EXPLAINING FERTILITY TRANSITIONS*

KAREN OPPENHEIM MASON

In this essay, I suggest that the crisis in our understanding of fertility transitions is more apparent than real. Although most existing theories of fertility transition have been partially or wholly discredited, this reflects a tendency to assume that all fertility transitions share one or two causes, to ignore mortality decline as a precondition for fertility decline, to assume that pretransitional fertility is wholly governed by social constraints rather than by individual decision-making, and to test ideas on a decadal time scale. I end the essay by suggesting a perceptual, interactive approach to explaining fertility transitions that is closely allied to existing theories but focuses on conditions that lead couples to switch from postnatal to prenatal controls on family size.

In this essay I am concerned with explaining fertility transitions—that is, long-term declines in the number of children from four or more per woman to two or fewer. Hirschman (1994) has recently argued that the field of demography's single-minded focus on fertility transitions has created a theoretical blind alley that leaves us incapable of understanding not only fertility transitions, but also other fertility variation and change (see also Wilson and Airey 1997, for example). He suggests that demographers would be better off considering models of population homeostasis that pertain to all varieties of fertility change, not just to the revolutionary transitions that began in the West in the early nineteenth century and that continue to this day in parts of the developing world (Bongaarts and Watkins 1996). I agree with Hirschman's assessment; but because transitions have been the daily meat and bread of so many demographers for so long, they are a natural starting point for clarifying our understanding of what drives fertility change. My goal is stimulating demographers to think more clearly about these transitions by reviewing the wealth of knowledge we already possess. If I meet this goal, I believe demographers will more or less automatically stop thinking of transitions as phenomena wholly unlike other forms of fertility change.

In 1952, the then-president of the Population Association of America, Rupert Vance, titled his presidential address "Is Theory for Demographers?" (cited in Robinson and Cleland 1992). Since then, one might say that demographers have indulged in social science theorizing with a vengeance. At least with regard to fertility transitions, we have perhaps too many formal theories,[1] none of which seems wholly satisfactory. I believe that this state of affairs results more from forgetting or ignoring what we already know than from any fundamental inability to understand fertility transitions or other types of fertility change. In the remainder of this essay, I will try to establish this point in three steps. First, I will sketch the six most commonly cited theories of fertility transition and will describe the major criticisms of these theories. Second, I will describe four fundamental problems in our thinking about fertility transitions and will suggest more fruitful ways of approaching these issues. Finally, I will describe a perceptual, interactive approach to understanding fertility transitions and will discuss an illustrative model.

MAJOR THEORIES

Fertility theories can be used on at least three distinct time scales, and which scale is chosen can influence the nature and success of the theory (Mason 1992). For example, on a millennial time scale, the focus is on why all fertility declines have occurred during the last 200 years rather than, say, five centuries earlier or five centuries later. This scale implicitly encompasses all of human history. Theories applied on this scale are consequently hard to disprove because there are few, if any, control groups. Any story that plausibly matches the march of history cannot be discounted.

On a centennial scale, the question is why fertility transitions in different countries or world regions have occurred in different centuries—for example, why they occurred first in Europe and its colonial offshoots during the nineteenth and early twentieth centuries, approximately one century later in much of Asia and Latin America, and only recently in most of sub-Saharan Africa and the Arab Middle East. Theories applied on this scale offer the possibility of disproof through comparison, but are difficult to test quantitatively using the methods normally favored by demographers.

*Karen Oppenheim Mason, Program on Population, East-West Center, 1601 East-West Road, Honolulu, HI 96848-1601; e-mail: MasonK@Hawaii.edu. This paper is a revision of the presidential address delivered at the annual meeting of the Population Association of America, Washington, D.C., March 27–29, 1997. I am indebted to Ian Diamond, John R. Sibert, and my current and former colleagues at the East-West Center, John Bauer, Minja Kim Choe, Phil Estermann, Griffith Feeney, Andrew Mason, Bob Retherford, Sidney Westley, and Peter Xenos for comments on earlier versions; to my long-term collaborators, Herbert L. Smith, Shireen J. Jejeebhoy, Zeba A. Sathar, Shyamala Nagaraj, Corazon M. Raymundo, and Napaporn Chayovan; and to other colleagues at the East-West Center who have shown me unfailing support, friendship, and encouragement. Funding for my recent research, including this address, has been provided by the Rockefeller Foundation, the Andrew W. Mellon Foundation, and by Grant RO1 HD3357 from the National Institute of Child Health and Human Development. I am grateful for all of these sources of support.

1. By formal theory, I mean one that is presented by its author—or described by others—as a relatively coherent set of ideas, not just a collection of *ad hoc* explanations. The theory need not be mathematical.

Finally, on a decadal scale, the question is why fertility decline began in one decade rather than another—for example, in the 1880s rather than in the 1890s. This is the time scale employed in Princeton's European Fertility Project (summarized in Coale and Watkins 1986), a project that has strongly influenced thinking about fertility declines. The decadal time scale allows for quantitative tests but, as I will argue below, may be an inappropriate scale on which to understand the institutional forces that ultimately drive fertility transitions.

Now let us consider six major theories of fertility decline. For most demographers, the "granddaddy" of fertility transition theories is classic demographic transition theory as described by Thompson (1930: chap. 8) and Notestein (1953).[2] This theory attributes fertility decline to changes in social life that accompany, and are presumed to be caused by, industrialization and urbanization. These changes initially produce a decline in mortality, which sets the stage for—or by itself may bring about—fertility decline by increasing the survival of children and, hence, the size of families. Urbanization and industrialization also create a way of life in which rearing more than a few children is expensive enough to discourage most parents from having large families.

Demographers have used classic transition theory extensively, but they have also criticized it harshly (e.g., Cleland 1985; Cleland and Wilson 1987; Coale and Watkins 1986; Knodel and van de Walle 1979; McDonald 1993). Transition theory is plausible on a millennial scale, but as noted earlier, any theory consistent with the history of the West is equally plausible. When applied on a decadal scale, the theory is frequently contradicted. In both Europe (Coale 1973; Coale and Watkins 1986) and the developing countries (Bongaarts and Watkins 1996), correlations between level of urbanization or industrialization and the decade in which nations or provinces first experience a fertility decline are weak.

At the centennial level, classic transition theory is more successful but still needs obvious modification. That the first set of transitions occurred in the West approximately 100 years before the second set occurred in Asia and Latin America fits fairly well with the history of urbanization, industrialization, and mortality decline in these world regions. Less consistent with the theory, however, is the demographic history of particular countries. For example, several countries in Asia (e.g., Bangladesh: Amin, Cleland, Phillips, and Kamal 1995) and Latin America (e.g., Haiti: Zavala de Cosio 1996) that are currently undergoing the fertility transition are agrarian and underdeveloped, an apparent contradiction to the idea that development and modernization bring about fertility declines. Thus, demographic transition theory has ideas that are hard to ignore and that live on despite the barrage of criticism to which the theory has been subjected. In its original form, however, the theory is incomplete.

2. For economists, the economic theory of fertility as elaborated by Leibenstein (1957) and Becker (1960) is often treated as though it were the grand daddy of transition theories (see Robinson 1997; Robinson and Cleland 1992); but for most demographers, demographic transition theory represents a far older and equally, if not more influential, intellectual tradition.

