
Fitness Tradeoffs in the History and Evolution of Delegated Mothering with Special Reference to Wet-Nursing, Abandonment, and Infanticide

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Although thresholds for maternal investment may be set by evolved motivational processes, adjustments in parental investment are consciously calculated to achieve economic and cultural as well as biologically-based goals. Maternal decision-making is played out in specific demographic, ecological, and cultural contexts where maternal options are also constrained by the fitness tradeoffs concurrently being made by other (sometimes more powerful) individuals in the same population. In this reflective review, I examine retrenchments in maternal investment ranging from mild neglect to abandonment and infanticide within the framework of culturally imaginable, and ecologically or institutionally available options actually open to the mother.

KEY WORDS: Parental investment, Delegated mothering, Wet-nursing, Child abandonment, Infanticide, Fitness tradeoffs

“Early European accounts of infanticidal savages bristled with ethnocentric moralizing. And yet as we read the tragic accounts from one society to another, it is not the inhumanity of the unfortunate perpetrators that confronts us, but rather their humanity.”

Martin Daly and Margo Wilson (1988: 59)

I. INTRODUCTION: MOTHERHOOD AS COMPROMISE

The dilemma confronting working mothers in the western world today has universal dimensions.¹ To imagine that there is anything new in the conflicts faced by modern women is to adopt a mythologized concept of self-sacrificing motherhood. For mother-

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hood has always meant compromise, compromise between subsistence needs of the mother and the time, energy, and resources needed to mate and reproduce (reproductive effort). In addition to conflicts between the mother's own needs and a general commitment to reproduction, iteroparous mothers (breeding over a lifetime) must also partition their reproductive effort among different offspring. Parental investment of time, energy, or resources in the production or nurturing of one offspring can diminish a mother's ability to invest in older offspring, or in her ability to produce additional offspring in the future (Trivers 1972).

As Robert Trivers pointed out (1974), individual infants may attempt to extract greater investment from their parents than the parents have been selected to give. Herein lies the source of the chronic tension between parental commitment to the survival and well-being of offspring and parental frustration at the frequency and insistence of infant demands. Although a primate infant should rarely seek to extract more reproductive effort from a mother than is compatible with her survival, it might well seek to extract additional parental investment when it would come at the expense of future siblings, rather than the mother's survival. In this paper I will be dealing with maternal dilemmas and decision making at two levels: 1) at the level of reproductive effort—her own survival versus that of her progeny, and 2) at the level of parental investment—investment in one particular infant versus investment in infants of another sex, born with different qualities and/or under different circumstances.

In most mammals, and all primates, newborns are dependent on their mother for warmth, protection, locomotion, and nutrition. Substitute providers of these functions occasionally crop up in evolutionary history (e.g., van Lawick 1973 for wild dogs, Hrdy 1976, Thierry and Anderson 1986 for primates) and have even been common during some periods in human history. More often than not however, survival of the infant depends on the mother's survival. From an evolutionary perspective then, it is the mother who is the critical unit of selection and the mother's survival would always have priority except in the case of older or incapacitated mothers with low probabilities of reproducing again, that is, mothers with very low reproductive value. Even here, maternal survival should take priority if survival of the infant depends on her nurturing.

Where parental rank is correlated with the survival and breeding prospects of selected offspring, even the maintenance of parental status may take precedence over the survival of less favored infants. Some of the best documented examples derive from human parents who cloister in convents or actually destroy daughters whose dowry costs jeopardize family socioeconomic status, or destroy daughters who threaten to injure family standing or "honor" (Dickemann 1979, Manzoni 1961: 134ff, Boone 1986).

In other mammals who produce either sequential young or litters parents respond to local conditions in evaluating the worth of a particular offspring in terms of probabilistic assessments of future conditions and "as a function

of the proportion that this child represents of his total future reproductive prospects" (Dawkins and Carlisle 1976: 132). That is, parents respond with what Daly and Wilson (1980, 1983) refer to as "discriminative parental solicitude"—an amalgam derived from assessments of probable degree of relatedness (clearly more important in the case of males and egg layers than for most female mammals), worth of the offspring in terms of its ability to translate parental investment into subsequent reproduction, and finally consideration of alternate uses to which the parent could devote the resources, such as diverting resources to a stronger child, a child of a preferred sex, or sustaining the parent until more favorable opportunities to breed should present themselves. In humans these levels of solicitude are tempered (albeit rarely overridden completely) by cultural ideals, especially ideals about continuation of the household or the lineage, ideals which are in turn shaped through historical time by the changing productive and reproductive value of children (Hrdy 1990).²

Here I focus on fitness tradeoffs made by mothers through human history. In humans, however, as in so many species, maternal subsistence and especially the survival of her offspring are so heavily influenced by other group members that it is impossible to consider the mother in isolation from the web of fitness tradeoffs by other individuals in the social network she is part of (see Hill and Kaplan 1988 for an exemplary case study exploring how reproductive decisions "mutually constrain one another" and involve complex tradeoffs between alternative behavioral options among Ache hunter-foragers of Paraguay). Relevant individuals may include former and future mates of the mother, biological relatives, affines and unrelated individuals linked to her in either cooperative or competitive arrangements, subordinate individuals she exploits as well as dominant individuals exploiting her. For the purposes of this paper, I will sometimes substitute the term "parental" for maternal when my knowledge of the situation is too limited to separate maternal from paternal interests, or when in fact there is good reason to assume they coincide.

II. FITNESS TRADEOFFS IN DETERMINING THE LEVEL AND TYPE OF SOLICITUDE

For the purposes of this article, I assume that infanticide (were information available) could be documented for virtually all human populations, although frequencies differ markedly, ranging from near zero to over 40% of live births

² Whether individuals are primarily motivated by a desire to perpetuate a biological lineage (i.e., reproductive success) or whether parental investment strategies are geared to perpetuation of the social or economic status of a family or household (containing affines and adopted members) is not always clear. Perhaps this is because over past generations these two outcomes have been so closely interconnected. Other ideological factors influencing cultural attitudes toward children are clearly important, but beyond the scope of this paper.

(section IV-B) The main functional classes of infanticide that have been described for nonhuman animals (Hrdy 1979) can all be documented among humans, if only anecdotally. Nevertheless, the patterning of infanticide in humans is considerably different. For example, in other primates unrelated males are the most likely perpetrators of infanticide (Hrdy 1977, 1979, Leland, Struhsaker, and Butynski 1984). While the close proximity to the mother of males unrelated to her infant (either captors or step-fathers) can represent a threat to human infants (e.g., see Biocca 1971, Hill and Kaplan 1988 for Amazonian hunter-foragers, Exodus 1:16 and Matthew 2:16 for ancient Near Eastern pastoralist, Daly and Wilson 1988 for contemporary North American populations), biological parents are responsible for the largest portion of infanticides, and marriage and inheritance systems, religious beliefs, and social norms concerning individual and family honor play central roles in parental decisions to terminate investment in these human infants. Furthermore these parental decisions are informed by a unique awareness of history, the future, and long-term goals for family survival. Hence although thresholds for parents to invest may be set by evolved motivational processes (Daly and Wilson 1980, 1988) adjustments in parental investment are consciously calculated to achieve culturally as well as biologically defined goals, and are played out in specific demographic and cultural contexts (e.g., see Korbin 1981, Skinner 1988 and in press).

By far the most common goal for parents committing infanticide involves the manipulation of family size, composition, or the adjustment of the timing of parental investment by the mother and/or father. In fact, however, infanticide in the sense of Langer's (1974) classic definition ("the willful destruction of newborn babies through exposure, starvation, strangulation, smothering, poisoning, or through the use of some lethal weapon") represents only the extreme end of a continuum of behaviors which function to reduce the costs (in terms of time, energy, risk, and resources) that offspring impose upon parents. In contrast to rodents and other mammals who may cannibalize supernumerary infants (Day and Galef 1977; Gandelman and Simon 1978), thereby recouping nutrients, there are virtually never any benefits to killing one's own offspring apart from perceived benefits in rare cases of child sacrifice (e.g., points to be won with a god for sacrificing a valued son, Genesis 22, see Stager and Wolff 1984 for ancient Carthage). And quite often, there are costs.

Hence, we would expect infanticide involving direct destruction of the young to occur only as a last resort when other options for reducing postpartum investment are constrained by legal sanctions which make abandonment riskier than murder, by the lack of supportive kin networks or other potential caregivers, or else by particular sorts of environmental hazards which make abandonment impractical. A different set of constraints may also pertain in the upper reaches of stratified societies where the continued existence of a child may represent a threat to social status, family "honor," or orderly succession. Although it is very common to read in the literature

on infanticide that parents were responding to scarcity by eliminating their infants, limited resources by themselves (except in special circumstances, see section IV-A) are no reason to destroy an infant. Scarcity is merely a reason for parents to REDUCE investment in a current infant, perhaps abandon it. There exist a wide array of alternatives to infanticide whose availability varies according to specific historical and ecological contexts.

These means of reducing parental investment in offspring have received relatively less emphasis in the literature than has infanticide per se. Nevertheless, such retrenchments from the “primate ideal” of Pleistocene mother emotionally bonded and physically in contact with her continuously suckling offspring (Konner 1976) are for most societies far more common, and sociologically and demographically more important than actual infanticide (exceptions are discussed in section IV-B). I list below seven different ways of dealing with infants, each of which functions to mitigate or terminate parental investment without outright destruction of the infant. This list is by no means exhaustive.

