfortunately, there is very little firm knowledge concerning the cultural factors that have facilitated the acceptance of family limitation.

One cultural feature that we believe the historical record suggests is particularly important is the status of women. We regard this more as a cultural characteristic than a socioeconomic or structural one since the extent to which women participate in the broader socioeconomic system beyond the home and extended family appears to be determined more by religious and other cultural values than by socioeconomic development per se. Of course the two are related, but the point is that the success of both family planning programs and more general development efforts designed to affect fertility may be quite dependent on the cultural beliefs regarding the appropriate role of women. This implication is consistent with the evidence suggesting that women may be more receptive than men to the limitation of family size, at least in circumstances where fertility is quite high. In cultural settings where the female role is subordinate to the extreme and where women are isolated from the broader communication network, policies designed to alter the status of women may be more conducive to reduced fertility than either family planning alone or more general development efforts.[43]

Sociological theory has attempted to describe both cultural and structural factors that sustain high fertility. These include the role of the kinship group as the locus of decision-making in the area of reproduction and the means by which individuals can further their interests within kinship groups. John Caldwell suggests that in present-day circumstances, the onslaught and popularity of media material that reflects western attitudes and value systems, if they could be measured, would also reflect the breaking down of cultural barriers and the diffusion of universal fertility norms.[44] The identification of social and cultural indicators that would reflect receptivity to family limitation has lagged behind measurement of the more readily identifiable socioeconomic characteristics. Such indexes would be of considerable value to social scientists and policymakers alike. More effort needs to be made in this direction.[45]

Conclusion

It may be helpful to rephrase the argument of this paper using the general framework developed by Richard Easterlin.[46] The determinants of fertility must work through (a) the demand for children, as determined by income, prices, and tastes; (b) the supply or potential output of children in the absence of fertility limitation, a function of natural fertility and the survival of children; and (c) the cost of fertility regulation, both psychic and objective. We believe the historical record suggests the relative lack of importance of income and prices in determining the demand for children prior to or during early stages of the fertility decline. In fact,

the typical situation in the past seems to have been one in which the demand function is indeterminate and in which, to repeat Coale's expression, fertility is not "within the calculus of conscious choice."[47]

When target family size begins to be articulated, the dominant factor may be tastes, which may reflect external influences as much as or more than socioeconomic conditions specific to the society in question. In contrast to those who postulate a role of declining infant mortality in hastening the resort to contraception to regulate the size of families, we note that the decline of fertility occurred among countries with very different supply functions, both in terms of overall fertility and in terms of childhood survival. Finally, we believe that what is understood by the "cost of fertility regulation," a term that covers a variety of factors including sheer familiarity with the concept and means of family limitation, is an extremely important component of an explanation of the secular fertility decline, as it occurred in Europe and as it will occur in many other parts of the world where high fertility now prevails. Here, too, the diffusion of attitudes toward and knowledge of contraception, and of contraceptive techniques and implements themselves, may trigger or accelerate the decline of fertility. The model western nations provide of family limitation and small family sizes may be among the most important factors in contemporary fertility declines in a number of developing countries.

If our interpretation of the European transition from high to low fertility is correct, some of its early features can only be explained by a change in tastes or a decline in the cost of fertility regulation or some combination of the two. These features include the variety of social, economic, and demographic conditions under which the decline of fertility occurred; its remarkable concentration over time; the apparent coincidence of the decline with the sudden adoption of family limitation practices; the rapid generalization of such practices, once they appeared; the resultant drastic change of reproductive regimes; and finally, the importance of cultural factors among those that appeared to influence the onset and the spread of the fertility decline.

Although the European experience confirms a loose relationship between socioeconomic modernization and fertility decline, it also suggests that there was an important innovation-diffusion dimension to the reproductive revolution that swept the continent. This suggests that the introduction of the concept of family limitation (along with the means of effective fertility control), particularly in combination with the diffusion of tastes for modern consumer goods, higher material aspirations, and an awareness of alternative roles for women, can have a substantial impact on populations today. Indeed, given the nature of modern communications existing in much of the developing world today, the potential for rapid diffusion of birth control practice is considerably greater than it

was historically in Europe. At the same time, the historical record does not suggest success will necessarily be immediate. Even within Europe there were cultural clusters particularly resistant to the modernization of reproduction.