The same can be said of virtually every other transition theory that has appeared during the past three decades. Lesthaeghe (1983, 1995; Lesthaeghe and Surkyn 1988; Lesthaeghe and Wilson 1986) has elaborated classic transition theory by adding to economic modernization a shift in values toward individualism and self-fulfillment that occurs with rising affluence and secularization. This addition to transition theory fits the data from Europe quite well, but fits data from several developing countries much less well: For example, in Bangladesh, a fertility transition is clearly in progress despite little apparent change in traditional values.[3]

Caldwell's theory of wealth flows (Caldwell 1982) attributes fertility decline to the emotional nucleation of the family, a change that may be triggered by either economic or cultural forces. At the heart of the theory is the idea that nucleation makes children, not parents, the net economic beneficiaries of family life, a process that Caldwell calls the reversal of intrafamilial "wealth flows." Caldwell's theory may apply to sub-Saharan African, where Caldwell conducted much of the field work that generated the theory and where extended families are strong and lineage elders are likely to benefit from high fertility (Lesthaeghe 1980). As Freedman (1979b) and others have noted, however, the theory does not work as well in many parts of East Asia, where fertility has declined with little apparent change in extended family relationships (Thornton and Fricke 1987).[4] Equally problematic may be its applicability to western Europe, where family nucleation existed for centuries before fertility decline (Hajnal 1965).

The neoclassical microeconomic theory of fertility (Becker 1960; Schultz 1973) emphasizes three proximate determinants of couples' fertility choices: the relative costs of children versus other goods, the couple's income, and their preferences for children versus competing forms of consumption.[5] This theory provides a quantifiable framework for investigating fertility change, but as a theory is silent about the environmental and institutional conditions that change costs, income, or preferences, and thereby trigger fertility declines. Thus, in addition to problems in the theory's internal logic recently elaborated by Robinson (1997), the microeconomic theory of fertility decline can be faulted for adding little to classical demographic transition theory when

3. In fairness to Lesthaeghe, his intent was to explain the European fertility decline, not to explain all fertility transitions in the world.

4. I question whether extended family relationships have changed as little in East Asia during the period of rapid fertility decline as is often claimed. Although three-generation households may have remained relatively common, relations of authority and obligation, which are what drive fertility in Caldwell's theory, are likely to have changed considerably. The type of extended family found in East Asia also is quite different from the type found in much of sub-Saharan Africa. For example, in East Asian family systems the claims of collateral relatives (e.g., a man's nephews or nieces) have always been relatively weak when compared to sub-Saharan Africa. Such differences may have important implications for so-called wealth flows within families that make East Asia not so much a case that contradicts Caldwell's theory as one that requires a different set of explanations for fertility decline.

5. The theory is phrased not in terms of children, per se, but in terms of child services, home-produced commodities that generate utility for parents.

it comes to insight into the institutional conditions conducive to fertility transitions.

Easterlin's framework (1975, 1978; Easterlin and Crimmins 1985) elaborates the microeconomic fertility model by adding to it a sociological variable, the supply of children. The Easterlin framework explains fertility in terms of three proximate determinants: *the supply of children*, that is, the number of children that parents would bear in the absence of deliberate fertility limitation; *the demand for children*, or the number of surviving children they would *like* to have; and *the costs of fertility regulation*, where "costs" are psychic, social, and monetary costs. This framework has been useful for organizing thinking about fertility decline (see, for example, Bulatao and Lee 1983; also see Robinson and Cleland 1992, who suggest the Easterlin framework has misled us as well). As with the neoclassical microeconomic model, however, the Easterlin framework contains few ideas about the institutional determinants of fertility decline.

The final theory of fertility decline reviewed here is the so-called ideational theory enunciated by Cleland and Wilson (1987; Cleland 1985). This theory attributes the timing of fertility transition to the diffusion of information and new social norms about birth control (previous mortality decline may also be a necessary precondition for the transition). Although this theory adds an important element to earlier theories, Cleland and Wilson recognize that Africa poses a difficult case for a pure diffusion theory. In Africa, parents want large numbers of *surviving* children (Caldwell 1982: chap. 2). Under these conditions, the diffusion of birth-control information is unlikely to result in a fertility decline, although birth control may be adopted to achieve desirable birth spacing (Caldwell, Orubuloye, and Caldwell 1992). Diffusion of ideas and the processes through which diffusion occurs—namely, social interaction and influence—are increasingly recognized as important for the timing of fertility declines, especially on a decadal time scale (Bongaarts and Watkins 1996; Hirschman 1994). Like all of the other theories reviewed here, however, the ideational theory as enunciated by Cleland and Wilson is incomplete.

In summary, although there are many theories of fertility transition, each containing important ideas, none provides a complete explanation for all known fertility declines.[6] Moreover, those theories that are specific enough to be tested in a meaningful manner have been contradicted by the evidence. I believe that this situation has arisen largely because we have made four errors in our thinking about fertility transitions, often ignoring or forgetting important points in doing so.

FOUR ERRORS IN OUR THINKING

1. Assuming That All Transitions Have the Same Cause

One of the most problematic assumptions embedded in our theories of fertility transition is that all fertility transitions have the same cause, an assumption implicit in the fact that most theories focus on only one or two causes.[7] Thus, for example, Caldwell's theory features reversals in intrafamilial wealth flows as the cause of fertility decline, whereas Cleland and Wilson point to diffusion of new ideas about birth control.

The assumption of a single cause is, on its face, unreasonable for three reasons. The first is the existence of potentially important influences on fertility in only some times or places (Teitelbaum 1975). For example, state-organized family planning and population programs, which exist in many countries today and often are quite influential in fertility change,[8] did not exist during the nineteenth- and early twentieth-century fertility transitions in the West. As Teitelbaum (1975) noted more than 20 years ago, one major difference between today's developing countries and those of the eighteenth and nineteenth centuries is that the high-fertility societies of today have the experience of the countries that have already undergone a transition. Given the massive efforts of a global population movement to bring that experience to the high-fertility countries of the world (Harkavy 1995), it would be surprising to find identical causes of fertility transitions in all times and places.

Second, the assumption that all transitions have a common cause is also unreasonable in light of the increasing evidence that diffusion of information and ideas about fertility limitation can influence reproductive behavior in the absence of major structural changes. Indeed, data assembled by Bongaarts and Watkins (1996) suggest that regions typically have leaders and followers—populations that undergo fertility transition earlier than did their neighbors because of structural changes, and those that through diffusion from the leaders undergo transition somewhat later, often before they have experienced the structural changes that stimulated the fertility transition in the leader country.

Finally, the expectation that all fertility transitions have a common cause seems unreasonable in light of enormous demographic and social variation across pretransitional populations (this point is made for the populations of sub-Saharan Africa by Lesthaeghe, Ohadike, Kocher, and Page 1981). For example, the lineage-based kinship systems of sub-Saharan Africa that encourage a preference for large numbers of surviving children (Caldwell 1982: chap. 2) contrast sharply with

6. Alert readers will notice that I have omitted one major restatement of classical demographic transition theory here: Davis' theory of the multiphasic response (1963). I do so because much of the field seems to have forgotten Davis' ideas, not because I believe them to be unimportant. Davis' theory is discussed later in this essay.

7. This point, like most of the points made in this essay, has been made by others as well. See Greenhalgh (1990), Hirschman (1994), Szretzer (1993), and Van de Kaa (1996:426–28).

