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Parent-Offspring Relations

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Not all animals that reproduce sexually care for their young. Many creatures just release fertilized eggs—or even unfertilized ova and sperm—into the environment and hope for the best. But parental nurture can greatly increase young animals' survival prospects, and it has evolved independently many times. In mammals, parental care is complex and nowhere more than in *Homo sapiens*. Perhaps the most intensely parental species on earth, people invest several years and millions of calories in each offspring.

Parental care could not have evolved unless it enhanced the genetic posterity (the "Darwinian fitness") of caregivers. To the degree that care contributes to the young's survival, growth, and eventual reproductive prospects, it clearly does enhance parental fitness. However, it also imposes costs on parents, and when the fitness benefits no longer cover those costs, natural selection favors the cessation of care. Efforts to identify and measure these costs and benefits have helped scientists better understand the great variability in parental care that nature presents. This entry looks at parenting, parent-offspring conflict, and implications for child development from an evolutionary point of view.

The simplest form of parental care is merely guarding eggs against predation, but even this costs time that might have been spent seeking new mates or foraging for food to make more eggs, and guarding can also expose the parents themselves to predation. Thus, when eggs and larvae have a good chance of surviving on their own, parental care beyond the egg stage may be completely absent. Examples include many fish and frog species, especially ones that deposit their eggs in large bodies of water where unguarded eggs have the best survival prospects.

The human species has taken a very different evolutionary path, partly shared with related animals and partly unique. An early landmark in the lineage leading to mammals was the advent of copulation, as opposed to spawning. Ovum and sperm could then unite in relative safety inside the mother, setting the stage for the further evolution of important sex differences. First, because the young begin development inside the mother, any evolutionarily novel forms of parental nurture were likely to be maternal rather than paternal. The machinery of resource transfer to fetuses during pregnancy, for example, is female machinery.

Second, unless biparental care is very much more beneficial than uniparental care, it may behoove males to desert pregnant females immediately, and most male mammals do just that. As a consequence, even those forms of parental nurture that are postnatal also tend to be maternal rather than paternal specializations. Lactation is a major example.

A third asymmetry resulting from internal fertilization is that fathers can't always identify their own offspring: "Mama's baby is papa's maybe." The chance that an attribution of fatherhood may be erroneous raises the average cost of providing paternal care, because a male who unwittingly cares for young he didn't sire is contributing to a rival's fitness rather than to his own. Natural selection generally tends to eliminate behavior with such consequences, which is a further reason why internal fertilization is associated with predominantly maternal care.

Mammalian parental care is overwhelmingly maternal; indeed, a defining feature of the class Mammalia is that females produce milk. In each of the other vertebrate classes—fishes, amphibians, reptiles, and birds—there are species in which parental care beyond the egg stage is provided solely by fathers, and in birds, care is usually biparental. Not so among the mammals, but the males do sometimes pitch in. Most wild members of the dog family, for example, have stably mated pairs that cooperate in protecting and provisioning the pups. And there is a minority incidence of biparental care in other mammals, ranging from beavers to a

few primate species, including humans.

The claim that biparental care is part of humanity's evolved nature may sound odd. Don't "deadbeat dads" and changing norms about fathering imply otherwise? Not really. Hunter–gatherers provide the best models of how all people lived before the invention of agriculture a few thousand years ago, and it is noteworthy that marriage—long-lasting, socially recognized, sexual, and reproductive partnership between mates—is standard practice in every hunter–gatherer society known to anthropologists.

Moreover, men make useful contributions to their wives and children in all such societies, and *alloparental* contributions by kin other than parents are also cross-culturally universal. These are ancient elements of human lifeways, and their emergence must have required major psychological and behavioral innovations. In humans' nearest relatives, the great apes, mothers care for their young unassisted.

How and why humans evolved their social peculiarities is not yet fully resolved, but other pair-forming mammals that raise young cooperatively provide some hints. What else do such species have in common? One ecological attribute that apparently predisposes animals to pair formation and paternal participation is carnivory. Unlike a grazer, a hunter can bring something useful home to his family, and in contemporary hunter–gatherers, the special contribution of men is to provide animal protein. Many scientists therefore believe that the emergence of biparental care in human evolution was linked to the novel importance of meat in the human diet.

