1 Anthropological Demography and Human Evolutionary Ecology

Two Solitudes

With the twenty-twenty vision of hindsight, I can easily identify two events that initiated this book. The first was a 1996 American Anthropological Association (AAA) Invited Session titled "Evolutionary Biology and Human Social Behaviour: 20 Years Later." Organized by human behavioral ecologists Lee Cronk and Napoleon Chagnon, this two-part session took its name from the AAA session twenty years earlier that culminated in the edited volume, *Evolutionary Biology and Human Social Behavior: An Anthropological Perspective* (Chagnon and Irons 1979). This work became the flagship for the anthropological application of E. O. Wilson's (1975) thesis of sociobiology. During the 1996 session (now represented in the edited text, *Adaptation and Human Behavior: An Anthropological Perspective*, by Cronk, Chagnon, and Irons 2000), paper presenters spoke passionately of the importance of evolutionary perspectives in understanding and explaining human behavior, including demographic behavior. They also clearly spoke to the converted; not one member of the audience questioned the speakers' basic assumptions of fitness maximization as the underlying motivation for human behavior.

Presenters emphasized biology, at the expense or even exclusion, of culture. In doing so they echoed past evolutionary ecologists' thoughts on the nonimportance of human culture, exemplified by Wilson's (1978:171) famous statement that "genes hold culture on a leash." Although contemporary human evolutionary ecologists, today also called human behavioral ecologists, distance themselves from such blatant statements of genetic determinism, they still have little time for culture. For example, a recent major review of the evolutionary perspective within anthropology appeared in the prestigious *Annual Review of Anthropology* under the title, "Is there a role for culture in human behavioral ecology?" (Cronk 1995). Even more succinctly, the human evolutionary ecologist Laura Betzig (1997a:49), in her introduction to an important collection of evolutionary ecological works titled *Human Nature: A Critical Reader* (Betzig

1997b), issued the terse statement that, in the investigation of human motivation, "I, personally, find 'culture' unnecessary."

The second event leading to the present work was the 1997 volume edited by David Kertzer and Tom Fricke, titled *Anthropological Demography: Toward a New Synthesis*. Rather than proposing a synthesis between cultural and biological demographic perspectives, the authors used the term *anthropological demography* as shorthand for cultural anthropological studies of demography. That the book sought a synthesis between cultural anthropology and demography, rather than a anthropological reconciliation between cultural and biological perspectives, was evident in the text's relegation of the evolutionary approach to an unflattering footnote (Hammel and Friou 1997:193):

> Where evolutionary theory and particularly sociobiology use concepts of selection and adaptation to explain individual behaviour they often seem thoroughly teleological and not mindful of the fundamental contributions of Darwin and Huxley.

Both *Anthropological Demography: Toward a New Synthesis* and *Adaptation and Human Behaviour*: *An Anthropological Perspective* do an excellent job in presenting their particular analytical framework, one emphasizing culture, the other stressing the evolutionary biology, of human demographic behavior. Both also share an air of apathy and downright disdain toward the other paradigm. The result is to ignore the other perspective, often apparently without even an attempt at understanding the other school's basic concepts and initial assumptions. This situation has not improved. For example, recently the anthropological demographer John Caldwell (1997) called for a uniform theory of fertility to describe historic and modern fertility decline, whereas the human evolutionary ecologist John Bock (2002) urged the formation of an overarching unified field theory of fertility. The former contains no reference to human evolutionary ecology; the latter contains no references to anthropological demography. The result of this continued intentional ignorance is akin to the "Two Solitudes" of Anglophone and Francophone traditions in Canada (MacClellan 1945) or C. P. Snow's (1993) "Two Cultures," denoted by what he termed "literary intellectuals" and natural scientists.

This book attempts to initiate a discussion between the fields of anthropological demography and human evolutionary ecology. One way to do so is to delineate largely unrecognized common ground, both theoretical and methodological, shared by both perspectives. I have no doubts that even this modest goal will not please dogmatists within either

Table 1.1. *Chapter titles from* Adaptation and Human Behavior: An Anthropological Perspective *and* Anthropological Demography: Toward a New Synthesis