8. There is little question that state-organized family planning programs have played a role in fertility decline in many late twentieth-century transitions, although the precise role—whether as initiator or accelerator of the decline, for example—is extremely difficult to ascertain for reasons elaborated by Freedman (1997) and Hirschman (1994). Much has been made of a recent econometric analysis purportedly showing that such programs have had virtually no effect on fertility decline (Pritchett 1994), but the validity of this analysis has been thrown into serious doubt (Bongaarts 1994; Knowles, Akin, and Guilkey 1994; Robinson 1997: note 37). There is a large body of literature reporting evidence of program effects, although often in interaction with development variables (Phillips and Ross 1992).

the conjugal-based family system historically dominant in western Europe in which preferences for children appear to have been much more moderate (Cleland 1993). Such differences in preexisting social and demographic patterns make it unlikely that precisely the same changes or events would trigger a fertility transition in all settings.

The tendency to assume that there is one master cause of all fertility transitions not only clouds reality; it sets us up for failure. A claim that only one factor causes all fertility transitions can be destroyed by discovering a single exception. As noted earlier, exceptions to all the major theories of fertility transition have indeed been found, and the field consequently suffers from a sense of malaise caused by our apparent inability to explain one of the most important demographic phenomena in human history (Hirschman 1994). In my opinion, the way out of this unhappy situation is to assume from the start that different fertility declines will have different causes. The goal is then to understand the circumstances under which different causes are likely to operate.

In searching for this understanding, it is important to recognize that because no single cause can explain all fertility declines, few events or conditions are likely to be *either* necessary or sufficient for a fertility decline. (As discussed later, mortality reductions may be an exception to this rule; see Chesnais 1992: chap. 5.) As Freedman (1979a, 1979b) has emphasized, critical for triggering fertility transitions are *combinations* of causes that provide a sufficient impetus for the widespread adoption of fertility limitation within marriage. For example, a combination of improved health, rising educational levels for both sexes, and a strong family planning program (as in Thailand and China) may be sufficient to initiate a fertility transition even though any one of these changes alone would not be (Freedman 1979a). Later, I suggest some of the factors that, in combination, are likely to play a role in bringing about fertility transitions.

2. Ignoring Mortality Decline as a Precondition of Fertility Decline

Although classic demographic transition theory was concerned not just with fertility transitions, but also with the totality of change in birth and death rates through which new population equilibria are established, several more recent theories of fertility transitions appear to have forgotten the critical point that without a mortality decline, a fertility decline is highly unlikely. (Cleland's ideational theory is an important exception here; see, e.g., Cleland 1993:349.) Mortality declines of the magnitude experienced by most human populations over the past 200 years, which involve an approximate doubling of life expectancy at birth from 25–30 to 50–60 or more years of life, are likely to increase average family size by at least 50% and often by 100% (McNicoll 1986 cited in Lloyd and Ivanov 1988). For populations in which parents want only a moderate or small number of surviving children, or in which social systems are designed to accommodate only a moderate or small number of children per family (probably the majority of populations in human history, as Cleland 1993, Coale 1986, Wilson and Airey 1997, and others have stressed), such increases in family size are likely to prove economically stressful for the family. As Davis noted more than three decades ago in his P.A.A. presidential address (Davis 1963), this stress provides the central motivation for reducing family size, although not necessarily through limiting births.[9]

Why have many recent theories tended to ignore mortality? I believe the answer lies in two findings from the Princeton European Fertility Project. First, in one or two cases in Europe, fertility declined before infant mortality declined. Second, fertility transitions occurred at many absolute levels of infant and child mortality, although apparently not at very high levels (van de Walle 1986). In my opinion, far too much weight has been given to both of these findings. For example, with regard to the priority of mortality decline over fertility decline, work by Chesnais (1992: chap. 5) calls into question the supposed exceptions to the "mortality first" rule. In virtually all countries that had started or completed the demographic transition by the end of the 1980s, population growth rates had risen during the course of the transition, a sign that the mortality decline occurred before at least a portion of the fertility decline.

There also are at least two reasons why mortality thresholds need not exist even when mortality decline is a necessary condition for fertility decline. One reason is the multiphasic response elaborated by Davis (1963). When families begin to experience the economic stress brought on by survival of too many children, their first response need not be to limit the number of births. Rather, in many historical situations, Davis suggests, the easiest way to cope with increased child survival may be to send children to work as servants in other households or to have them migrate to urban areas or overseas destinations (both of these having been common in the history of western Europe). Because alternatives to family limitation vary by historical and cultural context, there can be no simple, fixed level of child survival at which parents will necessarily start to limit births. In settings with few alternatives to birth limitation, fertility control may begin while mortality levels are relatively high, even if reduced from their historical level. In settings with many alternatives, fertility control may be postponed until the alternatives are exhausted and mortality has fallen to low levels.

The other reason that fertility decline can occur at many absolute levels of mortality has to do with the loose connection between the reality of child survival and parents' perceptions of this reality. For example, Montgomery's (1996) recent review of the psychological literature suggests that in many circumstances, people are unlikely to perceive on their

9. The situation is somewhat different for populations in which large numbers of surviving children are considered ideal (e.g., some sub-Saharan African populations). Here, mortality decline may initially put relatively little stress on families or the communities in which they reside. Mortality decline nonetheless may be an important precondition for fertility decline simply because it enables parents to realize that they can achieve large family sizes without having larger numbers of births. Thus, whether mortality decline provides a positive impetus to reducing family size or instead merely makes reduced fertility acceptable, it is likely to be an important precondition for fertility transitions.

own the full extent of mortality decline. Perceiving improvements in child survival involves noticing the absence of something, which may be difficult. Even when people notice that their children are more likely to survive than their neighbors' children were a decade or two earlier, they may attribute this to luck rather than to a new demographic equilibrium. Only when a trusted authority points out the change or guarantees that the change applies to individuals' own children are people like to see the new reality. Also, as Lloyd and Ivanov (1988) have noted, the cause of the mortality decline may affect the mortality level at which people become confident that their children are likely to survive to adulthood. For example, a mortality decline achieved through techniques that mothers themselves can control—say, oral rehydration therapy—may engender confidence in children's survival at a higher absolute level of mortality than a decline achieved through techniques that mothers cannot control or might not understand.

In summary, because we have taken particular findings concerning mortality and fertility decline too much to heart and have ignored the idea of a multiphasic response and the complexities of people's perceptions of mortality decline, we have fallen into the trap of ignoring mortality decline as an important if loosely linked precondition to fertility decline. Currently, there probably is no major population with mortality levels as high as experienced in the past. Whether further mortality declines are necessary for initiating a fertility transition is therefore unclear. The relatively low levels of child survival that continue to characterize much of sub-Saharan Africa, however, may be one force contributing to the delayed onset of fertility transitions in that region.

3. Assuming That the Regulation of Fertility is Fundamentally Different in Pretransitional and Posttransitional Populations

One of the most serious problems in existing theories of fertility transition is the widespread use, or misuse, of the concept of *natural* fertility (Henry 1961). Natural fertility refers to fertility that is socially controlled but not controlled by individuals on a parity-specific basis (the latter phenomenon is referred to as *controlled fertility* and supposedly stands in opposition to natural fertility). The ambiguity of this concept has long been recognized (Knodel 1983; Menken 1979). Instances of individual fertility control unrelated to parity, such as the practice of terminal abstinence based on the age or marital status of the oldest child, or the use of contraception to lengthen the spacing between births, meet neither the definition of natural fertility nor the definition of controlled fertility. Despite these ambiguities, the concept has been widely accepted and has been incorporated into mainstream thinking about fertility transitions.

As used in most theories of fertility transition, the concept of natural fertility makes the problematic assumption that culture rather than individual rationality governs pretransitional patterns of reproduction, indeed, that people in pretransitional settings do not think consciously about the total number of children they bear. Wrigley (1978:148) states:

> When the demographic transition occurred it did not take the form of a move from a situation in which fertility was uncontrolled to one in which it was reduced by the exercise of prudent restraint. Fertility is under constraint in almost all societies. The key change was from a system of control through social institution and custom to one in which the private choice of individual couples played a major part in governing the fertility rate.