1) *Exploitation of the infant as a resource, usually selling the infant* which entails some immediate (usually small) gain to the parents (e.g., see Boswell 1988: 170–171), Fildes 1986: 6). Although prostitution or slavery would be likely fates for offspring sold (Boswell 1988) some children could conceivably end up with improved prospects of survival or even reproduction.

2) *Abandonment of the infant* where the parents leaves the infant, typically out of harm’s way so that there is some prospect that the infant will be taken up and cared for by someone else (Trexler 1973a, Boswell 1988, see Exodus 2, for the story of Moses). In the most benign form of abandonment, children are relinquished for adoption (Bachrach et al. 1992). Admittedly there can be a fuzzy distinction between abandonment and infanticide when real or imagined parental optimism comes up against the realities of infant starvation or hypothermia. Nevertheless, the practice common in Medieval Europe of abandoning infants with identifying tokens indicates—at least for those cases—the existence of a parental mind set where retrieval of the infant one day remained a possibility. Some parents found solace by fantasizing fabulous destinies of upward social mobility for abandoned progeny (e.g., Romulus, who founds a dynasty, see Boswell 1988 for other European examples).

3) *Fostering out the infant* either through arrangements with relatives who can rear children more cheaply (a grandmother in a rural area) or provide them special opportunities (education in an urban area) or through the more common practice of an “invented” kin tie whereby infants, or more often children past weaning, are sent to a distant household to live and one or both parents pay (in cash, goods or current, or future favors) someone (often an older woman) to care for an infant (Goody 1969, Isiugo-Abanihe 1985 for West Africa, Pennington 1989 for South Africa, Shahar 1990 for Medieval Europe). Although typically infants going to foster mothers are

weaned, the distinction between “fostering out” and “wet-nursing” can become blurred when the foster mother does provide milk (Bledsoe and Isiugo-Abanihe 1989 note 1) Because children fostered out tend to be older, there is also a much higher likelihood that a foster parent (as opposed to a wet-nurse) can set them useful tasks, and the use of foster children as helpers and child minders may explain the fact that among Botswana pastoralists daughters are more often sent (Pennington 1989)

4) *Wet-nursing* when the mother or both parents contract with another woman to suckle their infant (for over-view see Fildes 1988), an arrangement which encumbers the wet-nurse but frees the mother both for status or labor-related pursuits and simultaneously also renders the mother fertile for subsequent pregnancies—an artifact of wet-nursing that may or may not be intended; see next section

5) *Oblation* when one or both parents leaves the children in the custody of a religious institution, usually, but not always, irrevocably (Boswell 1988 Chapter 8, Fuchs 1984)

6) *Reducing overall reproductive effort* so that parents continue to rear their own children but at a lower level of resource and energy expenditure, or a lower level of direct involvement, delegating care to others, such as locally available kin, particularly older siblings as is characteristic today in much of Bantu East and South Africa (e.g., Weisner 1987, Draper 1989)

7) *Reducing parental investment in particular children*, often weak ones, or else supernumary daughters destined to be economic or social liabilities, or in later born sons in societies with primogeniture, etc (Cain 1977, Miller 1981, DeVries 1984, Boone 1986, Das Gupta 1987, Voland 1988) Such reduced investment may be motivated either by insufficient resources, by probable absence or loss of paternal investment (e.g., Scheper Hughes 1985 for mothers in Brazilian shantytowns), or by the advantages which may accrue to families channeling resources towards selected progeny in high density, stratified societies (see Dickemann 1979, Levine 1987: 293)

In the last five or so thousand years, such “mitigating strategies” accounted for the fates (both survivals and deaths) of far more infants than did infanticide, even though infanticide as a phenomenon has attracted more attention from anthropologists and biologists. Indeed, patterns of continued investment with retrenchments (7 and 8 above) are so common in human societies as to be—at least in their milder forms—completely unremarkable both to the ethnographer in tribal societies or to the sociologist surveying contemporary western populations. These patterns represent the investing end of a continuum that ranges from termination of investment at the one extreme to total self-sacrifice of the parent on behalf of offspring at the other—what might be termed “the Stella Dallas” strategy. Although I would expect such maternal self-sacrifice to be more common in fiction than in life, real-life examples can be documented.³

³ Stephen Lock (1990: 397) discusses the case of a mother who risks her life for her unborn child. A twenty weeks pregnant woman informed by her doctor that she has cancer of the cervix must choose between immediate treatment and sacrifice of the pregnancy with an 80 percent chance of complete cure versus delayed treatment until the baby could survive with only a ten percent chance of cure. The mother opted to save the baby.

Globally, I suspect that retrenchment of parental investment would have pertained to more infant survivals and deaths than all the other strategies, including infanticide, combined. Nevertheless, depending on the time and place one or another of these patterns can become demographically more important. Wet-nursing, which affected large segments of the population in seventeenth and eighteenth century France is a case in point, and is discussed below.

From the perspective of reproductive strategies, abandonment of an infant should be the default divestment strategy for parents terminating investment, infanticide would only be a last resort when this option is curtailed. Hence when parents destroy their children, it is certainly important to ask what factors diminished parental solicitude toward their offspring (Daly and Wilson 1984), but it is also useful to identify the ecological, social, and cultural constraints which prevented parents from abandoning the baby or from attempting to mitigate the cost of rearing an infant through some other means (Granzberg 1973). In this review I focus on the decision-making process of parents, and inquire: what social, economic and environmental factors shape parental cost-benefit analyses? If indeed the various mitigating strategies outlined above are all functionally similar, why do parents opt for one strategy rather than another? What is the role of historical precedents, history, and local ecology in these decisions? What factors predispose or forestall pursuit of alternative strategies to mitigate parental effort?⁴

III. WET-NURSING AS A CASE STUDY IN TRADEOFFS

A. Diluting the Costs of Reproductive Effort

It is widely believed that the use of wet-nurses in premodern Europe was in fact a disguised, nonprosecutable form of infanticide. This interpretation is implicit in terms for wet-nurses such as the English “angelmaker” and the German “Engelmacherin.” Wet-nurses were viewed as “surrogates upon whom parents could depend for a swift demise for unwanted children” (Smith 1984: 64C). “It must have been common knowledge” writes Maria Piers in her book on *Infanticide*, that the wet nurse “was a professional feeder and a professional killer” (1978: 52). Critics of wet-nursing, such as the reformer Dr. Alexander Mayer, giving testimony before the Roussel Committee in France at the end of the nineteenth century, just before the Roussel Law of 1874⁵ was passed, claimed that the artisans of Paris sent their infants off to wet-nurses “with the desire of not seeing them again.” (cited from court records by Sussman 1982: 123).

In fact, however, even during the European heyday of wet-nursing at

⁴ It is important to note that I do not consider here the infant’s “point of view.” Nor do I address ethical implications of the behaviors I describe. These are separate issues.

⁵ The primary intent of the Roussel law was to protect infants from the worst abuse of commercial wet-nursing.

the end of the 18th century when up to ninety percent of infants born in urban centers such as Paris and Lyon were nursed by women *other* than their biological mother (20,000 of 21,000 infants born in the famous statistic given by Paris lieutenant general of police for Paris, LeNoir 1780–63), wet-nursing is best understood as a strategy to reduce the costs of reproductive effort for individual mothers. Wet-nursing represented an alternative to worse outcomes (death of infant and maternal destitution) rather than a covert means of destruction. There can be little doubt that wet-nursing varied according to circumstances of parents, and that under some circumstances this form of delegated mothering was associated with high levels of mortality. But these cases involved parents with poor access to resources and dismal alternatives.

The risks that parents took with the lives of their infants cannot be understood without reference to both local customs (e.g., a well established tradition of wet-nursing among elites that had long exposed rural poor in many parts of France to the practice) and prevailing ecological conditions. By the eighteenth century, France was in the throes of a tremendous increase in population (from 20 million in 1720 to 27 million by the end of the century, Hufton 1974: 14). In the countryside, poor harvests and especially fractionalization of small landholdings among several sons swelled the numbers of the dispossessed. There was a proliferation of people who found it difficult to provide themselves with the bare necessities. A man by himself, without a working wife, could not expect to earn enough to support more than himself and perhaps one child. The arrival of additional children could reduce the family to destitution.

Moving to the city could not have been much improvement. Rapid urbanization combined with slow industrialization meant that opportunities were few—not only for parents but for children who survived to mature. Incomes were low, rents high. Around sixty percent of these French mothers sending their infants to wet-nurses belonged to the large class of artisans. In his detailed analysis of wet-nursing commerce, George Sussman writes that “a majority of the working people of eighteenth century Paris was engaged in a perpetual struggle to avoid insolvency and indigence, a struggle that became more difficult as the cost of living and particularly bread rose faster than wages” (1982: 58). Even for this “Bourgeoisie” then, maintenance of that status was precarious. In Sussman’s calculation of a typical budget for a family of the artisan class, a husband would earn about 25 livre a month, the wife another fifteen. Of this, 40–50 percent would go for food, 15 percent for clothing, 6 percent for light and heat, and another 13 percent for rent. In addition, each wet-nursed child would cost about 8 livre a month (or 20% of the total budget per child) as long as the parents chose to keep up the payments (see below).