Anthropological Demography (Kertzer and Fricke 1997)	*Adaptation* (Cronk, Chagnon, and Irons 2000)
Culture Theory and Demographic Process: Towards a Thicker Demography (Fricke)	Fertility, Offspring Quality, and Wealth in Dotoga Pastoralists: Testing Evolutionary Models of Intersexual Selection (Sellen et al.)
Demography Without Numbers (Scheper-Hughes)	The Evolutionary Economics and Psychology of the Demographic Transition to Low Fertility (Kaplan and Lancaster)
Kinship Systems and Demographic Regimes (Das Gupta)	An Adaptive Model of Human Reproductive Where Wealth is Inherited: Why People Have Small Families (Mace)
Population and Identity (Kreager)	Manipulating Kinship Rules: A Form of Yanomamo Reproductive Competition) (Chagnon)
Family Systems and Demographic Processes (Skinner)	The Grandmother Hypothesis and Human Evolution (Hawkes et al.)

group. This group of dogmatists, sadly both numerically large and powerfully influential, is not my target audience. Rather I hope to address open-minded scholars on both sides of this debate who value, but perhaps are not reconciled to, opposing premises, approaches, interpretations, and conclusions. The book also is addressed to demographers interested in learning about both approaches and who are not burdened by the academic blinkers of the two anthropological schools.

I am not so naive as to think that the goal of interested mutual discussion will be an easy task, because both perspectives have radically different basic concepts and methodological approaches; this results in dramatically different vocabularies. The gulf separating the two approaches is exemplified in Table 1.1, which lists chapter titles from the two aforementioned texts, human evolutionary ecology's *Adaptation and Human Behavior: An Anthropological Perspective* (Cronk, Chagnon, and Irons 2000) and *Anthropological Demography: Toward a New Synthesis* (Kertzer and Fricke 1997). These titles point to the divergent roots and subsequent trajectories of these two demographic approaches. From the most pessimistic view, the resulting chasm is too broad to span and the prevailing dogma within anthropology too strong to permit any type of rapprochement among anthropologists.

However, I have a sense of hope outside anthropology, generated by demography's current interest in culture and evolution. My optimism stems from the recent inclusion of evolutionary approaches to demography in scheduled sessions at the meetings of the Population Association of America (PAA). These sessions now coexist with regularly scheduled sessions on anthropological demography. Unlike the situation at the AAA, I see the same scholars at both PAA presentations. Even more encouraging, these demographers actually seem keen to understand both perspectives.

This openness on the part of demographers is particularly encouraging given the initial skirmishes between demography and human evolutionary ecology, epitomized by the latter's aggressively negative view of Caldwell's Wealth Flow Theory (Turke 1989; Kaplan 1994) appearing in *Population and Development Review*. Today, however, evolutionary perspectives on subjects as diverse as human aging (Kaplan 1997; Carey and Judge 2001; Carey and Tuljapukar 2003), the demographic transition (Foster 2000; Clark and Low 2001; Haaga 2001), the evolutionary importance of meat eating (Smil 2002), and kin selection (Sear et al. 2002) appear in this and other mainstream demographic journals. In the same editions, these journals feature anthropological demographic studies (Watkins 2000; Johnson-Hanks 2002).

In simultaneously considering evolutionary and cultural perspectives, demographers may actually hold more potential for uniting anthropological demography and human evolutionary ecology than do anthropologists. In part, the difficulty of reconciling these two paradigms within anthropology lies in the fact that each side brings a vastly different time depth to their analyses. Anthropological demography, which today borrows heavily from the traditions of political economy (Wolf 1982), dependency theory (Frank 1967), and world systems theory (Wallerstein 1976) in examining local, non-Western cultures in light of larger Western capitalistic expansion, features a time depth measured in decades, or, at the most, centuries. In contrast, human evolutionary ecologists' view behavior as the long-term product of natural selection, leading to a far greater time depth. Or, as stated by a doyenne of evolutionary theory, Sara Blaffer Hrdy (1999:xi), "My depth of field is millions of years longer, and the subjects in my viewfinder have the curious habit of spontaneously taking on the attributes of other species: chimps, platypuses, australopithecines."

Recently, the biological anthropologists Goodman and Leatherman (1998:31–32) urged their colleagues to study biological adaptations within broader historical contexts, focusing on the roots of socioeconomic variation; or, as they put it, to "refocus upstream" rather than on the temporal immediate. However, human evolutionary ecologists could argue

that Goodman and Leatherman severely limit themselves by concentrating on the few centuries of Old World–New World contact. To truly go "upstream" requires a time depth measured in millions, not hundreds, of years. Again demography, with its interest in paleodemography, the evolution of human population numbers, and human longevity, seems well positioned to bridge these two temporal scales.