Parental Investment, Discrimination, and Budgeting

What determines how long and how attentively parents will care for their young? What determines the relative contributions of mothers, fathers, and other kin? How and why do caregivers discriminate in their treatment of young? And when conflict occurs in parent–offspring interactions, what is at issue? Evolutionary biologists and psychologists are convinced that questions such as these are best illuminated by considering how natural selection acts on the motives and emotions of the respective parties.

Women's childbearing careers must end at menopause, whereupon holding back resources for future children is no longer necessary. More generally, as a woman ages, any compromising effects that expenditures on the current young impose on her total reproduction shrink. All else being equal, an older mother may therefore be expected to cherish her newborn infant more than a younger mother. A variety of evidence, both behavioral and physiological, supports this expectation.

A crucial theoretical construct in this sort of argument is *parental investment*. This economic metaphor draws attention to the problem of how individuals allocate their time and energy and regulate their exposure to risks. The food, protection, and other goods that parents provide are limited resources, and not all offspring are equally capable of converting them into increments in the long-term survival of the parent's genes.

Because resources invested in one youngster are, in effect, being withheld from others, evolved parental psyches are discriminative. Natural selection favors preferring one's own offspring over unrelated little beggars; preferring robust, viable young over lost causes; and preferring those who will profit most from nurture over those better able to fend for themselves.

Partitioning parental investment is one aspect of a larger "budgeting" problem. How should energy be divided between growing and reproducing? Between seeking mates and caring for young? Different species answer these questions differently, and the sexes often do, too. Male mammals typically allocate more time and energy to "mating effort" and less to "parental effort" than females, a sex difference that is relatively small in biparental species but seldom absent. To produce viable children, women must pay the costs of pregnancy and, in ancestral environments, of prolonged lactation as well.

The minimum required from men is much less, so one big reason why men are less reliable parental investors than women is arguably because they can sometimes get away with diverting time and energy toward the pursuit of additional mates. In most traditional societies, a few successful men take multiple wives, and their reproductive success is thus elevated. But although polygamous men are almost always wealthier than monogamous men, their children are often no better provided for, exhibiting little or no advantage in survival and growth. Polygamists apparently stint on paternal care.

In regard to discriminative treatment of one's own young, there is a large literature on nonhuman parenting showing that parents accept greater costs to protect higher quality young with greater reproductive potential. This principle clearly applies to the human case. Human parents also tend to favor their firstborn children, especially when hard choices affecting survival must be made, and this, too, is predictable on the basis of their higher fitness value: Simply by virtue of having survived longer, older children have a better chance of eventually reproducing than their younger siblings.

Somewhat more puzzling is a cross-culturally widespread tendency to prefer sons, but even here there have been persuasive evolution-minded analyses of particular cases, especially where highstatus families invest preferentially in sons, who may become polygamists, whereas low-status families actually prefer daughters, who may marry upward.

Parent–Offspring Conflict

To understand how evolution shapes parental decision making, it is essential to understand genetic relatedness. According to the Darwinian view of life, expected fitness is the ultimate basis of self-interest and of proximal perceptions thereof. Two parties have a fundamental commonality of interests insofar as that which elevates the expected posterity of one's genes also enhances that of the other's, and a conflict of interests insofar as one's genetic posterity competes with that of the other. It follows that a major determinant of harmony *versus* conflict is the extent to which genes are identical.

Relatedness (r) equals 0.5 for the parent–child relationship, because (ignoring the sex chromosomes), a person gets half of his or her nuclear genes from each parent. Thus, parent and child have a substantial but imperfect overlap of interests. As Robert Trivers first clearly explained, parent–offspring conflict is ubiquitous in sexual species because the division of resources that would best promote a child's fitness typically differs subtly from that which would best promote its parent's.