B. Reconstructing the History of Wet-Nursing

Such was the ecological context for 18th century France. Let us proceed then by trying to put the phenomenon of wet-nursing in broad evolutionary

and comparative perspective, and then examine its antecedents in human history. From a comparative perspective, we can certainly locate examples of communal suckling and “delegated mothering” in other animals. As we further attempt to reconstruct the use of wet-nurses in prehistoric times it seems probable that this curious phenomenon initially functioned either to 1) enhance foraging (or labor) opportunities for mothers who would otherwise be burdened by infants, or 2) to reduce the physiological costs of lactation. In either case, the ultimate outcome would be enhanced reproductive success for the mother, either due to her own or her infant’s improved survival prospects and/or her own shorter inter-birth intervals.

In the animal literature, biological relatedness looms large in the evolution of communal suckling (e.g., McCracken 1984, Lee 1989). Although there exist primate cases where lactating females adopt unrelated (or distantly related) individuals, under natural conditions adoption of close relatives (siblings, grandchildren) is the more common pattern (Thierry and Anderson 1986; Goodall 1986: 101–103, 383–384). As in allomaternal caretaking generally, kinship tends to play an important role (Hrdy 1976, Sommer in preparation). Although care of these adopted young may not include suckling, several spectacular cases involve older female monkeys who resume lactating when caring for grand-offspring (see Auerbach 1981, Auerbach and Avery 1981 for evidence of induced lactation in women other than the biological mother).

The presence of matrilineal kin might have been problematic, however, for early humans—just as it is for most contemporary humans. It would be ill-advised to extrapolate to humans from cercopithecine and colobine monkeys which are predominantly matrilineal and female philopatric.⁶ By contrast, human societies are most often characterized as patrilineal and patrilocal (Murdock 1934), that is, humans are most often “male philopatric,” a tendency that may be quite ancient (Ghiglieri 1987), characterizing as it does four of five hominoid species. Males remain in their natal range, while females migrate out to breed in gorillas, common chimps, bonobos, and the majority of human societies. If early hominid allomothers only chose to suckle infants born to close kin, they might then have had few opportunities to do so (i.e., allomaternal suckling would have been limited to cases where two sisters were married to the same man or to brothers, or else lactating relatives of the father). Biocca describes for the Amazonian Yanomama a case where the mother had decided not to rear her son. The paternal grandmother intervenes and the infant is suckled by the father’s sister in addition to suckling her own new infant (1971: 299).

It is perhaps not surprising then that in contrast to most examples of communal suckling in animals, co-residence and the potential for reciprocity appear to be more important than kinship in sustaining shared nursing in traditional societies. Where kinswomen are available to nurse, all three fac-

⁶ That is, females remain in their natal group while males migrate away to breed.

tors (relatedness, co-residence, and reciprocity) may be at issue (see Tronick et al. 1987 for Ituri Forest pygmies in Central Zaire). Furthermore, it is probably not a coincidence that kin-based fostering out (as opposed to commercial daycare and boarding schools, or paid wet-nursing) is most richly developed in West Africa and other parts of the world where matrilineal kinships systems are strongly developed and intact (e.g., see Bledsoe and Isiugo Abanihe 1989, Draper 1989).

Assuming that most women in early human societies were living in patrilocal (male philopatric) systems, wet-nursing in its earliest manifestations was probably a reciprocal favor among co-wives or neighbors. Among the Andaman Islanders, for example, any lactating woman supposedly would give her breast to any crying child (Radcliffe-Brown 1922: 76, see also Tronick, Morelli, and Winn 1987, for Efe pygmies in Zaire). In addition to incorporating infants into a network of caretakers, mothers presumably gain from being able to forage more efficiently while another female holds her infant (Hrdy 1976, Whitten 1982). Hurtado has recorded significantly lower rates of food acquisition by Ache food gatherers who are lactating (1985), to compensate, women shared food with the inefficient gatherer. Among Solomon Islanders where taboos prevented mothers from nursing their babies in the place where they garden, a mother might leave her infant with a lactating sister-in-law for an hour or so while she goes to work in the fields (Akin 1983 and personal communication). Indeed, among the Arunta, where women nurse one another's children, disputes may arise over which mother is to stay in camp and which is to go and forage (Murdock 1934: 35).

These wet-nursing relationships are best characterized as casual opportunistic cooperation among women—affines, neighbors, and blood kin—who are in a position to reciprocate help. Some voluntary wet-nurses may look forward to future support from a grown charge who owes his life to her (e.g., Biocca 1971: 214 for the case of a captured woman who nurses the orphaned daughter of a headman). In some societies, wet-nursing arrangements have become more formalized. In Arab culture, such relationships are institutionalized and Islamic law actually allows for three kinds of kinship: kinship by blood, by marriage, and by the happenstance of two individuals having suckled milk from the same woman (see for example Altorki 1980). The same incest rules pertain to children who suckled from the same woman as for true siblings.

Wet-nursing on a large scale probably did not emerge until there were stratified societies in which one class could command or purchase the services of lower-ranking mothers. But this situation was probably neither that rare nor that recent in human history. Enforced suckling involving females of different dominance statuses occurs in a wide range of animals (e.g., see van Lawick 1973 for wild dogs, Rood 1980 for dwarf mongooses, O'Brien 1988 for cebus monkeys, reviewed in Lee 1990), and it is likely that "enforced suckling" among humans predates its appearance in the historical record. In the most famous animal example of enforced suckling, the dom-

inant female in a pack of wild dogs kills all but one of the pups of a subordinate female, designated by van Lawick as “Angel.” Angel’s single pup is sufficient to sustain the subordinate female’s lactation so that at a later date the dominant female’s ten-week-old pups can preferentially nurse from her, at the expense of the lone, stunted, survivor who is not competitive for her milk with these older and larger pups (van Lawick 1973)

Although enforced wet-nursing among humans is no doubt even older, the earliest written records of one woman suckling another’s infant in a context that was neither kin-based nor rooted in reciprocal cooperation date from 3000 BC (see Fildes 1988 Chapter 1 for a review of wet-nursing in antiquity) Consider a Sumerian lullaby from the late third millennium BC. As the wife of Shulgi, ruler of Ur, sings her son to sleep she promises him first a wife and then a son—complete with wet-nurse “The nursemaid, joyous of heart, will sing to him, The nursemaid, joyous of heart, will suckle him” (from Wallis Budge 1925, cited in Fildes 1986: 6) Some of these nurses were themselves from privileged backgrounds, their status elevated still higher through contact with their charges. Fildes (1988: 3–4) points out that for Ancient Egypt, wet-nurses were recruited from the harems of senior officials, and subsequently appeared on the guest lists for royal funeral feasts, the child of one royal wet-nurse from Ancient Egypt was permitted to use the title “milk-sister to the king.” Similar respect could be accorded wet-nurses in India, China, Japan, and the Near East (Fildes 1988: 4) Less fortunate wet-nurses were actually, or effectively, slaves. Furthermore, not all wet-nurses were living under close supervision of the parents, since Near Eastern authorities clearly had some reason for fearing wet-nurses were substituting another infant for one that had died when they outlawed the practice (cited by Fildes 1988: 24 from the Code of Hammurabi, ca. 1700 BC)

In South Asia, in the period just prior to the Buddha’s lifetime (566?–480 BC), references in the *Caraka Samhita*, an encyclopedic collection of Ayurvedic beliefs, made it clear that the use of wet-nurses was widespread among the elites and that great care was taken to assure nurses of appropriate caste, color, and character, a common theme through the history of wet-nursing (Fildes 1988) In Hellenistic Egypt, from about 300 BC, the Greek ruling class used slaves as wet nurses⁷, however, free women as well turned to wet-nursing for income (see Pomeroy 1984: 139 for evidence from Greek papyri) In some cases, people who planned to rear a founding as a future slave hired one of these wet-nurses to suckle it (personal communication from S. Pomeroy) Nursing contracts from the subsequent period of Roman rule in Egypt also survive (Bradley 1980)

By the second century AD, wet-nursing in parts of Europe was an or-

⁷ After the Augustan period, some of these enslaved wet-nurses would have been abandoned daughters who had been reared by “foster parents” and subsequently sold. “Foster parents” in this context are in fact slave dealers (Pomeroy 1984: 138)

ganized commercial activity. In Rome it was centered about particular columns in the vegetable market at the Forum Holitorium specifically referred to as "lactaria." From Medieval times onward, wet-nurses, paid, indentured, or enslaved, were used by royalty and elites in many European countries. Typically, propertied families would hire women to suckle their children under conditions of close supervision, so that only one infant was nursed at a time by a nonpregnant woman with a healthy supply of milk. Although more costly, wet-nursing in this form ensured high rates of infant survival (Sussman 1982 for 18th century France, Klapish-Zuber 1985a for 15th century Italy). Infant mortality in the French case of in-house wet-nursing hovered around 20%—about the same, or only slightly higher than if a French mother of that period suckled her own offspring (see Fig. 1, note 4).