Accompanying the concept of natural fertility is a conception of the collective ideational system that governs custom (that is, of culture) that views culture as a relatively fixed set of rules for behavior into which each new generation is inculcated, and that thereafter regulates their behavior. (Wrigley hypothesizes that these rules for behavior arise through group rationality.) The cultural control of fertility, thus, is conceptualized as the opposite of the individual (rational) control of fertility, and the switch from one to the other is a critical feature of the fertility transition.

There is considerable evidence counter to the key assumptions of natural fertility as this concept has been used in theories of fertility transition. First, the view of culture as a relatively rigid template for individual behavior has increasingly been viewed as unrealistic (Hammel 1990). A new consensus among anthropologists regards culture as a set of rules that individuals are ceaselessly reinterpreting and renegotiating.[10] To be sure, not all individuals are equally able to influence culture. Typically, the gatekeepers of powerful institutions such as church or state have a disproportionate say in determining the rules for behavior. The point is, however, that even the most powerless members of society are able to resist, redefine, or reinterpret the group's rules for behavior and, in so doing, contribute to the change of culture. In this view, there is nothing contradictory about the idea that individuals can and do think self-consciously and rationally about behaviors that are culturally prescribed or forbidden. Indeed, as frequent violations of fundamental cultural norms such as the prohibition against incest suggest, people often treat the ideas of culture critically and self-consciously and often reinterpret these rules in ways that meet their personal ends.

That social controls and individual rationality normally coexist does not demonstrate that individuals in pretransitional settings necessarily think, plan, or strategize about numbers of children. Given the importance of children in most historical settings for the survival and well-being of their parents, however, it would be surprising if they did not. Moreover, scattered but considerable evidence from ethnographic, historical, and demographic studies suggests that individuals in many pretransitional settings do think, plan, and strategize about what Skinner (1997) refers to as the configuration of their offspring sets (e.g., Balikci 1970:101–

10. The development of this new consensus can be seen as the latest stage in a very old conflict within the social sciences over the relative force of social controls and individual choice in determining human behavior and the cohesion of society (Wrong 1961).

109,147–62; Blake 1985; Bledsoe 1990; Friedl 1975:8, 26, 91–92; Geertz 1961: 83–85; Hanley 1979; Lee, Wang, and Campbell 1994; Levine 1977: chap. 5; Morgan 1991; Robinson and Cleland 1992:111–12; Skinner 1997; Wang, Lee, and Campbell 1995; Wolf 1972: chap. 3; Wrigley 1969). This strategizing is often conducted in terms of the gender composition of offspring, the spacing between children, the timing of births, or whether another child is desired at a particular point in time, rather than in terms of an *ex ante*, target number of children. Moreover, the strategizing appears to be done largely in terms surviving children rather than in terms of births (although there are numerous reports of women's concerns about pregnancy and childbirth from a health or survival point of view). In addition, strategizing about children often appears to be part of strategizing more broadly about the economic fortunes of the family and the deployment of family members in seeking those fortunes (or in merely surviving). The important point, however, is that people in pretransitional populations plan their families, even if the terms in which they plan them are not the terms in which demographers think.

Evidence from ethnographic, historical, and demographic studies suggests that people in pretransitional settings not only think about their offspring configurations, but also do something about them. Most of their actions, however, are taken postnatally rather than before birth (although terminal abstinence is common in parts of sub-Saharan Africa (Ware 1983), and there are scattered reports of women resorting to abortion in parts of Asia and elsewhere (e.g., Minturn and Hitchcock 1966:97)). In a wide variety of settings, including historically in the West (Langer 1972), parents have been known to kill their infants, abandon them, neglect them in the hopes that they will die, give them into the care of wet nurses, sell them, give them up for adoption, marry them off at a young age, loan them to other families for fostering, or at an older age send them into service in other households, the military, the merchant marines or prostitution, or overseas as migrants (e.g., Balikci 1970:101–109,147–62; Bledsoe 1990; Davis 1963; Flandrin 1976: chap. 4; Friedl 1975:8, 26, 91–92; 83–85; Hanley 1979; Langer 1972; Lee, Wang, and Campbell 1994; Levine 1977: chap. 5; Robinson and Cleland 1992:111–12; Skinner 1997; Wang, Lee, and Campbell 1995; Wolf 1978). They do this because they do not want or cannot accommodate another child or a child of a particular gender, health status, or occupation at a particular point in time. These postnatal controls on family size and composition obviously do not result in a significant decline in fertility (live births). If they did, the population would by definition no longer be pretransitional. The use of postnatal controls demonstrates, however, that people in many pretransitional populations actively shape their families.

The substantial proportion of women in some pretransitional populations who respond to survey queries about desired numbers of children by saying "it's up to God," or who give a similar nonnumerical and seemingly fatalistic response, is often taken as evidence of natural fertility, that is, of an absence of individual, rational choice regarding fertility. This interpretation is questionable. "Up-to-God" responses would be evidence of natural fertility only if people in pretransitional populations made fertility decisions the way economists say they do—namely, choosing the best number of children to have on an *ex ante,* lifetime basis at the start of their reproductive careers. In many settings, however, especially in settings with high levels of infant and child mortality, people plan their families sequentially; that is, they plan their families after learning important facts about their reproductive capacity and luck such as how fecund they are, how many of their babies will die, how many of their children will be idiots or deformed, and how many boys versus girls will survive to adulthood (Robinson and Cleland 1992). Only once these facts of reproductive fate become evident are couples likely to take action to alter their reproductive careers, and then only if they don't like what is happening in those careers or perceive that they are unable to accommodate all of the children being born and surviving beyond childhood. Thus, nonnumerical responses to questions about desired family size show only that women do not think like demographers, not that women do not think about the size or the configuration of their offspring sets at all.

As a way of summarizing this discussion of natural fertility, one might characterize the weakness of the concept of natural fertility—or the way it has been used in most fertility transition theories—as a failure to recognize the possibility of the multiphasic response identified by Davis (1963) more than three decades ago. As noted earlier, Davis' seminal idea was that families need not respond to excess numbers of surviving children by practicing birth limitation. They can and often do respond by invoking various postnatal means of family limitation.[11] Although these postnatal responses do not alter their fertility as demographers choose to define this concept, they show that individuals in pretransitional populations often take their reproductive fates into their own hands, especially in societies in which the organization of kinship and social life makes large numbers of surviving children relatively costly for parents. I am convinced that we would be better off recognizing the historical continuity of family planning (Blake 1985) and asking what leads people to switch from postnatal to prenatal forms of family limitation than stereotyping all pretransitional populations as the mindless puppets of culture (cf. Wilson and Airey 1997). Later, I take up the question of the historical circumstances under which we can expect pretransitional populations to have engaged in postnatal forms of family limitation.

4. Focusing on a Decadal Time Scale

Although none of the major theories of fertility transition discussed so far specifies the time scale on which the theory is intended to apply, tests of these theories invariably involve a choice of a time scale. Studies that have chosen a decadal

11. I am grateful to Skinner's (1997) discussion of family limitation in premodern societies for the idea of postnatal controls on offspring set configurations.

scale, the Princeton European Fertility Project in particular, have produced misleading results because of this choice and a related failure to recognize the normalcy of leads and lags in processes of social and demographic change.