One of the more important implications of our interpretation of historical fertility studies is that current recommendations to shift the emphasis away from family planning programs and toward development efforts as a means of reducing fertility should be viewed with considerable caution.[48] Stressing the importance of general development programs or the selective restructuring of such programs at the expense of programs aimed at disseminating both knowledge and methods of birth control is politically popular at the moment.[49] Our interpretation of the historical record, however, casts doubt on the assumption that such shifts in policy will often be expedient in hastening declines in birth rates. In many cases a greater payoff might well result from concentrating efforts on improving and extending existing family planning programs.

Of course, it would be unrealistic to assume that either family planning programs or development efforts designed to influence fertility will be successful everywhere immediately, especially if no attention is paid to the long-established cultural values regulating fertility in specific societies. In particular, the historical record indicates special heed must be paid to those cultural features that determine the status of women and their ability to assert their own wishes regarding childbearing. In addition, the success of organized family planning efforts depends on such programmatic factors as program content, strategy, organization and administrative structure—factors about which the historical record cannot tell us much since the fertility transition in the West occurred while most governments, rather than enacting programs to encourage fertility decline, remained staunchly pronatalist.

Although it would be foolish to expect that all the critical policy issues of today can be effectively addressed by looking into the past experience of the West, anyone familiar with the richness of the findings emerging from the large number of in-depth studies of the historical fertility experience now under way will be quick to realize we have far from exhausted their implications for current policy. Moreover, we recognize there is sufficient room for genuine disagreement with those implications we have drawn. Too often, however, interpretations of the historical record are based more on theoretical preconceptions derived from the present than on an empirically grounded familiarity with what actually went on in the past. We hope we have made clear that recent research has expanded our knowledge of the historical record to a point where such an approach can no longer be acceptable. We also hope we have helped form a basis from which a more informed debate can continue

Notes

1. See, for example, Judith Blake and Prithwis Das Gupta, "Reproductive motivation versus contraceptive technology: Is recent American experience an exception?" *Population and Development Review* 1, no. 2 (December 1975): 245; Gösta Carlsson, "The decline of fertility: Innovation or adjustment process," *Population Studies* 20, no. 2 (November 1969): 149–174; Paul Demeny, "Observations on population policy and population programs in Bangladesh," *Population and Development Review* 1, no. 2 (December 1975): 307–321.

2. Paul Demeny, letter to the editor, *Scientific American* 232, no. 5 (May 1975): 6.

3. An excellent summary of some of the results of this project is given in Ansley Coale, "The demographic transition reconsidered," *International Population Conference, Liege 1973*, Vol. 1 (Liege: IUSSP, 1973), pp. 53–72.

4. John Hajnal, "European marriage patterns in perspective," in *Population in History*, ed. D. V. Glass and D. E. C. Eversley (London: Adeline, 1965).

5. Rudolf Andorka, "Un exemple de faible fécondité légitime dans une région de la Hongrie," *Annales de démographie historique 1972*, pp. 25–53; John Knodel, "Fertility transition in rural Germany: An analysis of family history data," paper presented at the Social Science History Association Meetings, Columbus, Ohio, 3–5 November 1978.

6. John Knodel, *The Decline of Fertility in Germany, 1871–1939* (Princeton: Princeton University Press, 1974); Ron Lesthaeghe, *The Decline of Belgian Fertility, 1800–1970* (Princeton: Princeton University Press, 1978).

7. For the 71 administrative areas of Germany, the predecline level of infant mortality correlates —.32 with the year I_g declined by 10 percent.