Not much is known about wet-nurses themselves, but there can be little doubt that in most cases their occupation curtailed the opportunities that their own infant had to nurse, and may have led to its death. In Renaissance Italy, nearly 30 percent of the infants sent to foundling homes—where probability of survival would be low—were in fact the offspring of slave women whose milk would subsequently be used or sold to the benefit of her owner (Trexler 1973b: 270, Klapish-Zuber 1985a: 141 and 141, n. 33). There are dozens of texts and manuals describing attributes of a good wet-nurse. Virtually all advise parents not to select a nurse who is either pregnant or still suckling her own infant—even when they also recommended choosing mothers with very new milk. The wet-nurse's own infant might be farmed out to an even less well paid wet-nurse, or else "dry-nursed." Klapish-Zuber expresses the suspicion that fourteenth and fifteenth century Florentine slaveowners may have hastened the death of "certain socially condemned infants" through abandonment in order to obtain a wet-nurse (1985a: 140). In the rich correspondence between Margherita Dattini and her Renaissance merchant husband for whose client she was seeking a suitable wet-nurse, Margherita conveys her disappointment that the infant of one prospective candidate had survived after all (Origo 1957: 200–201, see also Trexler 1973b for more of the same). In other cases a lactating nurse might simply sustain milk production over years (Jane Austen, born 1775 in Hampshire, was the seventh of eight of her siblings to be suckled by the same nurse).

Given that any shift away from breastmilk would have introduced new opportunities for infection and lowered survivorship for infants thus deprived of milk their mothers provided to the children of others, wet-nurses were directly contributing to the death of their own offspring. Maternal decision-making in these instances must however be examined in social context. The wet-nurse's behavior benefited nonrelatives more powerful than she (although in some of these instances, fitness tradeoffs will be complicated by biological relatedness between the infant and a male householder who fathered it). The price paid by these mothers for remaining within the system at all (perceived by them with some accuracy as synonymous with survival?)

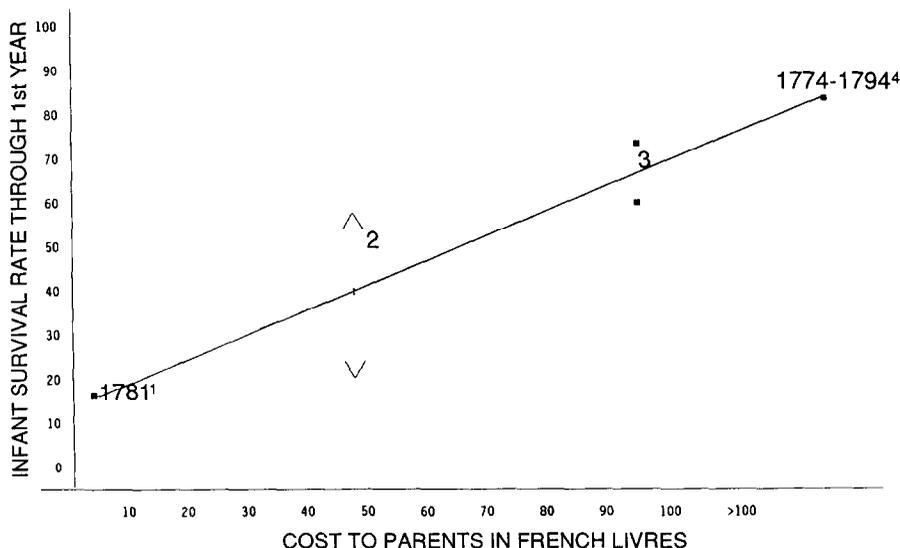


FIGURE 1 Linear relationship between amount expended by parents to pay wet-nurses and the probability of infant survival

Notes on how survival rates and costs were calculated

1 Mortality rates during the first year of life for infants deposited in Parisian foundling hospitals reached 68.5% in 1751, and rose to 85.7% by 1781. Ninety-two percent of these children would die by their eighth birthday (Sussman 1982: 62–64).

2 Roughly 10% of parents who sent children to rural wet-nurses subsequently defaulted on their payments with the result that their infants were eventually deposited in foundling homes (Sussman 1982: 62). Infants abandoned after six months of paid wet-nursing nevertheless tended to have higher prospects of survival than did those infants abandoned at birth (Delasselle 1975). The cost here is calculated at one half the yearly rate for a rural wet-nurse.

3 A Parisian artisan might earn 20–25 livres per month, his wife one-half that. Seven to eight livres per month went to pay the rural wet-nurse (Sussman 1982: 59). Sussman estimates mortality for these wet-nursed infants at 25–40% (1982: 67). Mortality rates rose somewhat over time as good wet-nurses became increasingly hard to find. By the period 1871–1874 mortality reached 42% according to records kept by the Bureau of Wet-Nursing.

4 Infants tended at home by live-in wet-nurses enjoyed roughly the same prospects of survival as infants nursed by their own mothers. Based on information recorded for 11,923 babies born in 19 parishes in suburbs south of Parisian and nursed by their own mothers during the period 1774–1784, Galliano (1966) estimates that mortality rates were around 18% (Sussman 1982: 67). Data collected by Maurice Garden (1970: 125) for Lyon during the period 1785–88 indicates a comparable rate of mortality for mother-nursed infants, only 16% died in their first year of life.

was to redirect their own milk to nonrelatives—a forced decision not unlike that made by “Angel,” the subordinate wild dog mother.

C. Reproductive Consequences of Wet-Nursing

Although it is difficult to precisely document what happened to the wet-nurse’s own infants, demographic consequences for the women on whose

behalf they were hired are better known, largely through family diaries and birth records. Non-nursing mothers gave birth at a higher rate (Dupaquier and Lachiver (1969–1399)—as often as annually in some extreme cases instead of every three or four years as one might expect if they nursed their own infants. Maurice Garden's remarkable study of the demography of 18th century Lyon documents nearly annual births in the families of butchers and silk-makers, with mothers routinely producing 12–16 children (Garden 1970: 95–97). One of the women in his sample of butchers' wives produces 21 children in 24 years (see 1970: Tableau VII "Les enfants de Jacques Gantillon le cadet"). A similar hyper-fertility is documented for upper class British women, but the situation is more complicated for French elites for whom the average number of births per marriage fell from 6.15 in the 17th century to 2.79 in the 18th century (Johansson 1987b) despite continued use of wet-nurses.⁸ Of fifty women focused on in Judith Lewis' study of child-bearing among the British aristocracy between 1760–1860, the Duchess of Leinster was the most fecund, giving birth to her first child at sixteen, only a year after her marriage, and continuing to reproduce until her twenty-first and last child was born thirty years later when the Duchess was forty-six (1986: 123–124). For the entire group of fifty, the *median* span of childbearing from marriage to last birth was eighteen years, resulting in an average of eight children each. Twenty-three of these women gave birth to their second child within a year or less of their first.⁹ (Contrast this with the four-year birth intervals, and average of five children per female thought to have characterized Pleistocene hunter-gatherers during most of human history, Short 1976, Lancaster and Lancaster 1987). There can be little doubt that the anemia, poor health, prolapsed uteruses, and other obstetrical difficulties documented in such lurid detail by Shorter (1982) was in fact the toll taken on women's bodies by nearly annual births during the first decade of marriage, followed by a second decade of production at a slower—but still "unnaturally" high—rate. In the years before the availability to women of birth control, any behavior that circumvented lactational amenorrhea resulted in increased fertility so that wet-nursing was well-suited to achieve (primarily male?) pronatalist goals.

⁸ According to Johansson (1987b) fixed incomes among continental elites coincided with a new enlightenment ethic which called for parents to treat children equally. Anxious to maintain their high social status, these parents reduced fertility since only by producing few children could they both treat heirs equally and provide them large legacies.

⁹ Note that Lewis disagrees with both Stone (1977) and Trumbach (1978) over how late British women continued to use wet-nurses. Although Trumbach assumed that most aristocratic women were breastfeeding their own infants by 1780, the data from Lewis' sample causes her to assume that wet-nursing continued much later, and she can come up with no other feasible explanation for short birth intervals. "While there may well have been more women breastfeeding by the 1780s than in earlier generations, it had become by no means a uniform practice" (Lewis 1986: 209). Some women—apparently fully aware of the contraceptive effects of breastfeeding—adjusted their use of wet-nurses accordingly—using a wet-nurse with the first children and breastfeeding later ones for long periods so as to deliberately avoid additional impregnations (Lewis 1986: 212).

For those who combined these high levels of fertility with relatively low levels of mortality (i.e., twenty percent or less), wet-nurses meant large completed family sizes, such as those recorded for aristocratic British women between 1760 and 1860 (Lewis 1986). There is little reason to doubt Stone's assessment that prior to the demographic transition, the wealthy had larger completed family sizes than the poor (Stone 1977: 64).¹⁰ Even as late as the nineteenth century in parts of Sicily, the landed aristocracy using wet-nurses produced significantly more children (an average of seven per family) and children were born at shorter intervals (two years) than was the case for families lower in the social hierarchy and among those foregoing the services of wet-nurse (four children on average, with a birth interval of 4.3 years) (Schneider and Schneider 1984).

