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## Deflating the Myth of Monogamy

By DAVID P. BARASH | APRIL 20, 2001

The Nobel Prize-winning ethologist Konrad Lorenz used to recommend that every scientist discard at least one cherished notion every day, before breakfast. It is excellent advice (although Lorenz wasn't known for tossing away many of his own prized ideas). In any event, good science doesn't really require that its practitioners intentionally turn their backs on what they believe to be true, or what they devoutly wish were so. Tincture of time and the accumulation of new findings generally accomplish that: If we wait long enough, the world has a habit of making mincemeat of even our most strongly held ideas. The only thing necessary is to remain open to the evidence.

Case in point: the widely held view that certain animals -- notably the great majority of bird species -- are monogamous. Second case in point: the belief that females of most species, including our own, strongly tend toward sexual fidelity -- in contrast to males, who are known to have a penchant for sexual variety, if not promiscuity.

Biologists have long understood that monogamy is rare in mammals. Of about 4,000 mammalian species, only a handful have ever been called monogamous. The tiny list includes beavers and a couple of other rodents, otters, bats, certain foxes, a few hoofed mammals, and some primates -- notably gibbons and the tamarins and marmosets of the tropical New World. By contrast, birds have long been the poster children of monogamous fidelity. A common figure, first reported by the great ornithologist David Lack in the 1960's, has been that 92 percent of the 9,700 bird species are monogamous. Picture an archetypal male and female robin, collaborating in nest building, then devotedly taking turns incubating the eggs and feeding their young.

The notion has even penetrated into popular culture. In the movie *Heartburn*, a barely fictionalized account by Nora Ephron of her marriage to Carl Bernstein, the lead character complains to her father, who responds, "You want monogamy? Marry a swan!" Now we are learning that even swans aren't monogamous.

Actually, the myth of monogamy didn't disappear overnight. The tell-tale hiss of its deflation began several decades ago. One now-famous study, for example, sought to assess vasectomy as a possible means of population control among red-winged blackbirds. To their surprise, the researchers discovered that female blackbirds, mated to vasectomized males, were nonetheless laying eggs that hatched! Evidently, there was some hanky-panky going on in the blackbird world.

And not just blackbirds. By the 1980's, studies employing blood typing as well as analyses of proteins were leading researchers to question whether social monogamy and sexual monogamy were necessarily synonymous. Then came DNA fingerprinting in the 1990's, and

a veritable avalanche of new findings. Time and again, it was revealed that 10, 20, even sometimes 40 percent of nestlings were not fathered by the social father. The apparent mother, on the other hand, usually is what she seems to be, reinforcing the adage "Mommy's babies, Daddy's maybes."

Reports of extra-pair copulations -- henceforth, E.P.C.'s -- in animals previously thought to be monogamous have come hot and heavy during the last decade. Increasingly, biology journals have featured articles with titles such as "Behavioral, Demographic, and Environmental Correlates of Extra-Pair Fertilizations in Eastern Bluebirds," "Extra-Pair Copulations in the Mating System of the White Ibis," "Extra-Pair Paternity in the Shag, as Determined by DNA Fingerprinting," "Genetic Evidence for Multiple Parentage in Eastern Kingbirds," "Extra-Pair Paternity in the Black-Capped Chickadee," "Density-Dependent Extra-Pair Copulations in the Swallow," and "Patterns of Extra-Pair Fertilizations in Bobolinks." We've even seen these oxymoronic reports: "Promiscuity in Monogamous Colonial Birds" and "Extra-Pair Paternity in Monogamous Tree Swallows."

The situation has reached a point whereby a failure to find E.P.C.'s in ostensibly monogamous species -- that is, cases in which monogamous species really turn out to be monogamous -- is itself reportable, leading to the occasional appearance of such reassuring accounts as "DNA Fingerprinting Reveals a Low Incidence of Extra-Pair Fertilizations in the Lesser Kestrel" or "Genetic Evidence for Monogamy in the Cooperatively Breeding Red-Cockaded Woodpecker."

Nor have mammals been exempt. Gibbons, for example, were long thought to be lifetime monogamists. No longer. Ditto for essentially every species that has been investigated with any thoroughness.