Why is demography, but not anthropology, so open to pursuing these issues? Why does the ensuing gap between anthropological demography and human evolutionary ecology within anthropology continue to widen? Because both subfields are fully capable of developing their own theory and methodology, I suggest the central question for practitioners of each approach is this: Why bother learning anything about the other perspective? The remainder of this book uses detailed case studies to address this question. Let me give a brief overview now. If, following this section, you are not persuaded by my argument, then you will not find the rest of this book worth your time.

Why Bother?

I begin by asking this question: Why should anthropological demographers learn about human evolutionary ecology when their perspective seems, as described by Hammel and Friou (1997:193), "thoroughly teleological"? The converse question is this: Why should human evolutionary ecologists invest their time and effort in learning about anthropological demography, because, in terms of behavioral motivation, culture is, in the words of Betzig (1997a:49), "unnecessary"? I believe the answer to these questions lies in the overturning of historic paradigms and their replacement with contemporary data.

For anthropological demographers, this means rejecting the now-outdated Standard Social Science model that emphasizes nurture, in the form of society and culture, to the total exclusion of biology. Pinker (2002) traces the development of this model from two historic notions, the tabula rasa, or blank slate, and "the ghost in the machine." The first is the idea that we are born without an innate human nature and therefore all human behavior is molded entirely by one's lifetime experiences. The second proposes a strict mind–body dichotomy, with only the latter ruled by mechanical laws. Both concepts are entrenched in anthropology, where culture historically was seen as *superorganic*; that is, it was an entity totally removed from the biological world of heredity. Two historic quotes from the anthropologist Leslie White (1949; quoted in Degler 1991) exemplify this perspective: "the cultural process may be regarded as a thing *sui generis*, culture is explainable in terms of culture" (p. 208)

and "much of what is commonly called 'human nature' is merely culture thrown against a screen of nerves, glands, sense organs, muscles, etc." (p. 161).

In direct contrast to this vision, both biologists and social scientists in the latter half of the twentieth century began to consider human social behavior from an evolutionary perspective. Their research, exemplified by Hamilton's (1964) work on kin selection, Trivers' (1974) analysis of reciprocal altruism, Axelrod's (1984) simulation studies on the emergence of cooperation, and Maynard-Smith's (1982) application of game theory to social strategies, demonstrated that aspects of human social interaction such as cooperation, nepotism, and altruism, which Darwin had difficulty explaining in his original model of evolution by means of natural selection, could now be incorporated by means of the new concepts of kin selection and inclusive fitness. The former proposes that altruistic acts between relatives will be favored by selection if the benefit to the recipient exceeds the cost to the donor, devalued by the degree of relatedness between them (Barrett, Dunbar, and Lycett 2002:386). Inclusive fitness expands Darwin's original consideration of the individual as the sole unit of analysis to include behavior conferring reproductive advantages to relatives who share the same genetic material by common descent.

Incorporating these results into new syntheses of biosocial behavior (Wilson 1975; Dawkins 1976, 1979) resulted in the recognition that basic aspects of human behaviour, such as nepotism, cooperation, and altruism, should be considered evolutionary products of natural selection with biological roots (for recent book-length compilations of this scientific revolution in biology and social behavior, see Hamilton 1998, 2002; Trivers 2002). It also suggested that these basic behaviors formed a biological basis for human culture (see Tooby and Cosmides 1989, 1990; Cosmides and Tooby 1992) somewhere in our evolutionary past. If so, then the two previous quotes should be reworked to read, "much of what is commonly called culture is merely human nature," and "the evolutionary process may be regarded as a thing *sui generis*; biology is explainable in terms of biology."

At the same time as these developments, the long-held notion of culture as the sole source of all human variation was dealt a series of devastating blows by publications refuting long-standing anthropological claims. These claims included arguments that life-cycle stages are experienced differently in distinct cultures (Mead 1927) and that the Hopi peoples of the southwestern United States had no linguistic or psychological concept of time (Carroll 1956); they also included "the doctrine of extreme linguistic relativity," exemplified by the arbitrary linguistic description and

classification of color by various cultures. (For additional anthropological claims to the primacy of cultural diversity and in-depth discussions of these three examples, see Brown 1991; Durham 1991; and Cronk 1999.) One by one these claims were falsified by careful anthropological fieldwork. Research in Samoa revealed that Mead's utopian view of Samoan adolescent as a time of socially sanctioned sexual freedom arose from her young female informants' playing a practical joke on the overeager young ethnographer (Freeman 1983). In reality, Samoan adolescence is as sexually conflicted and stressful as that experienced by Western cultures. Ekkehart Malotki's book *Hopi Time* (1983) unequivocally demonstrated that Hopi possess elaborate ceremonial and technical concepts of time fully comparable with other cultures. Berlin and Kay's (1969) cross-cultural research on color classification revealed far more uniformity than disparity. For example, their study populations acknowledged from two to eleven basic colors, but they all start with the colors *black* and *white* and then, if they possess more color classifications, invariably add the same colors. Thus a culture with seven basic colors starts with *black* and *white*, and then it always adds *red, blue, yellow, green*, and *brown*.