D. Different Fitness Tradeoffs in the Social Transformation of Commercial Wet-Nursing in Europe

Shorter birth intervals, greater fertility, and high infant survivorship were outcomes of wet-nursing for families at the higher end of the social scale whose power and resources permitted them to engage or enforce the highest quality wet-nurses and have them perform their services under close supervision in the parents' place of residence. In time, wet-nurses themselves may have become a sort of status symbol which members of the sub-elites struggled to retain, even if it meant sending their infants out to wet-nurses further and further from the parental abode. Klapisch-Zuber (1985a) documents this transition from a primarily upper class to a middle class child rearing practice for Renaissance Italy. Using data gleaned from domestic diaries or "ricordanze" she shows that between 1302 and 1399 only two of fifteen fathers who put children out to nurse did not come from prominent families. After 1450, however, half the families were of modest rank. From the middle of the fifteenth century onward, nursing by a paid wet-nurse or slave was the norm for all but the poorest women. "It is probable" writes Klapish-Zuber "that the demand for nurses among proper Florentines motivated the *popolo minuto*—particularly those who had professional dealings with the merchants and the families of the highest society—to dispatch their children to the country as soon as they were born so that they could offer the wife's milk to the burghers who found it unthinkable that their own wives be allowed to breast-feed" (1985a: 138). The practice spread not only by direct emulation, but also through "ricochet" effects as wealthier babies displaced poorer ones and so on down the line.

It seems possible then that this upper class practice, increasingly adopted by sub-elites, served as a model for artisans and marginal members of the bourgeoisie, who for quite different reasons—in order to maintain the

¹⁰ But note for the reasons given in footnote 9, Stone would probably not concur with my assessment of the role of wet-nurses in maintaining this differential—at least not for Britain.

wife's labor within the family business—adopted what had begun as an elite pronatalist strategy. Working women began to purchase wet-nursing services from still poorer women (e.g., see Sussman 1982 for France). Garden's data for Lyon document the use of wet-nurses in order to retain a mother's labor. The more involved the wife was in helping her husband in the butcher shop or in silk-making, or other trades—the more likely the family was to use wet-nurses (1970: 137).

By this point, historical links with traditional patterns of reciprocal wet-nursing as in the Solomon Islands or pygmy cases have become very remote. Enforced wet-nursing through exploitation of slaves (as in the Classical and Oriental examples) provides a more apt precedent for commercial wet-nursing in pre-modern Europe.

One striking feature of commercial wet-nursing to emerge from the French and Italian case studies is the linear relationship between extent of parental outlay (cost of wet-nurse) and infant survivorship (Fig. 1). This finding is consistent with the idea that parents are using wet-nurses to lower the overall cost of producing infants, but it is important to note that the nature of the costs may be quite different from group to group. For the elites engaged in this game early on, wet-nurses meant shorter birth intervals, and greater reproductive success (since higher fertility was not offset by greater infant mortality). As even the elites confronted greater and greater competition for suitable wet-nurses, later born children and non-heirs would have to settle for inferior care. The amount that parents were willing to spend for wet-nurses depended on the reproductive value of the nursling. That is, given the system of primogeniture, what was this son's prospect for translating parental investment into subsequent reproduction? Given a system in which dowries were larger for daughters lower in the birth order, what was this daughter's prospects? The firstborn of each sex was likely to be at an advantage over same-sex siblings, and sons favored over daughters.

E. The Role of Postpartum Sex Taboos

Among the elite, it seems likely that wet-nurses do indeed free mothers for status-enhancing social functions. The process by which ambitious women obtain favors for their families by service at court are well described in writings from the period (e.g., La Fayette 1678). The primary original function of wet-nurses for this group may have been to not only circumvent lactational amenorrhea, but also postpartum sex taboos.

Although historians tend to regard postpartum sex taboos as a uniquely European phenomenon, strictures against husbands sleeping with lactating wives are in fact very widespread in traditional societies. These taboos can be documented in cultures as geographically diverse as the Eipo of New Guinea, the !Kung and Herrero of South Africa, the Mende and other tribes of West Africa, the Yanamamo, Nambikwara, and other South American

tribes as well as the North American Sioux (Schiefenhovel 1989, Howell 1979, Pennington 1990; Isiugo-Abanihe 1985 72, n 8; Early and Peters 1990).

This custom, so common in traditional societies, can be documented in Europe at least by the 2nd century AD. In his medical writings, Galen ordered all nursing women to abstain completely from sexual relations. The Alexandrian physician Soranus, writing around the same period, maintained that "coitus cools the affection toward nursing by the diversion of sexual pleasure and moreover spoils and diminishes the milk or suppresses it entirely by bringing about conception" (cited in Bradley 1980 322). Similar versions of this postpartum sex taboo persisted through the 18th century in Britain, France, and other parts of Europe, although there is some question as to how strictly parents abided by these taboos (Fildes 1986 105). Nevertheless, one reason why the Catholic church so strongly supported the practice of sending babies to wet-nurses was that the use of wet-nurses (who were also not supposed to be sleeping with their husbands) permitted the women who hired them "to provide for the frailty of her husband by paying the conjugal due" (cited in Fildes 1986 105). Note that the position of the Catholic church may help explain why wet-nursing was more common in France than in primarily Protestant England.)

A common belief associated with post-partum taboos is the notion that the milk of a mother who has intercourse will damage any infant (her own or others') that partakes of it. How these taboos came into existence is simply not well understood but, once practiced, would clearly constrain a couple's sex life. Given that frequent suckling over a 24-hour period would in any event contribute to long inter-birth intervals (Konner and Worthman 1980) the occasionally stated explanation that the taboo was used to prevent closely spaced births seems redundant and impractical. If postpartum sex taboos were really intended to *protect* babies it would have made more sense to keep babies with their mothers but permit them to suckle often enough both night and day to suppress ovulation (Konner and Worthman 1980). It seems an odd premise that babies were sent to wet-nurses—often with very detrimental consequences—in order to spare them ingesting the spoilt milk of a sexually active mother.

If protection of the baby was really the point, breaking the taboo seems so much more practical. For this reason, male pronatalist sentiment provides a more convincing explanation for husbands to ship babies out of the house as soon as possible. And indeed, whether for Britain, France, or Italy there is little doubt that husbands played key roles in insisting on the use of wet-nurses and in lining up the desired service, sometimes seeing that the baby was removed from the house almost before the mother could see it (e.g., the 18th century observations of Madame Rolande, cited in Sussman 1982 80, Klapish-Zuber 1985a 143). Whatever its cause, this early separation of mother and infant would inhibit the bonding of mother with infant. Mothers of the new mother, or mothers-in-law could play key roles in this process,

criticizing new mothers who insisted on nursing their own baby (Lewis 1986: 61)

Is it possible that the widespread postpartum sex taboo is a cultural outgrowth of male (and lineage) pronatalist interests? The prevalence of these taboos combined with the absence of any obvious rationale for believing that sex spoils milk (although a subsequent pregnancy might, Palloni and Tienda 1986: 31) makes this a problem that clearly deserves further research. In any event, whether it was to preserve fertility for pronatalist purposes among the elite, or to preserve the woman's labor for family ends among the artisan class, the outcome of wet-nursing was the same: shorter birth intervals for the paying mother, far longer ones for the paid nurse. This higher fertility among elites would have come linked to high survivorship of their offspring, but be linked to high infant mortality among workers. The paid wet-nurse in this system would suffer both lower fertility and higher mortality for her offspring.

F. Differential Treatment of Wet-Nursed Charges

Among elites, artisans and peasants, parents used wet-nurses to reduce the labor-intensive tasks of nurturing slow-maturing human young. But for each group, the costs and benefits were quite different. Furthermore, the strategies pursued were changing through time in response to social and economic competition, costs of superfluous children (e.g., the increasing cost of providing dowries for elite daughters, see Klapisch Zuber 1885b: 215 for Renaissance Italy, Boone 1986 for Medieval Portugal) and fluctuations in the availability and cost of wet-nurses and other resources that mitigated the costs of parenting.

Elites for example were clearly fine-tuning investment in children in line with quite specific social and reproductive needs. One family out of three in Klapish-Zuber's Florentine sample were more likely to keep sons than daughters at home, to nurse them longer, and to use a higher quality wet-nurse. Twenty-three percent of boys were entrusted for relatively long periods to a wet-nurse who lived in casa, compared to 12% of girls (1985a: 138). Conversely, 69% of daughters born compared to 55% of sons, were sent to wet-nurses in the country. Assuming that the nurse in casa cost 18–20 fiorini annually, compared to 8–15 for a nurse in the country (Klapish-Zuber 1985a: 136) parents are clearly paying more for sons. Furthermore, parents were more likely to wean daughters abruptly while paying extra for sons to enjoy a supplementary transition period, which may in part account for the fact that boys spent on average one and one-half months longer at wet-nurses than daughters did (1985a: Table 7.7). Similar preferences can be documented for first versus later-born children.

Given such prejudices, it might appear at first glance surprising that infant boys sent out to wet-nurses did not survive any better than girls. In fact, the tendency was slightly in the opposite direction with 18.1 percent

of 144 boys and 15.8 percent of 139 girls in Klapisch-Zuber's sample dying. However, if we take into account that the primary male heirs were kept at home and not sent out to begin with, these high mortality rates would be impinging upon sons who were already designated "heirs to spare."¹¹

Strategic allocation of resources to children vary according to circumstances (Hrdy and Judge, in preparation). Furthermore, within families such strategies might be altered over time in line with specific events. The life of Charles Maurice de Talleyrand-Perigord (1754–1838), the French diplomat and statesman, provides a poignant case in point. Talleyrand's ancient and powerful but not overly wealthy family, with one son in hand, sent their second son to a less expensive wet-nurse in the suburbs of Paris. Unfortunately, the firstborn son died, and when his parents sent for young Charles Maurice, they learned that sometime between his third or fourth year, the surplus son had fallen from a chest and injured his foot, rendering the newly needed heir crippled for life. Nevertheless, young Talleyrand was brought home to be groomed for his future role. But when his mother gave birth to yet another son, a family council was convened. In the interests of the family, it was decided that the crippled child should forfeit the right of primogeniture. Once again relegated to a secondary position, Talleyrand was educated for a career in the church—a vocation he soon abandoned. The rest, as they say, is history.