The question arises: Why is sexual fidelity so rare, even among animals that are socially monogamous? For most evolution-ary biologists, the real question is: Why do socially mated females have E.P.C.'s? There has never been much doubt about why males do. Males make sperm, which are extraordinarily small, are produced in amazingly large numbers, and require essentially no biologically mandated follow-through in order for reproduction to succeed. As a result, the optimal tactic for males is typically to be easily stimulated, not terribly discriminating as to sexual partners, and generally willing -- indeed eager -- to fertilize as many eggs as possible.

As the sociobiologist Robert Trivers first pointed out in 1972, and as subsequent theoretical and empirical research has shown, males tend to follow a "mixed reproductive strategy," whereby they establish a mateship with a designated female (and perhaps assist in nest building, territorial defense, care of the young, and so forth insofar as those activities increase their reproductive success) while also making themselves available for E.P.C.'s with other females, whom they will not assist.

To be sure, males can be expected to be at least minimally discriminating, because there may be costs associated with too much sexual gallivanting: A careless Lothario might be attacked, for example, by an outraged "husband." Or, while seeking his own E.P.C.'s, a

philanderer might be cuckolded by other males having similar designs on his mate, unavoidably left unguarded.

But on balance, it seems likely that the payoff to males engaging in successful E.P.C.'s would be great. That is especially true in species in which the males do some child care, because the successful philanderer thus uses other males' energy to raise his offspring.

When it comes to females, on the other hand, the evolutionary advantage of E.P.C.'s is much less clear. After all, although eggs are fewer and more costly to produce than sperm, most eggs are fertilized while most sperm is wasted. (Evolution has produced males who make lots of sperm for just that reason.)

If a female already has a mate to fertilize her eggs, what does she gain from an E.P.C.? In species where the male helps care for the young, the unfaithful female might risk the loss of her mate's help. Yet the DNA data are unequivocal: Female animals, in species after species, are sexual adventurers in their own right. Why?

It appears that there is no one-size-fits-all answer. For some species, notably certain lizards and insects, there appears to be a payoff in increasing the genetic diversity of one's offspring by copulating with multiple partners. For some birds, there may be an immediate benefit -- such as being fed by one's lover. In many cases, the payoff appears to be more indirect, via genetic benefits accruing to the "out-of-wedlock" offspring. By mating with males who are especially fit and/or who possess secondary sexual traits that are particularly appealing to other females, would-be mothers apparently can increase the fitness as well as the eventual sexual attractiveness of their offspring. (Among barn swallows, for example, a deeply forked tail is a sexually desirable male trait. Females paired to males whose tails are not especially impressive in this regard are prone to mate on the sly with those neighboring males whose tails have been made more forked by researchers.)

The anthropologist Sarah Hrdy has suggested that among primates in particular, females solicit E.P.C.'s in order to buy a kind of tolerance from their extra-pair sexual partners: Males of many species (including langurs, chimpanzees, and certain macaques) often kill offspring they have not fathered. By copulating with males from outside the troop, females could well be bribing them to avoid such violence toward offspring that might be their own.

Next stop, *Homo sapiens*. Social conservatives like to point out what they see as threats to "family values." But they don't have the slightest idea how great that real threat is, or where it comes from. Monogamy is definitely under siege, not by government, declining morals, or some vast homosexual conspiracy -- but by our own evolutionary biology. Infants have their infancy. And adults? Adultery.

To begin with, we probably never occupied an Edenic paradise of one-to-one fidelity. The evidence is as follows: First, men are significantly larger than females, a pattern consistently found among polygynous species. From deer to seals to primates, the harem-keeping sex is the larger one, because competition among harem keepers rewards those who are larger and brawnier. Second, around the world, men are more violent than women (see Evidence No. 1; it avails little in acquiring a large number of mates for a male to be physically

intimidating unless he is also inclined to make use of his assets). Third, girls become sexually mature earlier than do boys -- another tell-tale sign of polygyny, because the intense competition among harem keepers conveys an evolutionary payoff for the "keeping" sex to delay maturation until individuals are large, strong, and possibly canny enough to have some chance of success. And fourth, before the cultural homogenization that came with Western colonialism, more than three-quarters of all human societies were polygynous.

But it's one thing to conclude that our biology favors polygyny, and quite another to decide that most people, most of the time, were either keepers or members of harems. The likelihood is that only a few succeeded at polygyny, just as only a small proportion of females were chosen (or coerced). The great majority of people -- of both sexes -- undoubtedly practiced monogamy, at least its social variety. As to sexual monogamy, the situation is obscure, but -- given the high frequency of E.P.C.'s among ostensibly monogamous animals -- it is hard not to suspect something similar among *Homo sapiens*. Certainly, the intense sexual jealousy and competitiveness among human beings strongly suggest that adultery has a long history in our species. (Why would our biology have outfitted us with such traits if utter fidelity were the rule?) In this regard, moreover, testicles have a tale to tell.