To a mother, young of equal quality are equally valuable "vehicles" of fitness: Each carries half her genes, and a grandchild from either carries a quarter. But the young's perspective is different. An eventual child of mine will carry half my genes, but an eventual child of my sister won't. Two siblings are equally effective propagators of their mother's genes, but from either one's vantage point, one's self is twice as valuable as one's sibling as a potential propagator

of his or her own genes (and four times as valuable if the two siblings have different fathers).

Note that this reasoning does *not* imply that siblings totally disdain each other's well-being. Because they are my close kin, the eventual reproduction of my siblings contributes to my genetic posterity, too. I value them less than I value myself, but I still value them. In the parlance of social evolution theory, one's own offspring are vehicles of *direct fitness*, and nondescendant kin are vehicles of *indirect fitness*.

Together, these make up one's *inclusive fitness*, and it is this that natural selection tends to maximize. If by consuming a resource that our mother controls, my brother could gain more than twice as much direct fitness as I can by eating it myself, then I should prefer that he gets it. He's my competitor, but our rivalry is tempered by relatedness.

A major implication of this analysis is that it should not be assumed that parental responses mesh harmoniously with offspring demands. Selection favors inclinations in both parties to strive for their respective optima, partly against the wishes and efforts of the other. In this light, otherwise baffling phenomena such as weaning conflict suddenly make sense. The duration and intensity of nursing that are best for a suckling child's inclusive fitness usually exceed what is best for its mother, and selection acts against either party's surrendering to the other's preferences.

The conflict is wasteful, to be sure, but it is just the sort of *social trap* that organisms cannot readily evolve away from. Indeed, the wastefulness may even increase over generations in an "evolutionary arms race," because selection chronically favors escalated demands by the young and compensatory parental discounting of this exaggerated begging. Even before birth, such conflict has important effects that have influenced human evolution. In harsh conditions such as famine, a pregnant woman's fitness may be best served by miscarrying and trying again later. If conditions are so bad that the fetus's survival prospects are tiny, then even its inclusive fitness might thus be elevated, too.

However, a mother's next child will be of the same relatedness to herself as the current one, whereas from the fetus's perspective, mother's future offspring must be discounted relative to self, so conditions must be worse before miscarriage will promote fetal fitness than is the case for mother's fitness. David Haig has convincingly interpreted several peculiarities of human pregnancy, including the astonishingly high levels of substances that target maternal hormone receptors but are produced by the fetus, as the results of such an evolutionary history of maternal–fetal conflict over both the maintenance of pregnancy and the magnitude of resource transfers during pregnancy.

Another important implication of parent–offspring conflict theory concerns divergent views of other relatives. The logic by which parents see their children as unduly selfish in their attitudes toward siblings extends more widely. Your nephew's relatedness to you is 0.25, and (all else being equal) he is therefore half as valuable a fitness vehicle as your own son. But from your son's perspective, your nephew is a mere cousin ($r = 0.125$), only one eighth as valuable as himself. The implication is a chronic clash of views, with parents wanting their children to take a greater interest in the well-being of extended family members than the children are spontaneously inclined to do.

Implications for Child Development

Parent–offspring conflict theory suggests a different perspective on socialization than is

prevalent in developmental psychology. Because the interests of parents and offspring are not identical, socializing children is to some degree manipulative rather than selfless. Children face a problem: Becoming successful adults requires cultural competence that can be acquired only by heeding others, and yet a child cannot fully trust even its own parents for advice about how to pursue its interests.

This suggests that natural selection should have equipped children with both a receptivity to social learning and a skepticism that protects them from being easily seduced into embracing other people's pet agendas. The implications for understanding social development may be considerable. Trivers has proposed, for example, that adolescence is a time of "identity reorganization" because attaining independence frees offspring from parental power and thus allows them to define new priorities that reflect their own self-interest.

Conflict notwithstanding, parents achieve fitness through their children and are a child's most reliable allies. Having observed the psychological difficulties experienced by orphans, British psychiatrist John Bowlby first posited that children are predisposed to form a specialized attachment to one dependable caregiver, usually the mother, and argued that this was a necessity in the human *environment of evolutionary adaptedness*. About 3 months after birth, children begin to pay special attention to the primary caregiver, and by about 6 months, they are distressed if separated from her and exhibit fear of strangers.