In many regards, the most important result from the Princeton project was the finding that correlations between indicators of economic modernization and the date of the onset of fertility decline are, for the most part, weak and inconsistent (Coale 1973). Indeed, a major anomaly for classic transition theory was the late onset of the fertility transition in the country in which the industrial revolution began (England) and its early onset in a country that was late to industrialize and urbanize (France). On the basis of the Princeton project findings, Coale (1973) concluded that the only generalization about fertility transition left standing was that fertility would decline when three preconditions were met: (1) when fertility was within the realm of conscious calculation for most individuals, (2) when most of them knew some method to limit fertility, and (3) when they perceived there to be an advantage to doing so. Any ideas about industrialization, urbanization, or other forms of modernization as causes of fertility transitions were discredited.

Was the test of classical transition theory provided by the Princeton project fair? I do not believe it was. By choosing a decadal time scale and using a regression-type framework for testing the theory, the project implicitly assumed that the effects of economic modernization on fertility would be felt immediately, regardless of other conditions. As discussed earlier for the case of mortality decline, however, there is every reason to expect loose temporal connections between the structural or ideological changes that may underlie fertility transitions and the onset of these transitions. As Feeney (1994:1,520) has noted:

> Even the most satisfactory explanation of fertility declines will not necessarily explain why declines began when they did. By analogy, knowing that earthquakes are caused by the shifting of tectonic plates does not give an investigator the ability to predict when an earthquake will occur.

Thus, if classic demographic transition theory were correct on a centennial scale, testing it at a decadal scale would make it appear otherwise. The results of the Princeton project have contributed to a more sophisticated understanding of fertility declines than existed when early proponents of transition theory were writing because these results tell us something important about the process of fertility change that was not understood earlier. If we are to develop a better understanding of fertility transitions, however, then we need to test our theories on a lengthier or looser scale than the decade.

TOWARD A BETTER THEORY

In this final section, I would like to outline an approach to understanding fertility transitions that I think is more fruitful than the approaches used in the past, even though closely allied to them. First, it is helpful to review important facts about fertility transitions that demographers have established or have begun to establish.

1. Fertility transitions occur under a variety of institutional, cultural, and environmental conditions; they occur when *combinations* of conditions are sufficient to motivate or to enable a substantial portion of the population to adopt birth-prevention measures on a parity-specific basis.

2. Within a given geographic/cultural region, the first country to undergo a fertility transition is likely to have experienced cultural, social structural, or environmental changes that encourage fertility limitation. Other countries in the region that are not experiencing similar cultural, structural, or environmental changes may undergo transitions through the influence or example set by the first country.

3. The speed with which influences travel from one country to another depends on a variety of factors, including the quality and population coverage of communications and transportation infrastructures, the extent to which a common language is shared, the nature of informal social networks, the power and stance of local and national leaders, and whether state policy promotes birth control.

4. Mortality decline is usually a necessary condition for fertility decline, but is not normally a sufficient condition for that decline.

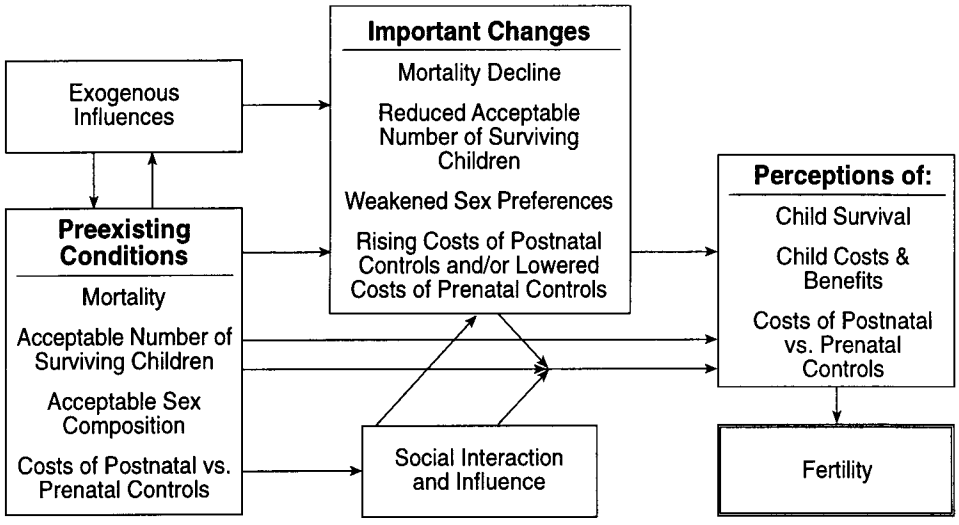
5. The number of surviving children that families can accommodate varies across pretransitional populations.

6. When the number of surviving children exceeds the family's capacity to accommodate them, parents will resort to some form of offspring control. These controls may be postnatal or prenatal, but in the absence of family planning programs, are initially more likely to be postnatal than prenatal. Parents may also use offspring controls to enhance the number of surviving children (e.g., breast-feeding used to space births).

7. The type of postnatal controls couples use depends not only on whether too many or too few children are surviving to adulthood, but also on the forms of control that are culturally, environmentally, or structurally available or acceptable (e.g., whether abortion or infanticide is morally acceptable).

8. When the number of surviving children exceeds the family's capacity to accommodate them, changing conditions that effectively close off the preexisting postnatal controls will encourage a switch to prenatal controls, especially if aided by state policy or programs (e.g., the closing off of overseas migration opportunities to European populations in the late nineteenth and early- to mid-twentieth centuries).

FIGURE 1. MODEL FOR EXPLAINING FERTILITY TRANSITIONS



These facts suggest that models of fertility transition need to be both ideational and interactive. They need to be ideational in that they must recognize that changing *perceptions* ultimately drive fertility change, and that perceptions may change more slowly *or* more quickly than the reality with which they are concerned. Models of fertility transition also need to be interactive in that they must recognize that the impact on fertility of a particular form of change depends on preexisting conditions in the population and on the nature of other changes simultaneously occurring in the population.

An example of such a model is outlined in Figure 1. In this model, fertility is the outcome of three proximate determinants: (1) perceptions of child survival probabilities among reproducing couples or women; (2) perceptions of child costs and benefits; and (3) perceptions of the costs of postnatal versus prenatal controls on family size and composition (where costs incorporates social, psychological, and financial costs; cf. Robinson 1997). As should be evident, these variables closely follow Easterlin's proximate determinants of fertility, but are explicitly perceptual in nature. The fertility-regulation costs variable also involves a tradeoff between postnatal and prenatal offspring controls rather than the absolute cost of prenatal controls.

The proximate determinants, in turn, are conceptualized as involving the direct and interactive effects of four preexisting conditions and changes therein: (1) mortality levels, (2) acceptable number of surviving children, (3) acceptable sex composition of surviving children, and (4) costs of postnatal versus prenatal controls on family size and composition. The potential importance of these variables for the proximate determinants should be evident, although some comment on sex composition may be in order. The acceptable sex composition of offspring can, in special circumstances, influence fertility, although generally only once birth control has begun to be practiced fairly widely. Perhaps more important, it can influence perceptions of child costs and benefits by determining whether sons and daughters have equal value to parents. There may be other aspects of composition of offspring important for the proximate determinants of fertility, but sex composition is one of the most universally relevant and important aspects of offspring composition.

The model shown in Figure 1 also includes as an explicit factor processes of social interaction and influence. These processes can influence the proximate determinants of fertility directly and can interact with preexisting conditions and changes therein to influence these determinants. (Interaction effects are depicted by the lines leading from the three boxed sets of causal factors and meeting in the middle of the diagram to form a single line leading to the proximate determinants.) I have singled out social interaction and influence because of the increasing evidence that these processes play a major role in the diffusion of fertility transitions.

