SEX, POLITICS, AND SUSTAINABILITY

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Why Sex Matters: A Darwinian Look at Human Behavior. Bobbi S. Low. Princeton University Press, Princeton, NJ, 2001. 432 pp., illus. $18.95 (ISBN 0-691-08975-2 paper).

Evolutionary biologist and anthropologist Bobbi Low has written a compelling and comprehensive synthesis of what is known (and not known) about the evolutionary basis for complex sexual behaviors in humans and other species. Low clearly and convincingly explains at several different levels of causality why sex matters. Ultimately, sexual reproduction is a very effective way to ensure genetic diversity within a species, and genetic diversity is essential for the survival of the vast majority of species that are confronted with uncertain environments. For example, when organisms are faced with pathogens that can quickly zero in on genetically homogeneous populations, diversity is an essential survival strategy, which explains why almost all species of plants and animals on earth employ sexual reproduction. Given this, the wrongheadedness of the idea of mass cloning of higher organisms becomes apparent. Imagine how easy a target for pathogens herds of genetically identical sheep or cows would be. Any slight savings realized by cloning only the very best-producing animals would be far outweighed by the costs of protecting them from pathogens.

Once going down the road of sexual reproduction, the next question is, Why are there only two sexes? Why not 3 or 10 or 100? Although there are a few rare exceptions (a 13-sex slime mold, for example), most higher organisms have only two sexes. Low explains this as the natural outcome of the two competing tasks gametes must accomplish to form a successful zygote: They must find another gamete, and they must form a well-endowed and ultimately successful zygote. Small gametes perform the first task well, large gametes the second. Medium-size gametes do neither well. This leads to

a bimodal distribution of gametes into small, abundant, low-cost ones (male sperm) and large, high-cost, scarce ones (female eggs).

Low then elaborates on how these competing tasks of producing a large number of small, inexpensive sperm and producing and nurturing a small number of large, expensive eggs are the basis for many male–female structural and behavioral differences across a broad range of species (including humans). Relative parental investment in offspring ultimately explains a lot of the "whys" behind male–female behavioral differences, including why males are usually the aggressors and risk takers (and shorter lived) while females are more nurturing (and live longer), why polygamy is such a common system and polyandry is so rare, why the division of labor along sexual lines is so common, why older men are still considered sexually attractive while older women generally are not, why large breasts and slim waists are considered attractive in women, whereas men with control over resources are considered attractive to women, and a host of other common sexual patterns that exist across a broad range of cultures.

Although Low's book also acknowledges the complex links between biological and cultural evolution, she does not take the next step of considering cultural reproduction itself as a distinct and parallel phenomenon. The ideas, norms, and rules that make up cultures can, like organisms, reproduce themselves, but without regard to the genetic relatedness of the individuals who carry those behaviors. If ideas and other aspects of culture reproduce and compete, there will be selection pressure for the most "successful" ideas, norms, and rules, where success is judged by the spread and reproduction of the idea, norm, or rule within the population. This type of reproduction is quite distinct from the physical reproduction of organisms. It allows culturally based evolution to occur at "light speed" relative to genetic evolution and in many cases to override genetically based behavior patterns (Ehrlich 2000). Of course, cultural and genetic evolution are intimately interconnected, but it is just this complex interconnection that has yet to be adequately explained and which represents a significant research challenge for evolutionary scientists.

Another important question has to do with the "reflexive" nature of cultural evolution: Because we are capable of at least some degree of conceptualization and foresight, we can exert at least partial control over our own selection environment (Arrow 1962). The process then becomes one of conscious design and tinkering with the cultural evolutionary process rather than passive response to externally determined biological criteria. How does this process work and what are its limits? Devising policy instruments and identifying incentives that can translate foresight into effective modifications of short-run cultural evolutionary dynamics is a key research challenge. In cultural evolution, we have the unique potential to first envision our goals and then modify the cultural selection criteria in order to achieve them (Costanza et al. 1993, 2000).

Low's book provides a solid basis for addressing these and countless other questions that are critical to understanding human sexual behaviors. But understanding how cultural evolution works and how it interacts with biological evolution in determining human behavior is still an elusive and increasingly important target.

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References cited

Arrow K. 1962. The economic implications of learning by doing. Review of Economic Studies 29: 155–173.

Costanza R, Wainger L, Folke C, Mäler K-G. 1993. Modeling complex ecological economic systems: Toward an evolutionary, dynamic understanding of people and nature. BioScience 43: 545–555.

Costanza R, Daly H, Folke C, Hawken P, Holling CS, McMichael AJ, Pimentel D, Rapport D. 2000. Managing our environmental portfolio. BioScience 50: 149–155

Ehrlich PR. 2000. Human Natures: Genes, Cultures, and the Human Prospect. Washington (DC): Island Press.