8. Knodel and Lesthaeghe, both cited in note 6. There are several sources of difficulty in interpreting the historical record of the relationship between declines in infant and child mortality and declines in fertility. First, there is considerable evidence that child mortality (say above age one but under age 15) dropped before infant mortality, and thus the latter may not accurately reflect the change in the supply function of births for parents. This point of view is argued by Paul C. Mathiessen and James C. McCann, "The role of mortality in the European fertility transition: Aggregate level relations," in *The Effects of Infant and Child Mortality on Fertility*, ed. Samuel H. Preston (New York: Academic Press, 1978). Second, it is not always as easy to establish a clear "take off" for the decline of infant and child mortality as it is for the decline of marital fertility. In some countries, such as Germany and Austria, available evidence suggests infant and child mortality remained fairly constant and high before the late nineteenth century, when it started to decline; however, in other countries, such as Sweden and France, existing series in infant *and* child mortality indicate earlier declines in the eighteenth and early nineteenth centuries. A priori arguments would lead us to expect a noticeable impact of the generalization of smallpox vaccination after 1800, although the French infant and child mortality decline is already marked before that time (see Yves Blayo, "La mortalité en France de 1740 à 1829," in *Population* 30, special issue on historical demography, November 1975, pp. 123–141). However, if there was a causal link in France between the early decline in mortality and the onset of the fertility transition, why then did the parallel decline of mortality in Sweden not produce similar results?

9. Ansley Coale, Barbara Anderson, and Erna Härm, *Human Fertility in Russia since the 19th Century* (Princeton: Princeton University Press, forthcoming).

10. Family limitation as used here refers to behavior intended to stop childbearing at some particular number of children and is thus a special case of birth control, an expression that refers to both stopping and spacing behavior. Deliberate attempts to space births may also have been absent in the predecline period, but most of the indirect techniques developed so far are only capable of detecting the absence of stopping behavior.

11. Ansley J. Coale and T. James Trussell, "Model fertility schedules: Variation in the age structure of childbearing in human populations," *Population Index* no. 40 (1974): 185–258; Ansley J. Coale and James Trussell, "A new procedure for fitting optimal values of the parameters of a model schedule of marital fertility rates," *Population Index* no. 44 (1978): 203–211.

12. Small differences in the value of *m* are not necessarily meaningful indications of differences in the extent of family limitation. For example, among the ten empirical fertility schedules that served as the basis for determining the standard shape of natural fertility, the values of *m* ranged from —.15 to .24. On a cross-sectional basis, some range of differences is to be expected even when little or no family limitation is being practiced. On the other hand, modern populations in which contraception is widespread are typically characterized by *m* values well over 1.0. Thus, moderate or large cross-sectional differences or consistent trends over time in a series of *m* values can be interpreted with reasonable confidence as reflections of differences in the degree of fertility control (Coale and Trussell, "A new procedure . . . ," cited in note 11). Since *m* is determined entirely by the age pattern of marital fertility rates, it is independent of the level of fertility and therefore insensitive to any attempts to space births that are independent of the wife's age and, presumably, her parity.

13. Louis Henry and Jacques Houdaille, "Fecondité des mariages dans le quart nord-oeust de la France de 1670 à 1829," *Population* 28, nos. 4–5 (July–October 1973): 873–922.

14. John Knodel, "European populations in the past: Family-level relations," in Preston, cited in note 8; John Knodel, "Natural fertility in preindustrial Germany," *Population Studies* 32, no. 3 (November 1978): 481–510.

15. Edward Shorter, John Knodel, and Etienne van de Walle, "The decline of non-marital fertility in Europe, 1880–1940," *Population Studies* 25, no. 3 (November 1971): 375–393.

16. William L. Langer, "Infanticide: A historical survey," *History of Childhood Quarterly* 1, no. 3 (1974): 353–365.

17. Norman E. Himes, *Medical History of Contraception* (New York: Gamut Press, 1963).

18. For an extensive review of the evidence supporting this point, see Etienne van de Walle, "Motivations and technology: The French fertility decline," unpublished chapter of a manuscript being prepared on the decline of fertility in France. See also Lawrence Stone, *The Family, Sex and Marriage in England 1500–1800* (London: Weidenfeld and Nicolson, 1977), Ch. 9.

19. Demeny, cited in note 2.

20. The "unthinkability" of birth control has been argued by Philippe Ariès. See, for example, "Interprétation pour une histoire des mentalités," in *La prevention des naissances dans la famille,* ed. Hélène Bergues et al. (Paris: INED, 1960). See also Stone, cited in note 18.