What are some of the important interactions among the factors shown in Figure 1 that are likely to influence fertility transitions? One of the most important interactions, I believe, is between the preexisting number of surviving children that families can accommodate, the onset of mortality decline, and their prior and subsequent use of controls on family size and composition. In other words, whether surviving children exceed, meet, or fall short of the numbers that families can accommodate or find optimum will determine the types of postnatal controls on offspring couples use and the purpose for which they use these controls, and together these will help to determine fertility. Another important interaction is between the types of postnatal controls in use in the population and external changes that alter the costs of these con-

TABLE 1. ILLUSTRATION OF INTERACTIVE APPROACH TO UNDERSTANDING FERTILITY TRANSITIONS

	Pretransitional Conditions			
Example	Acceptable Number of Surviving Children	Gender Stratification	Available Postnatal Controls	Factors Likely to Induce Onset of Fertility Transition
Western Europe	Small	Weak	Migration, service	Mortality decline, closing off opportunities for migration and service
East Asia	Moderate	Strong	Migration, infanticide, adoption, child marriage	Mortality decline, exposure to Western lifestyles via mass media, industrialization and rise of mass education (especially for females), creation of family planning programs
Sub-Saharan Africa	Large	Variable	Fostering, adoption, migration	Mortality decline, erosion of traditional kin obligations, creation of family planning programs

trols relative to the costs of prenatal controls. As noted earlier, in pretransitional populations, just as much as in those undergoing transitions, the nature of social systems influences the value of (surviving) children to parents and the extent to which families can accommodate different numbers of surviving children or sons and daughters. In particular, I suggest that the nature of kinship-cum-gender systems, in interaction with other forms of social organization, such as landlord-tenant, patron-client, or state-citizen relationships (Caldwell 1993; Greenhalgh 1990, 1992; Johansson 1991; Szretzer 1993), strongly influence whether families can accommodate modest numbers or large numbers of surviving children (Davis 1955).[12] Thus, whether postnatal forms of family limitation are used before a fertility transition, the nature of these postnatal controls, and whether they are used primarily to reduce the size of the family, to increase it, or to change its composition will depend on the nature of kinship and gender systems in interaction with other forms of social organization in the society.

In turn, the shift from postnatal to prenatal controls will depend on the nature and purpose of the postnatal controls and the fate that these controls and their prenatal alternatives undergo in the course of history. If postnatal controls were used to reduce effective family size, then if they become less readily available or more costly, the probability of switching to prenatal methods of fertility control would increase and fertility transition would become more likely. On the other hand, if the preexisting postnatal controls were used largely to increase family size or to alter is composition, then a rise in the cost of these controls may do little to trigger a fertility decline. Presumably, in settings where the value of children traditionally is high, changes in family and other social systems that reduce the value of children will be critical for initiating fertility transitions.

The idea that preexisting family size desires interact with type of postnatal controls in determining whether subsequent changes in either the costs of postnatal controls or the value of children triggers a fertility decline is illustrated in Table 1. Here, I have represented three archetypal cases: western Europe, East Asia, and sub-Saharan Africa. I recognize that there are many variations within each of these regions, but my purpose is to illustrate how particular social conditions may interact in determining whether or when fertility transitions occur. Although Goody (1996) has argued that our ideas about European versus Asian family systems are greatly overdrawn, there nonetheless is reason to think that the conjugally oriented, bilateral families historically dominant in western Europe placed a lower premium on having large numbers of surviving sons than did the patrilineal joint or stem families considered the ideal in East Asia. Also plausible is the idea that the strong lineage structures historically dominant in sub-Saharan Africa placed even more of a premium on large numbers of surviving children than did the household-based family systems of East Asia. For these reasons, Table 1 lists the acceptable number of surviving children before transition as small in western Europe, moderate in East Asia, and large in sub-Saharan Africa. These differences can be thought of as representing points at which parents experiencing high fertility and low mortality will start to find the numbers of surviving children stressful for their family's well-being.

In addition to differing levels of desired family size, the extent of gender stratification in these three archetypal cases also differed historically. In particular, although women in western Europe were hardly the equals of men, the European

12. Kinship systems, in interaction with other aspects of social organization, can also determine the extent to which different individuals agree on the value of children: for example, whether men value children more than women do or vice versa (Mason and Taj 1987), or whether family elders value them more than do the parents who are producing the children. Issues of different perceptions of the value of children can be important for fertility behavior, but for the moment, I will speak as though all adult family members share a single perception of children or an ability to accommodate certain numbers of them.

family system differentiated between the sexes less strongly than did the patrilineal joint or stem family systems of East Asia. For example, females in western Europe were never subjected to socially debilitating practices such as seclusion or foot binding. Thus, although I suspect that parents in East Asia reach their point of intolerance for surviving sons at a far lower level than do parents in the lineage-organized societies of sub-Saharan Africa (that fertility has declined sharply in most of East Asia *despite* the persistence of strong son preference is evidence of this), the strong preference for sons created by East Asian family systems may have retarded the onset of fertility transitions in that region when compared with western Europe.

Table 1 also illustrates what I believe to have been a much broader range of morally acceptable forms of postnatal family limitation available to couples in East Asia than in western Europe. For example, in parts of East Asia, traditional values permitted practices such as "returning" children at birth (i.e., killing them), selling them to families in need of a child, or marrying them off in early childhood (Hanley 1979; Skinner 1997; Wolf 1978), practices that if they occurred in the West were nonetheless morally questionable (Langer 1972). This, along with the later industrial development of East Asia than of western Europe, meant that postnatal forms of family limitation were closed off to parents much more slowly in East Asia than in the West. Mortality also declined later in East Asia. Thus, the interaction between preexisting family conditions and values, and the later occurrence of economic development and mortality decline, delayed the onset of fertility transitions in East Asia.

That most countries in sub-Saharan Africa have only recently begun to show signs of entering a fertility transition—or remain firmly entrenched in a pretransitional regime—is not surprising in light of the large family size desires resulting, historically, from strong lineage organization, the historical use of postnatal family controls to enhance family size, the lack of high-quality transportation and communications infrastructures, and the continued absence of strong family planning programs. Although contraceptive use is beginning in some parts of Africa, it is being used primarily to space births rather than to limit their number (Caldwell, Orubuloye, and Caldwell 1992). The model illustrated in Table 1 implies that fertility is likely to remain relatively high in Africa until lineage organization becomes more thoroughly undermined and family planning programs make prenatal fertility controls more widely available. Further reductions in child mortality and improvements in health care systems may also be necessary in areas that continue to have high rates of infant and child mortality.

CONCLUSION

In this essay, I have tried to show that our knowledge of fertility transitions is extremely rich and our ability to understand these transitions inhibited more by erroneous thinking than by any fundamental lack of knowledge. Specifically, I have argued that by recognizing the continuity between pretransitional and transitional populations (i.e., that people plan their families in all types of populations), we put ourselves in a better position to understand why this planning begins to take a particular form at a particular point in history—why, in other words, people limit births *before* they occur and at low parities. Are urbanization and industrialization important for this process? In some instances, probably yes; and in others, probably not, except insofar as they were implicated in lowering mortality and therefore in increasing the survival of children into adulthood. Is knowledge of methods of fertility limitation important for this process or for changes in the morality of their use? Probably in some settings, but probably not in others. By recognizing that a rich variety of family and social systems existed throughout the world long before any population began widespread fertility limitation, that different family and social systems accommodate or make valuable different numbers of surviving children, and that traditional values make alternatives to fertility limitation more morally acceptable in some populations than in others, we enable ourselves to understand not only fertility transitions, but pretransitional and posttransitional variation in fertility as well. And this broad understanding of fertility is what we have all sought for so long.