Gorillas, despite their large bodies, have comparatively tiny testicles. Those of chimpanzees, by contrast, are immense. The reason for the difference seems clear: Gorilla males compete with their bodies, not their sperm. Once a dominant silverback male has achieved control over a harem of females, he is pretty much guaranteed to be the only male who copulates with them. Chimps, by contrast, experience a sexual free-for-all, with many different males often copulating in succession with the same adult female. As a result, male chimpanzees compete with their sperm, and they have evolved big testicles to produce large quantities of it. In most species, the ratio of testicle size to body size is a good predictor of how many sexual partners an animal is likely to have.

How, then, do human beings rate in this regard? The testicles of *Homo sapiens* are, relatively speaking, larger than those of gorillas but smaller than those of the champion chimpanzees. The most likely interpretation? Human beings are less certain of sexual monopoly than are gorillas, but are not as promiscuous as chimps. Another way of putting it: We are (somewhat) biologically primed to form mateships, but at the same time, adultery is no stranger in our evolutionary past.

Given how much we have been learning about extra-pair matings among animals, and considering the current availability of DNA testimony, it is remarkable how rarely genetic paternity tests have been run on human beings. On the other hand, considering the inflammatory potential of the results -- as well as, perhaps, a hesitancy to open such a Pandora's box -- *Homo sapiens*' reluctance to test for paternity may be sapient indeed. Even before DNA fingerprinting, blood-group studies in England found that the purported father of a child is the real father about 94 percent of the time; that means that in six out of every hundred cases, someone else is. In response to surveys, 25 to 50 percent of American men report having had at least one episode of extramarital sex. The numbers for women are perhaps a bit lower, but in the same ballpark.

Many people already know quite a lot -- probably more than they would choose -- about the disruptive effects of extramarital sex. It wouldn't be surprising if a majority would rather not be informed about its possible genetic consequence, extramarital fatherhood. Maybe ignorance is bliss.

The poet Ezra Pound once observed (somewhat self-servingly) that artists are the "antennae of the race." Those antennae have long been twitching about extramarital affairs. If literature is any reflection of human concerns, infidelity has been one of humankind's most compelling interests, long before biologists had anything to say about it. The first great work of Western literature, Homer's *Iliad*, recounts the consequences of Helen's adultery. And in the *Odyssey*, we learn of Ulysses' return from the Trojan War, whereupon he slays a virtual army of suitors, each of whom was trying to seduce his faithful wife, Penelope. (By contrast, incidentally, Ulysses himself had dallied with Circe the sorceress, but was not considered an adulterer as a result. The double standard is ancient and by definition unfair; yet it, too, seems firmly rooted in biology.)

Monogamy's failures are recorded in many great works of literature: Tolstoy's *Anna Karenina*, Flaubert's *Madame Bovary*, Lawrence's *Lady Chatterley's Lover*, Hawthorne's *The Scarlet Letter*, Henry James's *The Golden Bowl*. More recently, John Updike's marriage novels -- not to mention scores of soap operas and movies -- describe a succession of affairs. And then there is the small matter of real life.

As G. K. Chesterton once observed about Christianity, the ideal of monogamy hasn't so much been tried and found wanting; rather, it has been found difficult and often left untried. Or at least, not tried for very long.

There is no question about monogamy's being natural. It isn't. But at the same time, there is no reason to conclude that adultery is unavoidable, or that it is good. "Smallpox is natural," wrote Ogden Nash. "Vaccine ain't." Animals, most likely, can't help "doing what comes naturally." But humans can. A strong case can even be made that we are never so human as when we behave contrary to our natural inclinations, those most in tune with our biological impulses.

In *Civilization and Its Discontents*, Freud argued that civilization is founded on the repression of instincts. It now seems clear that one of those instincts leads us away from monogamy. Whether we choose to follow, on the other hand, is up to us.

David P. Barash is a professor of psychology at the University of Washington. His most recent book, written with his wife, the psychiatrist Judith Eve Lipton, is *The Myth of Monogamy: Fidelity and Infidelity in Animals and People*, published this month by W. H. Freeman.

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