IV. CHOOSING BETWEEN ALTERNATIVE MEANS TO REDUCE PARENTAL EFFORT

If one accepts that wet-nursing, fostering out, abandonment, and infanticide all function to reduce outlays of parental effort (albeit with potentially quite different outcomes for the infant), we are still left with the question of why parents opt for one solution rather than another. Why, for example, is fostering-out of weaned babies the choice of some 30–40% of West African mothers,¹² while among their 18th century French counterparts, parents were electing en masse to hire paid wet-nurses? Why do some 20–40% of infant births end in infanticide among some Amazonian and Papuan tribes, while abandonment of infants accounted for comparable mortality in pre-modern Europe?

Sociobiologists have been able to identify several predictors for the retrenchment of parental solicitude. They focus on such variables as the high

¹¹ We can not of course rule out the alternative hypothesis these sons were simply more vulnerable to harsh conditions.

¹² One out of three Ghanaian women and forty percent of Liberian women between the ages of fifteen and thirty-four had a child living in another household. Forty-six percent of Sierra Leonean women aged thirty to thirty-four fostered children out. These figures derive from interview data reported in Isiugo-Abanihe 1985, see also Page 1989 Table 9.1 for similar data from Cameroon, Lesotho, and Ivory Coast. Slightly lower levels of fostering out exist in Kenya, Nigeria, and Sudan.

reproductive value of the mother combined with poor current prospects, low potential for paternal support in environments where such support is critical, or poor prospects of either productive or reproductive returns from investment in the infant (Alexander 1974, Daly and Wilson 1980, Hrdy 1987, 1990, Hill and Kaplan 1988)

These predictors probably apply to all types of retrenchment discussed here, and the same "ultimate explanations" may be invoked. For example, Bugos and McCarthy have shown for South American Ayoreo, and Daly and Wilson have shown for contemporary North Americans that mothers with high reproductive values, with many additional years of potential reproduction ahead of them, are significantly more likely to commit infanticide than are older mothers nearing the end of their reproductive careers. In a West African setting where infanticide is very rare, this same group of young, high reproductive value mothers, is significantly more likely to send infants to foster homes (Isiugo Abanihe 1985 Table 4 and p. 67). Purely from the perspective of maternal workload, one might expect higher parity birth order mothers, those with a number of children already, to send children away. The fact that it is instead lower parity mothers who reduce their investment in children is consistent with the hypothesis that these young women are keeping options open for future reproductive opportunities. Similarly, whereas lack of male support is a "risk factor" for infanticide for children born in Amazonian and New Guinea societies (see Bugos and McCarthy 1984 for the Ayoreo, Hill and Kaplan 1988 and Hill in preparation for the Ache, Schiefenhovel 1989 for the Eipo) it is a "risk factor" for fostering in African societies where paternal support is needed. Pennington, for example, found for patrilineal Herrero pastoralists in Southern Africa that unmarried mothers were nearly twice as likely as those in a stable union to send children to foster mothers (1989).

These parallels illustrate a highly facultative maternal response system that varies in line with life-history stage and socioenvironmental conditions. Examining this response system from a sociobiological vantage may help us understand why a mother would abandon her infant to a foundling home rather than continue to invest heavily by nursing the infant herself.¹³ But we must seek explanations at a different level for why a mother chooses to leave her infant in a foundling home versus a relative's rural hut, or why she abandons an infant versus fostering him out? Why bury alive versus abandon, and so forth. Such decisions are made within the framework of culturally imaginable and available options, as well as social (particularly family structure) and environmental constraints. Hence by identifying constraints which prevent people from selecting alternative tactics for reducing parental effort we go a long way towards understanding the proximate causes

¹³ Although it is commonly argued that the facultative withholding of maternal investment proves that maternal responses must be 'socially constructed' rather than "biological" in origin (e.g., Badinter 1980, Scheper-Hughes 1985) this conclusion is based on a misunderstanding of what an evolutionary approach means (Hrdy 1990)

of infanticide. Here sociobiology meets the traditional concerns of cultural ecologists and historians. Or rather, traditional but with an important twist. Instead of the "group," the focus is upon the decisions made by individuals in accordance with their assessments of maternal survival or lineage prospects.

A. Abandonment Versus Infanticide: Opportunities and Constraints

In his 1988 book *The Kindness of Strangers*, John Boswell documents a widespread traffic in European babies from Antiquity to the Renaissance, as couples without children and perhaps especially slave-dealers gathered up those infants that their parents did not choose to rear. High population densities meant that even if no one in the mother's immediate vicinity was known to want her baby there might well be "strangers" willing to rear the foundling. Furthermore, compared to tropical forests with stinging insects and Amazonian jaguars and other predators, there was a reasonable chance that an exposed infant might survive long enough to be found. By the end of the Middle Ages, infant abandonment had become so widespread in the West, that throughout Europe public institutions were formed to cope with this epidemic of foundlings whose supply now clearly exceeded demand.

Between the thirteenth and sixteenth century charitable groups (whose motivations are outside the scope of this paper) set up hospitals and foundling homes. In one particularly well-documented case, the commune of Florence, together with the local silk guild, joined to build an asylum called Santa Maria degl'Innocenti. By 1445 the doors were opened to a small flood of "innocents." No doubt numbers of abandoned children rose and fell with economic conditions, but the numbers also increased in response to the opportunity to reduce parental effort without necessarily killing infants that was created by these institutions.

In what was a fairly general pattern for such institutions in continental Europe and Russia, the Innocenti in its early years was a fairly benign environment for infants. Death rates during the first year of life were around 26 percent for 1445, down to 23 percent during the Innocenti's second year (compared to ca. 21% for the population at large). However, by 1448, as the Innocenti became a magnet for abandoned babies from all over the dominion, these rates doubled to 53.6% mortality. By 1451, six years after the institution opened, death rates soared to 57.6% (Trexler 1973b Table V).

At the outset, in "a hospital of minimum crowding, and with a sufficient supply of *balie* (wet-nurses), spared famine and pestilence, the first innocents had as good a chance as any children" (Trexler 1973b 276). And many foundlings left at the Innocenti would definitely have been better off there. These were the illegitimate children of slaves and servants who according to Trexler would have died at triple the rates of legitimate children. The

decision by a mother to deposit her baby in the *tou* (rotating barrel) at the foundling home could be construed as in the baby's best interests

But what of the same decision once mortality rates in foundling homes reached the catastrophic levels which almost inevitably, they eventually did, as more and more parents made the same choice? (See Trexler 1973b for Italy, Dupoux 1958 for France) Dupoux's statistics for Parisian foundling homes at the end of the 18th century indicate that 92% of these children died before their eighth birthday. Death rates of 70–85% were not unusual. Were parents depositing their infants in the *tours* aware of the prognosis for survival of the abandoned baby? Surviving documents from 15th century Florence strongly suggest that parents depositing children at the Innocenti certainly were not only aware of the risks, but were capable of making shrewd assessments concerning the survival chances of a baby kept in Florence versus a baby farmed out by the foundling home to distant wet-nurses. "Some parents, in abandoning their child to the Innocenti pleaded that the hospital keep it and not send it to an outside nurse . . ." (Herlihy and Klapisch Zuber 1985 :147)

Parents would deposit their infants with various mementos and identifying signs—an indication that they were gambling on a good outcome and that they harbored some hope of one day retrieving their child. Nevertheless, at some point, parents must have become aware of the high death rates suffered by the babies they abandoned.

Volker Hunecke records case studies from 18th and 19th century Milan of a tailor "Filippo A . . ." who keeps his first son and then deposits the next six (in the space of five and a half years) at the nearest *tou*. When his first wife dies, Filippo remarries "Cecilia B . . ." who deposits there five infants in five years. After a year and a half, Cecilia tries to retrieve them, but only two had survived long enough for her to be able to. "Francesco G . . ." and his wife "Amalia S . . ." similarly produced twelve infants in thirteen years. The first of these died shortly after birth. All the others were left at foundling homes, and only one of them—a girl, survived.