21. Thomas R. Malthus, *Population: The First Essay* (Ann Arbor: University of Michigan Press, 1959), p 54.

22. Baron de Grimm and Diderot, *Correspondance littéraire, philosophique et critique,* Vol. 5 (Paris, 1813), pp. 318–319.

23. Paul Demeny, "The populations of the underdeveloped countries," *Scientific American* 231, no. 3 (September 1974): 152.

24. Himes, cited in note 17. For an extensive review of the lay and religious literature, see van de Walle, cited in note 18.

25. Edward Shorter, *The Making of the Modern Family* (New York: Basic Books, 1975), Ch. 5; Edward Shorter, "The great transformation of mother–infant relations, eighteenth to twentieth centuries," manuscript dated October 1978 and prepared for UNESCO's commemoration volume for the International Year of the Child; Langer, cited in note 16; William Langer, "Checks on population growth: 1750–1850," *Scientific American* 226, no. 2 (February 1972): 92–99; Maria Piers, *Infanticide* (New York: Norton, 1978); Stone, cited in note 18; Robert Sauer, "Infanticide and abortion in nineteenth century Britain," *Population Studies* 32 (1978): 81–92.

26. Shorter, *The Making of the Modern Family* and "The great transformation . . . ," both cited in note 25; Rudolph Braun, Protoindustrialization and demographic changes in the canton of Zurich," in *Historical Studies of Changing Fertility*, ed. Charles Tilly (Princeton: Princeton University Press, 1978), pp. 318–319; Stone, cited in note 18; W. R. Lee, *Population Growth, Economic Development and Social Change in Bavaria, 1750–1850* (New York: Arno Press, 1977), p. 282.

27. John Knodel and Etienne van de Walle, "Breastfeeding, fertility and infant mortality: An analysis of some early German data," *Population Studies* 21 (September 1967): 109–131.

28. Shorter, *The Making of the Modern Family*, cited in note 25, p. 176; Massimo Livi-Bacci, *A History of Italian Fertility during the Last Two Centuries* (Princeton: Princeton University Press, 1977), p. 256; Knodel, cited in note 5.

29. See, for example, Lee, cited in note 26, p. 69. Susan Scrimshaw comes to a similar conclusion regarding present-day developing countries based on a review of anthropological evidence; indeed, there appear to be remarkable similarities in the historical and present-day situations. See Susan C. M. Scrimshaw, "Infant mortality and behavior in the regulation of family size," *Population and Development Review* 4, no. 3 (September 1978): 383–403.

30. Scrimshaw, cited in note 29, makes the same point based largely on evidence from present-day developing countries: "High mortality, when looked at in the context of family formation patterns, may point to a readiness for family planning rather than the opposite" (p. 397).

31. The values of the m indexes plotted in Figure 1 differ somewhat from those published earlier [in John Knodel, "Family limitation and fertility transition: Evidence from the age patterns of fertility in Europe and Asia," *Population Studies* 31 (July 1977): 219–249], since they are calculated by a different method recommended by Coale and Trussell, "A new procedure . . . ," cited in note 11. More specifically, a regression equation based on the values of marital fertility for the six five-year age groups, 20–24, . . . , 45–49, was employed to estimate m. Somewhat higher values of m, ranging from .06 to .26, are found for Sweden prior to the fertility decline if the age group 45–49 is excluded from the regression.

32. Increases in the last birth interval are sometimes evident, but this can best be interpreted as a reflection of attempts at stopping rather than spacing per se. See Knodel, cited in note 5.

33. Te-Hsiung Sun, Hui-Sheng Lin, and Ronald Freedman, "Trends in fertility, family size preferences, and family planning practice: Taiwan, 1961–76," *Studies in Family Planning* 9, no. 4 (April 1978): 54–70.

34. See Knodel, "Family limitation and fertility transition . . . ," cited in note 31; John Knodel and Nibhon Debavalya, "Thailand's reproductive revolution," *International Family Planning Perspectives and Digest* 4 (Summer 1978): 34–49.