Developmental psychologists following Bowlby's lead have identified several distinct attachment styles called *secure, insecure-avoidant*, and *insecure-resistant* that derive mainly from differences in how the primary caregiver behaves toward the child and that may affect the child's subsequent social relationships throughout life. Several theorists have proposed that these attachment styles help attune children to the social environment they will face. Secure attachment develops when resources and caregivers are relatively dependable and inclines people to become trusting, trustworthy adults who invest prolongedly in their own children.

The insecure attachment styles arise in less dependable environments and apparently lead to unstable adult relationships. The "avoidant" child learns that others are undependable, and allegedly becomes an opportunistic, exploitative adult with no deep social ties. The "resistant" child presents as highly dependent and demanding, despite caregiver inconsistency, and is likely to cling to genetic family ties. The idea that these developmental trajectories constitute adaptations presumes that childhood experience constitutes a good predictive sample of what one's adult social environment will be like; whether this is plausible with respect to traditional societies is debated.

Alloparental Care

Children do not, of course, receive care solely from one primary caregiver, nor even just from parents. Others help, too. The most important of these *alloparents* are grandmothers. Besides being closely related to the children ($r = 0.25$), human grandmothers are often in a unique situation: robust and productive, but postreproductive. After menopause, the obvious way for a woman to help her fitness is by supporting her children's reproduction; indeed, a popular but controversial theory is that menopause itself evolved because grandmothering eventually yields better fitness returns than further pregnancies. The personal reproductive prospects of grandfathers are often waning as well, making them potentially available as caregivers, too.

Theorists have posited that paternity uncertainty affects grandparental caregiving. Maternal

grandmothers have two sure links to the child and ought therefore to provide the most alloparental care. Paternal grandfathers have two uncertain links and are expected to invest the least, whereas the other two types of grandparents have one uncertain link and fall between these extremes. Observed grandparental support generally follows the predicted pattern, but skeptics argue that mother–daughter bonds could generate the same pattern regardless of paternity uncertainty.

Full siblings are even closer genetic relatives than grandparents, indeed as close as one's parents. Thus, when siblings stop competing for parental attention and resources, they are good candidates to become alloparents, and in cooperatively breeding birds and mammals, as well as in social insects, older siblings are indeed the main alloparental caregivers. In humans, children and adolescents often babysit younger siblings and otherwise assist with chores, letting parents focus on high-return activities that ultimately enhance their reproduction and the helpers' inclusive fitness.

So why aren't siblings even more helpful? Probably because they are accumulating "embodied capital" for their own eventual reproductive careers, although some gains in this sphere might be had from alloparenting siblings via practice at parenting and other life skills needed later. Sibling relationships are clearly complex, requiring some balance between self-serving and competitive inclinations that contribute to direct fitness, on the one hand, and solicitude toward siblings as indirect fitness vehicles, on the other.

Aunts and uncles are as closely related to a focal child as grandparents are (r = 0.25), but they are often busy raising their own children, which limits their availability as alloparents. In addition, aunts and uncles often have partners who have little or no genetic relationship to the focal child and are less enthusiastic about helping. As would be expected, therefore, research indicates that aunts and uncles indeed provide less alloparental care than do grandparents, but more than is provided by more distant kin.

A special and sometimes problematic category of alloparents is stepparents. Establishing a new sexual relationship sometimes puts people and other animals into a "parental" role toward unrelated young. In many species, new partners ignore their predecessors' young or even kill them, but in others, including humans, stepparental investment is common and sometimes substantial. However, such investment is restrained relative to investment by genetic parents, and stepfamilies experience much more conflict than do other families, especially over the children's entitlements. This is no surprise to those who think of human beings as having evolved by natural selection.

See also Adolescent Development, Theories of; Altruism; Childhood; Culture and Development; Evolutionary Psychology; Evolutionary-Psychological Perspectives on Human Nature, Critical Evaluation of; Gender, Evolutionary Perspectives on; Mating Strategy Evolution and Development; Nature Versus Nurture

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Further Readings

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