The point here is that these outcomes were not a secret. Parents were in a position to have some sense of the high mortality, and being human would have communicated what they knew to their neighbors. Granted that it is difficult, even for trained social scientists to obtain accurate estimates of infant mortality (and these were after all illiterate people with neither time nor facilities to study the situation), still I don't think we can assume that many parents remained ignorant of the prospects for their abandoned children. Yet even if parents were aware of high mortality, it does not mean that parents opting for the *tou* were merely seeking a legal way to kill an infant. More plausible is the hypothesis that parents were making their calculations based on immediate costs (mother's lost employment, cost of a wet-nurse). This information was likely to carry more weight than rumored events behind distant walls. Indeed, Garden's information for silk-makers and butchers in 18th century Lyon suggest that whether or not the mother

helped in the family business was a better predictor of whether or not babies were sent to wet-nurses than were mortality rates

Given the long history of child abandonment in the West (or indeed, currently tolerated child mortality rates in industrialized countries like the U S today, Gibbs 1990: 43) there is a certain irony about the readiness of people from "civilized" (e.g., Western-oriented) backgrounds to condemn infanticide among tribal societies. For as I will argue in the next section, infanticide has far more to do with family structure, ecology, and the absence of alternative means of mitigating parental investment than it does with morality

B. High Versus Low Rates of Infanticide

Infanticide is everywhere an uncommon event and tends to be poorly documented. By and large, reviews of infanticide in human societies have used ethnographic accounts to conduct surveys to try to determine whether infanticide is present or absent for a particular culture. Where infanticide occurs, special attention is given to the stated circumstances (Dickeman 1975, Daly and Wilson 1984). In the most extensive such review, Daly and Wilson took a representative sample of sixty cultures described in the Human Relations Area Files, infanticide was reported for 39 of these, and in 35, the circumstances surrounding at least some cases were known. They were able to identify sets of circumstances that pertained to virtually all reported cases, these circumstances were compatible with their sociobiological analysis: the infant killed was probably sired by a man other than the woman's current mate; the infant was defective or considered to be of poor quality or else was one of a pair of twins, there was a problem in the timing of the birth (short interbirth intervals), or else for some other reason (mother dead, no male support, poor economic conditions) parental resources were inadequate to rear the child. At the time of these surveys, virtually no data existed on the frequency of infanticide.

Scarcity of information is exacerbated both by the discomfort or grief that perpetrators feel in discussing infanticide (Bugos and McCarthy 1984) and the prospect of disapproval by public or religious bodies, or the prospect of legal sanctions. In contemporary Brazil, a woman may abandon or neglect her infant, thereby indirectly killing it, but if she commits infanticide, she is imprisoned (Scheper-Hughes 1985). This situation is currently complicated by the accusation that anthropologists who attribute violent practices to tribal people (and infanticide is considered a violent practice) are in fact playing into the hands of forces who wish to manipulate or eliminate these tribes (see Booth 1989 for South American case).¹⁴ For this reason, several of those anthropologists who for the first time actually have quantitative

¹⁴ The notion of violence is apparently crucial to the moral condemnation of infanticide, as lethal levels of child neglect in urban and shantytown areas of the same part of the world (Scheper-Hughes 1985, Gruson 1990) are not so condemned.

Table 1. Infanticide in Nine Traditional Societies in Africa, Amazonia, and New Guinea where Available Information Permits the Calculation of Rates of Infanticide for a Sample of Liveborn Infants

Culture and Location	Subsistence Type	No Reported Cases Infanticide/ No Live Births	Proportion Infant Mortality Due to Infanticide (%)	Source
1 EFE Ituri Forest Zaire	specialized hunter-gatherer	≈0/530 (≈0%)	≈0	Bailey 1989 and pers. com. from Bailey and Peacock
2 LESE Ituri Forest Zaire	horticulture	≈0/777 (≈0%) ^a	≈0	Bailey 1989 and pers. com. from Bailey and Peacock
3 DATOGA N Tanzania	pastoralism	0/762 (0%)	0	Borgerhoff Mulder in prep
4 KIPSIGIS S W Kenya	agro-pastoralism	0/2 190 (0%)	0	Borgerhoff Mulder in prep
5 SAN Kalahari Desert Botswana	hunter-gatherer	6/500 (1%)	3	Howell 1979
6 MUCAJAI YANAMAMO N Brazil	horticulture and hunting	17/283 (6%)	44	Early and Peters 1990
7 ACHE Paraguay	hunter-gatherer	26/223 (12%) ^b - 11 males (9) 15 females (16)	39 ^c	Hill in prep. and pers. comm.
8 AYOREO S W Bolivia and N Paraguay	horticulture and foraging	54/141 (38%) ^d 31 males (41) 16 females (27)	Unknown	Bugos and McCarthy 1984
9 EIPO Highland Central New Guinea	horticulture	20/49 (41%) ^e 5 males (21) 15 females (60)	≈81 ^e	Schiefenhovel 1989 Fig. 10.8

^a It is not possible to state with certainty that infanticide never occurred. It was suspicious for example that in these 777 births only two sets of twins were reported and in both cases only one twin survived (one was stillborn, the other twin died shortly after birth). Nevertheless, for the purposes of this paper the Efe and Lese qualify as groups with very low rates of infanticide.

^b These 26 Ache cases includes children who are killed up to five years of age and some of these cases involve nonparents.

^c These figures are only for the last decade prior to peaceful contact (1960–1970) and represent only a fraction of Hill's total data base. Hill believes that data from this period provide the most accurate estimate of infant mortality since his data suggest an increasing tendency not to report infants who die in cohorts born in the more distant past.

^d This is an inflated rate because Bugos and McCarthy only included in the sample of women known to commit infanticide. Apparently most women committed infanticide, but from the article it is impossible to say how many women were left out. Note that sex of infant was unknown in seven cases.

^e These data are for the period 1974–1978. Under mission influence, infanticide rates fell to 10% after 1978. The proportion of infant mortality due to infanticide is calculated from Schiefenhovel's estimation that normal infant mortality (excluding infanticide) is around 50 per thousand (1989, p. 174). Counting infanticide, total infant mortality would be 480 per thousand.

data on infanticide, are now reluctant to publish them, they have specifically requested that I delete their data from this paper.

In spite of these difficulties, a limited amount of data have emerged over the last decade, and permit us for the first time to move beyond largely anecdotal ethnographic accounts and examine actual rates. Hence, it is now possible to compare populations known to have very low rates of infanticide, approaching zero (epitomized here by the various African cases), with populations exhibiting high rates of infanticide.¹⁵ Table 1 summarizes information from nine traditional societies in which it has been possible for anthropologists to record the (acknowledged) proportion of livebirths that were

¹⁵ There is an obvious reporting problem here. Anthropologists tend to go to greater lengths to determine that neonatal deaths are or are not due to infanticide in societies where infanticide is thought to be an important phenomenon or in areas where it is already the subject of debate—as it is for Amazonia (e.g., the famous debate begun by Divale and Harris 1976 and still ongoing Chagnon 1983, Early and Peters 1990). Where infanticide rates are near zero, the matter is not pursued in demographic interviews with the results that investigators then hesitate to publish a rate of infanticide—they assume it is very low, but don't know it for sure.

killed, yielding minimum rates of infanticide. These rates range from zero or near zero in African hunter-gatherer, horticultural, and pastoralist groups and one percent among San hunter gatherers in the Kalahari, to the extraordinarily high rate of 41% of livebirths among the Eipo.¹⁶ Interviews by ethnographer Wulf Schiefenovel among the (up to that point) largely uncontacted Eipo tribespeople in the West New Guinean mountains revealed that 31 of the 42 infants killed in the period 1974–1978 were female. These data combined with interview data make it clear that the desire for sons is implicated in this very high rate.¹⁷ Preference for sons is also apparent in the Ache data where sixteen percent of daughters born and nine percent of sons were killed. Other Amazonian groups exhibited much lower rates—five to six percent of live births without such marked son preference. The Ayoreo rate is inflated upwards, not by son preference but by several other factors. In particular, Bugos and McCarthy (1984) only included women in their sample who had committed infanticide, and it is not clear how many non-infanticidal mothers were excluded.

These high rates of infanticide for New Guinea and Amazonia are consistent with the general ethnographic literature for these areas. That is, even though rates were not available, anthropologists were by and large aware that infanticide was going on (e.g., Neel and colleagues estimated that infanticide was occurring at a rate around 15–20 percent among the Yanamamo, Neel 1970). This situation contrasts markedly with the published literature on Africa, where infanticide is rare and largely confined to destruction of defective offspring or twins (Granzberg 1973), although other circumstances are sometimes also cited (see review in Daly and Wilson 1984). For large segments of sub-Saharan Africa, an area where there is an exceptionally high desire for parenthood and a real horror of subfertility (Page 1989), infanticide is unthinkable. Several African ethnographers I asked about infanticide either have no information on its occurrence (“the rate is zero”) or point out how puzzled their informants would be by the notion (personal communications from R. Bailey for Lese, and M. Bergerhoff Mulder and Lee Cronk for Nilotic Kipsigis and Mukogodo Ma-speaking people). The main exceptions to this would be for Africa’s nomadic

¹⁶ The Eipo and Ache rates may seem unbelievably high to some. For example, in a now famous computer simulated analysis, Schrire and Steiger (1974) demonstrated that if even eight percent of female births are terminated through infanticide the practice will lead to extinction of the population. And indeed, few would like to argue that such high infanticide rates represent a stable situation. Nevertheless, one flaw in such critiques is the assumption that children killed and those kept have equivalent survival rates. Children killed are often those whose survival prospects are in any event compromised.

¹⁷ If the data were comparably quantitative, rates of infanticide per live birth would probably be at least as high for those areas of early China and North India which practiced female-biased infanticide. In particular, in some 19th century North Indian clans, no daughter was ever allowed to live (Cave-Brown 1857, Parry 1979, Miller 1981, Dickemann 1979). Obviously, such stringent preference for sons would yield infanticide rates on the order of 50%. In spite of the greater public outcry today (Hull 1990, Rao 1986) the contemporary frequency of female foeticide and infanticide in India and China is almost certainly lower than historically they have been.

gathering people, who regard infanticide as a mother's right even if it is not one commonly exercised. In the words of demographer Nancy Howell who studied the Khoisan-speaking San hunter-gatherers "infanticide is part of a mother's prerogatives and responsibilities, culturally prescribed for birth defects and for one of each pair of twins" (1979). Of six San cases Howell knew about (out of 500 livebirths), two involved low probability of male support. Anecdotal reports of infanticide in early ethnographies for the Masai, Bemba, Lozi, and other African tribal groups (cited in Daly and Wilson 1984) appear to involve similar circumstances. A sense of the cultural difference between San and Bantu in respect to infanticide is conveyed by Nancy Howell's account of a San woman who gives birth to a defective infant. Although traditionally, the delivering mother would have been alone, on this occasion, Bantu women were present. The mother of the defective infant felt it her duty to dispose of the infant, but the Bantu women prevented her (Howell 1979: 119–120).