Ascribing biological roots to primary social behaviors and dispelling long-held anthropological myths concerning the supremacy of cultural diversity had profound ramifications within academia. In psychology, this gave rise to evolutionary psychology (Barrett et al. 2002); in economics, the linkage between rational choice theory and natural selection led to an adoption of evolutionary theory (Lam 2003). Darwinism became a mainstay of philosophical naturalism, with its proponents arguing for the evolution of free will (Dennett 2003) and the adaptive properties of biologically based human emotions (Frank 1988). In biology, E. O. Wilson's (1975) synthesis of Hamilton and Trivers' work formed the backbone of sociobiology. Today, within the biological sciences, this paradigm is so pervasive that the animal behavioralist John Alcock's (2001) book is correctly labeled *The Triumph of Sociobiology*. Darwin's adaptationist perspective also led to the emergent field of evolutionary medicine (Nesse and Williams 1994; Strassmann and Dunbar 1999).

In anthropology, reactions to these developments were mixed. Some practitioners abandoned studies of cultural singularities to concentrate on the search for human universals. This is best represented by Brown's (1991) cross-cultural research that constructed a Universal People, based on a compilation of shared traits ranging from sexual jealousy through notions of time to incest avoidance and the proscription of rape. Others launched concerted attacks on the new adaptationist perspective (see Sahlins 1976). However, the great majority of anthropologists simply ignored the debate about cultural versus biological roots to human

behavior. This lack of interest is truly lamentable, for anthropology still has much to offer in the study of human ethology. In response to Betzig's imperial statement that "personally I can do without culture," one of the founders of behavioral ecology, John R. Krebs, stated that he and his colleague Alex Kacelnik, "personally find culture necessary" (Kacelnik and Krebs 1997:27). In defending this statement, they make the following argument (1997:28):

> Cultural evolution has its own dynamics, constrained but not fully determined by human evolutionary adaptations. A satisfactory understanding of human behavior requires examining the articulation of formerly adaptive traits with present cultural circumstances.

A recent example of the necessity of considering culture along with evolutionary biology is provided by the phenomenon of partible paternity in Lowland South America (Beckerman and Valentine 2002a). Throughout this region, many indigenous cultures believe that multiple males are necessary to form a fetus because fetuses are "sculpted" out of successive coitus, and that only after a sufficient amount of semen accretion can a complete child be formed in women's wombs. Beckerman and Valentine (2002b) show that the belief in partible paternity, specifically the cultural recognition and acceptance of multiple biological fathers, is widespread throughout many Lowland South American societies separated by significant linguistic and geographical and with no history of cultural contact.

This indigenous concept of multiple fathers has notable demographic consequences. Consider the case of Ache foragers of northern Paraguay, reported by Hill and Hurtado (1996). Within Ache society, men and women engage in a series of short, sequential marriages, leading to a high degree of paternal uncertainty. As a result, Ache recognize "primary" and "secondary" fathers. The former consist of men who had intercourse with a woman prior to pregnancy, or when "her blood flow ceased to be found" (Hill and Hurtado 1996:249). Secondary fathers are men who had sexual intercourse with woman in the year preceding pregnancy as well as the man married to the woman at childbirth. Children call both groups by the same term for "father," and both groups contribute food and childcare for offspring they "fathered." The prevalence of both types of fathers is evident in Hill and Hurtado's (1996:273) survey of 321 Ache adults between 1980 and 1989, which included 632 reported fathers, for an average of close to two fathers per birth (mean = 1.97, standard error = 0.06, and median = 2; mode = 2 and maximum = 10).

