

perceptions of infidelity are so intertwined suggests that sex differences in aggression are rooted in our evolutionary past. Because men and women, by dint of their biology have historically faced different adaptive challenges to reproductive success, those who inherited the most effective sexual strategies (e.g., Buss 1998) would be better equipped to effectively reproduce. It seems that one strategy for differentially improving reproduction includes sex-specific risky-behavioral tendencies, with women focusing on low-risk forms of aggression and males focusing on high-risk forms of aggression.

Standards of evidence for designed sex differences

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Aaron Sell

Department of Psychology, University of California, Santa Barbara, Santa Barbara, CA 93106-9660.

sell@psych.ucsb.edu

<http://www.psych.ucsb.edu/research/cep/grads/Sell.html>

Abstract: At the heart of the debate between social role theorists and evolutionary psychologists is whether natural selection has designed the minds of the sexes differently to some interesting extent. In this commentary I describe the standards of evidence for both the positive and negative claims. In my opinion, Archer has met the standard for designed sex differences in intrasexual conflict.

George Williams argued that natural selection results in three categories of features: adaptations, by-products and noise (Williams 1966). The same classifications hold for sex differences, and the debate between evolutionary psychologists and gender role theorists can be understood as a debate about which of two categories sex differences in aggression falls into. Because Williams was classifying features and not differences in features, some slight translation is necessary.

Evolutionary psychologists tend to think that sex differences in aggression are *adaptive differences*; that is, they are sex differences resulting from adaptations designed differently in men and women by natural selection in response to differing ancestral selection pressures. Non-controversial examples include sex differences in body size and maturation rates. Gender role theorists tend to think of sex differences in aggression as *learned byproducts*, that is, as sex differences that result from learning mechanisms (which were designed by natural selection, of course) that are the same in men and women but create differences because of differential input. Non-controversial examples of this would be sex differences in car seat settings and fear of prostate cancer. Finally, there are *arbitrary differences*: these are sex differences that result from accidents of history and are not designed by natural selection but also do not stem from learning mechanisms in ways that lead to sensible outcomes. Non-controversial examples would be sex differences in styles of dress, the spelling of names (e.g., Aaron vs. Erin), and culturally agreed upon color symbols (e.g., pink for girls, blue for boys).

The standard of proof for adaptive differences is parallel to those for adaptations. One has to show evidence of complex functional design, geared toward solving an adaptive problem that acted differently on the sexes. Archer has done this for sex differences in intrasexual aggression. He lays out a complex of features, all of which would result from a differential selection pressure (namely, sexual selection). They include, for males: greater variance in reproductive success, greater size and strength, longer maturation times, higher mortality and male-biased conception ratio. I would add that physical differences in size and strength are also supplemented by sex differences in basal metabolic

rates (Garn & Clark 1953), heart size, heat dissipation, hemoglobin, muscle-to-fat ratio, and bone density (Lassek & Gaulin, in press). Across all those variables the sex difference is in the direction of males being designed for physical aggression. Additionally, boys prefer rough-and-tumble play, a type of activity that is understood by evolutionary biologists to be practice for future combat (Symons 1978). This last point is particularly important because of the overwhelming evidence that sex differences in rough-and-tumble play are not caused by societal expectation. Girls born with congenital adrenal hyperplasia (CAH) as well as progesterin-induced hermaphroditism (PIH) are typically raised as girls, and genetically *are* girls, but experience some heightened organizing effects of androgens during development. As a result, they engage in more boy-like play patterns, including rough-and-tumble play (Daly & Wilson 1983). All of these coordinated features, each in the predicted direction, provide powerful evidence that natural selection designed males and females differently when it comes to aggressive tendencies.

The evidence required to put sexual differences in aggression in the category of *learned byproducts* is as follows: (1) identify the adaptation (or adaptations) that aggressive differences result from, and (2) demonstrate why, as a byproduct of their design, those adaptations would lead to sex differences. Gender role theorists have taken steps in these directions, specifying that evolved physical differences in strength and size coupled with a cost-benefit analysis mechanism (and more traditional socialization mechanisms) will produce differences in aggressive tendencies (Wood & Eagly 2002). As Archer points out, however, the data are stacked against this theory. He mentions that aggression's developmental trajectories are inconsistent with socialization theory, and the role of testosterone and operational sex ratio are difficult for gender theorists to explain. The data from CAH and PIH girls also contradicts the idea that gender roles lead to differential aggression, as the girls generally maintain a female identity even while increasing their aggressive play. Finally, from a theoretical point of view, one has to ask why natural selection would have selected genes that created sex differences in body size and strength if males and females were aggressing at equal rates.

With regard to intersexual aggression, it is important to keep in mind that similarities between men and women on broad measures of aggression can hide sex differences in particulars. For example, men and women have similar rates of spousal homicide that are motivated by sexual jealousy, but it was *male* jealousy that resulted in both the killing of husbands, usually in defense, and wives, usually out of jealous anger (Daly & Wilson 1988). As Archer says, both evolutionary and social role perspectives predict that spousal aggression should vary with the relative power of the individuals. The question remains, however: Which perspective will be most useful for predicting and explaining currently unknown features of mate-directed aggression? By studying selection pressures and how they work, evolutionary biologists have been able to account not only for the origin of biological complexity, but the origin of sexual reproduction itself (Tooby 1982), the origin of sexes (Parker et al. 1972), the existence of maturation and senescence (Williams 1957), the origin of aggression (Maynard Smith & Price 1973), its major causes (Huntingford & Turner 1987), the existence and function of aggressive displays (Alcock 1998), the magnitude and constituent features of sexual dimorphism (Daly & Wilson 1983), and sexual differences in aggressive tendencies, homicide (Daly & Wilson 1988), and rough-and-tumble play (Symons 1978). Finally there is a massive amount of primatological data showing how natural selection has designed males and females of other species in ways consistent with the differing adaptive problems they faced ancestrally (Smuts et al. 1987). With all that in mind, it seems likely that natural selection played some important role in the differential design of male and female minds, particularly in domains defined by differential selection pressures such as aggression.