For the present, I accept these findings at face value, and conclude that by and large infanticide is not a salient feature in the lives of many Bantu and other African peoples. The key I think to the general low incidence of infanticide over much of Africa is linked to the same set of factors that lead to the persistent high fertility in contemporary (and presumably also traditional) Africa (Caldwell and Caldwell 1990): 1) children are highly desired for symbolic reasons involving ancestor worship and perpetuation of the lineage, 2) they reportedly cost their parents, particularly their fathers, very little to rear (though this is changing now with more emphasis on the need for education and payment of school fees), and 3) such costs as there are, are borne by the mother and by an assortment of caretakers—the infant's older siblings, real and fictive "grannies," and other patrilineal and especially matrilineal kin. Indeed, the Caldwells' claim in their famous argument (1982, 1990) that "wealth flows" from children to parents, that children eventually become net assets to parents although to date there are few empirical studies to support this claim (for an exception see Cam 1977, who has tried to measure benefits to parents from the labor of their offspring). Matrilineal social organization combined with female-centered horticultural practices mean that by and large male investment is not critical for child survival and well-being at the same time that the mother's social network makes available to her a range of options for delegating some of the necessary caretaking to other people—either older siblings and other related caretakers (Weisner 1987, Draper 1989) or fostering adults (Page 1989, Isuogo-Abanhe 1985). A fifth reason would be that few of these groups exhibit any strong preference for sons since daughters are often valued for their labor and the bridewealth they bring¹⁸ obviating any pressure for sex-preferential infanticide.

¹⁸ These generalizations, entrenched as they are in the literature on Africa, should nevertheless be regarded with caution (see especially critique by Turke 1989). Following the Caldwells, Draper, Page, and others I stress the high value placed on children and the prevalence in Africa of fostering. Yet there are signals in the literature that this story may be more complicated. Le Vine and Le Vine (1981) cite a Gusu saying that "another woman's child is like cold mucus".

The African cases contrast markedly with primarily patrilineal and virilocal horticultural/hunting/fishing societies in South America and New Guinea. Male protection and support are essential for the well-being of children, and orphans or children of inappropriate paternity are at high risk of dying before adulthood. Among the Ache horticultural hunters of Venezuela, Hill and Kaplan demonstrate that children whose reported biological fathers die before the children reach 15 years of age are significantly more likely to die (43.3% of 67 such children) compared to children whose fathers remain with the mother (only 19.3% of 171 such children) (Hill and Kaplan 1988: 298). Such children are at high risk from being killed by the mother's subsequent mate. Furthermore, because of their poor prospects, infants no longer under the protection of the acknowledged father are at risk of being eliminated by the mother herself (e.g., see Murphy and Murphy 1974: 166 for Mundurucu¹⁹, Bugos and McCarthy 1984 for Ayoreo, Hill in press for Ache). In contrast to Africa, men in the South American cases provide the bulk of protein and calories for the village, and children without a male protector are discriminated against (Hill in press).

As described by Bugos and McCarthy (1984), Ayoreo mothers—caught in transition between war and missionized settlement—confronted especially difficult socioecological conditions contributing to unstable marriages and exacerbating the need for male support. One mother, "Asago," with poor prospects of male support from her first three husbands buries at birth the first six of the ten children she will eventually bear in her lifetime. As extreme as this case is, Asago loses no more children to live-burial than did "Amalia S" to nineteenth century Milanese foundling homes. Hill reports similar (if less extreme) cases for the Ache. Many of these Ache children were either considered defective in some way or stood a high chance of eventually being murdered by a step-father or other male had the mother not eliminated them at birth (Hill and Kaplan 1988, and Hill in press). As in Medieval Europe, compassion for deformed, sick, or unwanted children was not a luxury that traditional societies in South America could readily afford, and events which would strike contemporary Europeans, Americans, or Africans as astoundingly callous are commonplace (e.g., Biocca 1971, and Chagnon, personal communication for the Yanamamo, Hill in press for

referring to something unattractive which clings. Furthermore, the Le Vines reported that five of eight children under the age of five who died were either illegitimate or were being reared by grandmothers. In short although there is general agreement that African children are being reared by a farflung assemblage of relatives and childless nonrelatives, and that this "complex web of dependency weakens the relations between the number of children the woman bears and the number she supports" (Caldwell and Caldwell 1990) we need more information on precisely which individuals comprise this web and how much each actually provides to their charges. At the same time, unpublished information for Yanamamo and other South American tribes (personal communication from Napoleon Chagnon) indicates that there is a greater deal of adoption of unwanted children by relatives which may in fact resemble fostering.

¹⁹ In contrast to other Amazonian peoples discussed here, the Mundurucu were probably originally patrilineal and patrilocal, but in the ethnographic present are patrilineal and matrilocal, a situation probably brought about by recent adoption of horticulture.

Ache) Among the Ache, children under the age of fifteen who are reared by a woman other than their biological mother suffer higher mortality rates (36.1% of 61 children) than do children reared in intact families (25% of 184 children died) (Hill and Kaplan 1988: 298). For children under two years of age, 100% of the four whose mothers died, also died (contrasted with 33% mortality for children under two whose mothers remained alive). The decision to terminate investment in a fatherless or motherless child, sooner rather than later, can be seen as rational. But why ever smother (e.g., Early and Peters 1990: 77 for Yanamama) or bury an infant alive (a very widespread practice throughout the Amazon, Gregor 1985: 89 for the Mehinacu, Hill in press for Ache, Milton *in press* 1991 for the Arawete, Wagley 1977: 137 for the Tapirape)? Why this shift in emphasis away from such default strategies as abandonment to either relatives or to "the kindness of strangers"?

The answer I think must be a culturally mediated, and also common sense, assessment of what use abandonment could possibly be. If in small, isolated villages, someone was going to take on responsibility for an unwanted child (see Biocca 1971 for cases involving a grandmother, a sister-in-law, and a captured woman) they would have made themselves known. Furthermore, fertility is high and people tend to have as many children as they want. In addition, stringent ecological conditions forestall abandonment. Whether lying on the forest floor or hanging from trees (the early European custom), no infant could survive long within the Amazonian context, any infant left unattended would soon die from the bites of stinging insects (see Hill and Kaplan 1988, Hurtado et al. 1985) or from predation. Jaguars in this area are a major source of mortality—even for adult males. An infant left in the forest would not only be doomed but would "condition" jaguars to a small human search image, increasing the predation hazard for wanted children as well. (A dissatisfied child may threaten parents with going off into the forest to be eaten by a jaguar, cited in Johnson 1981: 60). If Amazonian infanticide rates seem incredibly high, one must take into account ecological conditions that forestall European-style child abandonment.

Once a tradition of infanticide is developed, customs encouraging psychological distancing between mother and neonate become institutionalized.²⁰ Hence even as conditions become altered (e.g., by settlement) infanticide is more likely to remain in the cultural repertoire than if mother-infant bonding were encouraged from the outset (as it currently is in delivery rooms in progressive modern hospitals). Beliefs which withhold full human

²⁰ In addition to cultural customs, individual decisions or institutional policies can have profound effects on the development of mother-infant bonds. For example, practices which discourage prolonged close contact between mothers and infants in the days or months after birth weaken maternal attachment to the infant while customs (such as breast feeding or rooming-in) enhance it. Rachel Fuchs provides a tantalizing illustration of this point from her study of child abandonment by nineteenth century French mothers giving birth in a government-sponsored hospital for indigent women. Those mothers who spent eight days or more nursing their infants were significantly less likely to decide to give the baby up when they left the hospital than did mothers who spent less than eight days in association with the new baby (Fuchs 1987: 65).

identity to newborns until after some specific milestone or ritual (baby takes food, cries; receives a soul; receives a name—the traditional Greek “amphidromia” ceremony comes to mind) or customs which transfer the responsibility for survival to the infant (very different from our own culture where parents hold themselves responsible for infant survival) illustrate ways of looking at the world which facilitate infanticide. Hence even after ecological conditions have changed, infanticide may be more possible than in cultures where mother-infant bonding is promoted with little delay or where newborns are regarded as fully “human.” Where psychological distancing from the newborn is culturally entrenched, parents are more likely to resort to infanticide as an option rather than inventing new alternatives for mitigating costs of parental effort. Where other alternatives (e.g., giving children away to relatives or unrelated childless adults) also exist, one or the other traditions may become more emphasized. For example, increased contact between native South Americans and outsiders from urban areas has created many more opportunities for Indians to give children away. At the same time, infanticide has been becoming less common (Bugos and McCarthy 1984). An obvious conclusion from this analysis is that high rates of infanticide are inversely correlated with alternative opportunities to reduce parental effort.

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