Among the Ache, there is a long history of infanticide. Hill and Hurtado's data showed that, during the period of early contact with Europeans, 14% of all male and 23% of all female children were killed

before they reached the age of ten. Logistic regression analysis revealed that children without fathers were 3.9 times as likely to be killed in each year of childhood, relative to children with fathers. Adopting an evolutionary position, the authors considered Hrdy's (1979) suggestion that female nonhuman primates may counteract the threat of infanticide by spreading paternity confidence among several males. To test this among the Ache, Hill and Hurtado (1996:442) hypothesized that a female Ache strategy is to accumulate multiple sexual partners under the belief that males with some probability of paternity would protect or care for the child in question. A logistic regression analysis of yearly mortality rates and number of secondary fathers for the period 1890–1970 showed that the lowest child mortality rate (ages newborn through nine years) was for offspring with one primary and one secondary father, whereas the highest mortality rate was for those with no secondary fathers. Hill and Hurtado's interpretation is that the optimal effective female strategy is to have an intermediate number of fathers, represented here by one primary and one secondary father. Having more than one secondary father led to a sharp rise in offspring mortality, associated with the dissolution of paternal confidence and subsequent loss of male parental investment.

The same type of mortality differentials associated with the presence of multiple fathers is reported by Beckerman et al. (2002) for the Bari of Venezuela. In this society, the presence of secondary fathers resulted in food provisioning for pregnant mothers, rather than extra male investment in food and time for the offspring. As a result, the most important pathway linking the presence of secondary fathers with differential offspring mortality was by means of lower fetal wastage; the odds ratio of being a stillborn was significant both between those offspring who had no and one secondary parent ($p = 0.001$) and those offspring with one and those with more than one ($p = 0.0034$).

Whether achieved by provisioning of mothers or offspring, the presence of multiple parents in the Bari and Ache flies directly in the face of what Beckerman and Valentine (2002b:3) call the "Standard Model of Human Evolution" (Alexander and Noonan 1979; Lovejoy 1981), which heavily stresses paternal certainty as a vital determinant of human social evolution. This posits a strict sexual division of labor in hominid prehistory, so that males forage and provision females and their dependent offspring, who are under the constant supervision of their mothers. In this scenario, paternal investment is directly linked to paternal certainty, heightened by pair-bonding and monogamy. Only high levels of paternal confidence allowed for the heavy paternal investment of time and energy seen in human evolution but rare in nonhuman primates (Kaplan and Lancaster 2003).

Beckerman and Valentine (2002b:3) also note that the social acceptance of multiple fathers also contradicts previous notions of human universals that include sexual jealousy arising from concerns with paternal confidence. In this regard, Pinker (1997:488–490) writes the following:

> in no society do men readily share a wife. A woman having sex with another man is always a threat to the man's genetic interests, because it might fool him into working for a competitor's genes.

Likewise, the founder of sociobiology, E. O. Wilson, writes in his text, *Consilience* (1998:170), that "in courtship men are predicted to stress exclusive sexual access and guarantees of paternity."

Incorporating the Standard Model of Human Evolution, the widespread cultural phenomenon of partible paternity in Lowland South America constitutes a very strong example of the admonition of Kacelnik and Kreb (1997:28) that "a satisfactory understanding of human behavior requires examining the articulation of formerly adaptive traits with present cultural circumstances." Because analyses from both the Bari and Ache indicate improved offspring mortality rates associated with secondary fathers, it is legitimate to see partible paternity as constituting adaptive cultural behavior, whether or not it is consciously recognized by individuals within these societies. In this interpretation, culture is the *ideational model* of parenting that posits multiple sexual acts with different males are necessary to develop a fetus. It is adherence to, and deviation from, this ideational model, represented by children with one or multiple fathers, that constitutes *social behavior* within these societies. Although I return to this point in subsequent sections, it is important to stress here the difference between culture, which consists of socially recognized ideas that act as potential paths of behavior, and subsequent social behavior, in which individuals choose and enact one possible pathway.

Because in this perspective culture offers an array of choices, it follows that these choices can have adaptive, neutral, or even maladaptive consequences for individual fitness levels. Staying with the topic of paternity, Vickers (2002) describes the sexual belief and behavior of two other native groups of Lowland South America, the Siona and Secoya of northeast Ecuador, who do not recognize multiple fathers. Instead, these groups believe men should not engage in "excessive" sexual matters, because of the underlying cultural construct that menstrual blood will contaminate, weaken, and perhaps even kill men. It can also make their wives suffer, affect men's hunting skill and luck, and inhibit their receiving visions when they drink a potion made from the *yahe* vine (*Banisteriopsis caapi*). Given these dire consequences, it is perhaps not surprising that these two groups believe that fetuses are formed from a single genitor, adultery