REFERENCES

Amin, S., J. Cleland, J.F. Phillips, and G.M. Kamal. 1995. "Socioeconomic Change and the Demand for Children in Rural Bangladesh." Research Division Working Papers, No. 70, The Population Council, New York.

Balikci, A. 1970. *The Netsilik Eskimo.* Garden City, NY: National History Press.

Becker, G.S. 1960. "An Economic Analysis of Fertility." Pp. 209–31 in *Demographic and Economic Change in Developed Countries: A Conference of the Universities-National Bureau Committee for Economic Research.* Princeton: Princeton University Press.

Blake, J. 1985. "The Fertility Transition: Continuity or Discontinuity with the Past?" Pp. 393–405 in *International Population Conference, Florence, 1985,* Vol. 4. Liege, Belgium: International Union for the Scientific Study of Population.

Bledsoe, C. 1990. "The Politics of Children: Fosterage and the Social Management of Fertility Among the Mende of Sierra Leone." Pp. 81–100 in *Births and Power: Social Change and the Politics of Reproduction,* edited by W.P. Handwerker. Boulder, CO: Westview Press.

Bongaarts, J. 1994. "The Impact of Population Policies: Comment." *Population and Development Review* 20(3):616–20.

Bongaarts, J. and S.C. Watkins. 1996. "Social Interactions and Contemporary Fertility Transitions." *Population and Development Review* 22(4):639–82.

Bulatao, R.A. and R.D. Lee, eds. 1983. *Determinants of Fertility in Developing Countries.* New York: Academic Press.

Caldwell, J.C. 1982. *Theory of Fertility Decline.* London: Academic Press.

———. 1993. "The Asian Fertility Revolution: Its Implications for Transition Theory." Pp. 299–316 in *The Revolution in Asian Fertility: Dimensions, Causes, and Implications,* edited by R. Leete and I. Alam. Oxford: Clarendon Press.

Caldwell, J.C., I.O. Orubuloye, and P. Caldwell. 1992. "Fertility Decline in Africa: A New Type of Transition?" *Population and Development Review* 18(2):211–42.

Chesnais, J.-C. 1992. *The Demographic Transition: Stages, Patterns, and Economic Implications. A Longitudinal Study of Sixty-Seven Countries Covering the Period 1720–1984,* translated by E. Kreager and P. Kreager. Oxford, England: Clarendon Press.

Cleland, J. 1985. "Marital Fertility Decline in Developing Countries: Theories and the Evidence." Pp. 223–52 in *Reproductive Change in Developing Countries: Insights from the World Fertility Survey,* edited by J. Cleland and J. Hobcraft. Oxford, England: Oxford University Press.

———. 1993. "Equity, Security and Fertility: A Reaction to Thomas." *Population Studies* 47(2):345–52.

Cleland, J. and C. Wilson. 1987. "Demand Theories of the Fertility Transition: An Iconoclastic View." *Population Studies* 41(1):5–30.

Coale, A. J. 1973. "The Demographic Transition Reconsidered." Pp. 53–72 in *International Population Conference, Liege, 1973,* Vol. 1. Liege, Belgium: International Union for the Scientific Study of Population.

———. 1986. "The Decline of Fertility in Europe Since the Eighteenth Century As a Chapter in Demographic History." Pp. 1–30 in *The Decline of Fertility in Europe,* edited by A.J. Coale and S.C. Watkins. Princeton, NJ: Princeton University Press.

Coale, A.J. and S.C. Watkins, eds. 1986. *The Decline of Fertility in Europe.* Princeton, NJ: Princeton University Press.

Davis, K. 1955. "Institutional Patterns Favoring High Fertility in Underdeveloped Areas." *Eugenics Quarterly* 2:33–39.

———. 1963. "The Theory of Change and Response in Modern Demographic History." *Population Index* 29(October):345–66.

Easterlin, R.A. 1975. "An Economic Framework for Fertility Analysis." *Studies in Family Planning* 6:54–63.

———. 1978. "The Economics and Sociology of Fertility: A Synthesis." Pp. 57–133 in *Historical Studies of Changing Fertility,* edited by C. Tilly. Princeton, NJ: Princeton University Press.

Easterlin, R.A. and E.N. Crimmins. 1985. *The Fertility Revolution: A Demand-Supply Analysis.* Chicago, IL: University of Chicago Press.

Feeney, G. 1994. "Fertility Decline in East Asia." *Science* 266(2): 1518–23.

Flandrin, J.-L. 1976. *Families in Former Times: Kinship, Household and Sexuality,* translated by R. Southern. Cambridge, MA: Cambridge University Press.

Freedman, R. 1979a. "Overview." Pp. 286–98 in *Fertility Transition in the East Asian Populations,* edited by L.-J. Cho and K. Kobayashi. Honolulu, HI: University Press of Hawaii.

———. 1979b. "Theories of Fertility Decline: A Reappraisal." *Social Forces* 58(1):1–17.

———. 1997. "Do Family Planning Programs Affect Fertility Preferences? A Literature Review." *Studies in Family Planning* 28(1):1–13.

Friedl, E. 1975. *Women and Men: An Anthropologist's View.* New York: Holt, Rinehart and Winston.

Geertz, H. 1961. *The Javanese Family: A Study of Kinship and Socialization.* Prospect Heights, IL: Waveland Press.

Goody, J. 1996. "Comparing Family Systems in Europe and Asia: Are There Different Sets of Rules?" *Population and Development Review* 22(1):1–20.

Greenhalgh, S. 1990. "Toward a Political Economy of Fertility: Anthropological Contributions." *Population and Development Review* 16(1):85–106.

———. 1992. "State-Society Links: Political Dimensions of Population Policies and Programmes, with Special Reference to China." Pp. 276–98 in *Family Planning Programmes and Fertility,* edited by J.F. Phillips and J.A. Ross. Oxford, England: Clarendon Press.

Hajnal, J. 1965. "European Marriage Patterns in Perspective." Pp. 101–43 in *Population in History: Essays in Historical Demography,* edited by D.V. Glass. London, England: Edward Arnold.

Hammel, E.A. 1990. "A Theory of Culture for Demography." *Population and Development Review* 16(3):455–85.

Hanley, S. B. 1979. "The Japanese Fertility Decline in Historical Perspective." Pp. 24–48 in *Fertility Transition of the East Asian Populations,* edited by L.-J. Cho and K. Kobayashi. Honolulu, HI: University of Hawaii Press.

Harkavy, O. 1995. *Curbing Population Growth: An Insider's Perspective on the Population Movement.* New York: Plenum Press.

Henry, L. 1961. "Some Data on Natural Fertility." *Eugenics Quarterly* 8:81–91.

Hirschman, C. 1994. "Why Fertility Changes." *Annual Review of Sociology* 20:203–33.

Johansson, S.R. 1991. "'Implicit' Policy and Fertility During Development." *Population and Development Review* 17(3):377–414.

Knodel, J. 1983. "Natural Fertility: Age Patterns, Levels, and Trends." Pp. 61–102 in *Determinants of Fertility in Developing Countries,* Vol. 1, edited by R.A. Bulatao and R.D. Lee. New York: Academic Press.

Knodel, J. and E. van de Walle. 1979. "Lessons from the Past: Policy Implications of Historical Fertility Studies." *Population and Development Review* 5(June):217–45.