35. One well-known exception to this generalization has been indicated for the English village of Colyton, where E. A. Wrigley ["Family limitation in preindustrial England," *Economic History Review* 19 (1966): 83–109] found some evidence of family limitation in the seventeenth century, following a plague epidemic; 50

years later the villagers apparently reverted to uncontrolled fertility. However, the finding is best treated as a rare exception, based on a rather small number of cases. Even the validity of this exception is under debate. See Richard Morrow, "Family limitation in preindustrial England: A reappraisal," *The Economic History Review* 31, no. 3 (1978): 419–428; and E. A. Wrigley, "Marital fertility in seventeenth-century Colyton: A note," *The Economic History Review* 31, no. 3 (1978): 429–436.

36. John C. Caldwell, "The economic rationality of high fertility: An investigation illustrated with Nigerian survey data," *Population Studies* 31, no. 1 (March 1977): 8.

37. Evidence from an increasing number of developing countries confirms sustained demand for family planning programming services. Despite this, some still argue that "acceptors . . . are the cream skimmed off the top." See William Petersen, "The effects of government policies on the fertility of less developed countries," paper presented at the annual meeting of the American Association for the Advancement of Science, Washington, D.C., 14 February 1978.

38. Lesthaeghe, cited in note 6, p. 110.

39. Lesthaeghe, cited in note 6, p. 112.

40. John C. Caldwell and Lado T. Ruzicka, "The Australian fertility transition: An analysis," *Population and Development Review* 4, no. 1 (March 1978): 81–103. Quotes from p. 81.

41. Coale, Anderson, and Härm, cited in note 9.

42. Coale et al., cited in note 41.

43. For an example of how the subordinate status of women plays a semiautonomous role within the broader framework of social and economic organization in a contemporary developing country, see W. Brian Arthur and Geoffrey McNicoll, "An analytical survey of population and development in Bangladesh," *Population and Development Review* 4, no. 1 (March 1978): 23–80, esp. pp. 52–53. For evidence that in some developing countries there is a greater receptivity to birth control among women than men, see Perdita Huston, *Message from the Village* (New York: Epoch B. Foundation, 1978). Ruth Dixon, in *Rural Women at Work* (Baltimore: Johns Hopkins University Press, 1978), argues that general development efforts in developing countries often have little impact on the status of women.

44. John C. Caldwell, "Toward a restatement of demographic transition theory," *Population and Development Review* 2, nos. 3–4 (September–December 1976): 321–366.

45. The particular indexes that may be most appropriate for identifying readiness to decline in the historical setting may not always be the same as those appropriate for developing countries today. In general, however, it is not implausible that, independent of the overall level of development, countries where the education and labor participation of women does not lag much behind that of men where women are integrated into the modern communications and transportation networks, or where the cost of children exceeds their value to the family as an economic unit are candidates for an early and rapid decline of fertility. In addition, the generalization of western standards of public health, with their strong component of maternity and child care programs seems likely to be a harbinger of successful family planning. Indexes measuring these factors might prove far more predictive of fertility decline than conventional development indexes.

46. Richard A. Easterlin, "An economic framework for fertility analysis," *Studies in Family Planning* 6, no. 3 (March 1975): 54–63.

47. Coale, cited in note 3, p. 65.

48. For various versions of arguments for deemphasizing family planning programs, see Demeny, cited in note 1; Nicholas Demerath, *Birth Control and Foreign Policy* (New York: Harper

Row, 1976); Petersen, cited in note 37; Kingsley Davis, "World population growth and United States foreign policy," statement prepared for hearings before the Committee on Appropriations of the House of Representatives, 31 March 1977; Davis, "Population growth and policy in the less developed world," testimony before the House Select Committee on Population, 9 February 1978.

49. As, indeed, it has been since the 1974 World Population Conference at Bucharest. A central recommendation of the World Population Plan of Action passed at Bucharest is contained in paragraph 31: "that countries wishing to affect fertility levels give priority to implementing development programmes and educational health strategies which, while contributing to economic growth and higher standards of living, have a decisive impact upon demographic trends, including fertility." See *Population and Development Review* 1, no. 1 (September 1975): 163–181 for the full text of the World Plan of Action.