Knowles, J.C., J.S. Akin, and D.K. Guilkey. 1994. "The Impact of Population Policies: Comment." *Population and Development Review* 29(3):611–15.

Langer, W.L. 1972. "Checks on Population Growth: 1750–1850." *Scientific American* 226(2):92–99.

Lee, J., Wang F., and C. Campbell. 1994. "Infant and Child Mortality Among the Qing Nobility: Implications for Two Types of Positive Check." *Population Studies* 48(3):395–411.

Leibenstein, H.M. 1957. *Economic Backwardness and Economic Growth.* New York: John Wiley and Sons.

Lesthaeghe, R. 1980. "On the Social Control of Human Reproduction." *Population and Development Review* 6(4):527–48.

———. 1983. "A Century of Demographic and Cultural Change in Western Europe: An Exploration of Underlying Dimensions." *Population and Development Review* 9(3):411–35.

———. 1995. "The Second Demographic Transition in Western Countries: An Interpretation." Pp. 17–62 in *Gender and Family Change in Industrialized Countries,* edited by K.O. Mason and A.-M. Jensen. Oxford, England: Clarendon Press.

Lesthaeghe, R., P.O. Ohadike, J. Kocher, and H.J. Page. 1981. "Child-Spacing and Fertility in Sub-Saharan Africa: An Over-

view of Issues." Pp. 3–23 in *Child-Spacing in Tropical Africa: Traditions and Change,* edited by H. Page and R. Lesthaeghe. London, England: Academic Press.

Lesthaeghe, R. and J. Surkyn. 1988. "Cultural Dynamics and Economic Theories of Fertility Change." *Population and Development Review* 14(1):1–45.

Lesthaeghe, R. and C. Wilson. 1986. "Modes of Production, Secularization, and the Pace of the Fertility Decline in Western Europe, 1870–1930." Pp. 261–92 in *The Decline of Fertility in Europe,* edited by A.J. Coale and S.C. Watkins. Princeton, NJ: Princeton University Press.

Levine, D. 1977. *Family Formation in an Age of Nascent Capitalism.* New York: Academic Press.

Lloyd, C.B. and S. Ivanov. 1988. "The Effects of Improved Child Survival on Family Planning Practice and Fertility." *Studies in Family Planning* 19(3):141–61.

Mason, K.O. 1992. "Culture and the Fertility Transition: Thoughts on Theories of Fertility Decline." *Genus* 48(July–December):1–14

Mason, K.O. and A.M. Taj. 1987. "Differences Between Women's and Men's Reproductive Goals in Developing Countries." *Population and Development Review* 13(4):611–38.

McDonald, P. 1993. "Fertility Transition Hypotheses." Pp. 3–14 in *The Revolution in Asian Fertility: Dimensions, Causes, and Implications,* edited by R. Leete and I. Alam. Oxford, England: Clarendon Press.

Menken, J. 1979. "Introduction." Pp. 1–13 in *Natural Fertility: Patterns and Determinants of Natural Fertility, Proceedings of a Seminar on Natural Fertility,* edited by H. Leridon and J. Menken. Liege, Belgium: Ordina Editions.

Minturn, L. and J.T. Hitchcock. 1966. *The Rajputs of Khalapur, India.* New York: John Wiley and Sons.

Montgomery, M.R. 1996. "Learning and Lags in Mortality Perceptions." Working Papers, No. 91, Research Division, The Population Council, New York.

Morgan, S.P. 1991. "Late Nineteenth- and Early Twentieth- Century Childlessness." *American Journal of Sociology* 97(3):779–807.

Notestein, F. 1953. "Economic Problems of Population Change." Pp. 13–31 in *Proceedings of the Eight International Conference of Agricultural Economics.* London, England: Oxford University Press.

Phillips, J.F. and J.A. Ross. 1992. *Family Planning Programmes and Fertility.* Oxford, England: Clarendon Press.

Pritchett, L.H. 1994. "Desired Fertility and the Impact of Population Policies." *Population and Development Review* 20(1):1–55.

Robinson, W.C. 1997. "The Economic Theory of Fertility Over Three Decades." *Population Studies* 51(1):63–74.

Robinson, W.C. and J. Cleland. 1992. "The Influence of Contraceptive Costs on the Demand for Children." Pp. 106–22 in *Family Planning Programmes and Fertility,* edited by J.F. Phillips and J.A. Ross. Oxford, England: Clarendon Press.

Schultz, T.W., ed. 1973. "New Economic Approaches to Fertility: Proceedings of a Conference, June 8–9, 1972." *Journal of Political Economy* 81(2, Part II).

Skinner, G.W. 1997. "Family Systems and Demographic Processes." Pp. 53–95 in *Anthropological Demography: Toward a New Synthesis,* edited by D.I. Kertzer and T.E. Fricke. Chicago, IL: University of Chicago Press.

Szretzer, S. 1993. "The Idea of Demographic Transition and the Study of Fertility Change: A Critical Intellectual History." *Population and Development Review* 19(4):659–701.

Teitelbaum, M.S. 1975. "Relevance of Demographic Transition Theory for Developing Countries." *Science* 188(2 May):420–25.

Thompson, W. S. 1930. *Population Problems.* New York: McGraw-Hill.

Thornton, A. and T.E. Fricke. 1987. "Social Change and the Family: Comparative Perspectives from the West, China, and South Asia." Pp. 128–61 in *Demography as an Interdiscipline,* edited by J.M. Stycos. New Brunswick, NJ and Oxford, England: Transaction Publishers.

Van de Kaa, D.J. 1996. "Anchored Narratives: The Story and Findings of a Half a Century of Research into the Determinants of Fertility." *Population Studies* 50(3):389–432.

van de Walle, F. 1986. "Infant Mortality and the European Demographic Transition." Pp. 201–33 in *The Decline of Fertility in Europe,* edited by A.J. Coale and S.C. Watkins. Princeton, NJ: Princeton University Press.

Wang F., J. Lee, and C. Campbell. 1995. "Marital Fertility Control among the Qing Nobility: Implications for Two Types of Preventive Check." *Population Studies* 49(3):383–400.

Ware, H. 1983. "Female and Male Life-Cycles." Pp. 6–31 in *Female and Male in West Africa,* edited by C. Oppong. London, England: George Allen & Unwin.

Wilson, C. and P. Airey. 1997. "What Can Transition Theory Learn from the Diversity of Low-Growth Demographic Regimes?" Paper presented at the annual meeting of the Population Association of America, Washington, D.C.

Wolf, A. 1978. "Gods, Ghosts, and Ancestors." Pp. 131–82 in *Studies in Chinese Society,* edited by A. Wolf. Stanford, CA: Stanford University Press.

Wolf, M. 1972. *Women and the Family in Rural Taiwan.* Stanford, CA: Stanford University Press.

Wrigley, E.A. 1969. Family Limitation in Pre-Industrial England." Pp. 157–94 in *Population in Industrialization,* edited by M. Drake. London, England: Methuen.

———. 1978. "Fertility Strategy for the Individual and the Group." Pp. 135–54 in *Historical Studies of Changing Fertility,* edited by C. Tilly. Princeton, NJ: Princeton University Press.

Wrong, D.H. 1961. "The Oversocialized Conception of Man in Modern Sociology." *American Sociological Review* 26(2):183–93.

Zavala de Cosio, M.E. 1996. "The Demographic Transition in Latin America and Europe." Pp. 95–109 in *The Fertility Transition in Latin America,* edited by J. M. Guzman, S. Singh, G. Rodriguez, and E.A. Pantelides. Oxford, England: Clarendon Press.