

disapproval of direct aggression to other women is lessened, and beliefs about acceptable behavior for women are altered accordingly. In modern professional life, the costs of physically aggressing to a coworker are likely to be high, so that indirect aggression – which entails lower direct costs – will be used (Björkqvist et al. 1994; Rutter & Hine 2005). In this context, beliefs about what is acceptable behavior for men are altered. These examples involve influences that tend to reduce the sex difference, but there are other influences, such as the culture of honor (sect. 2.8), that increase it.

Sex differences in aggression between partners can also be viewed as following the immediate costs and benefits operating in particular social environments. Here the benefits will be control of the partner's behavior, rather than resource or status acquisition as is the case for within-sex competition. The main evolutionary model covering aggression between sexual partners (Clutton-Brock & Parker 1995) involves compliance by the physically weaker sex as a result of force by the stronger sex. This situation, which arises from sex differences in size and strength, has been viewed as forming the evolutionary origin of patriarchal beliefs (Smuts 1995), which will in turn legitimize, accentuate, and to some extent control, men's violence against their partners. The legitimacy of "wife beating" (Campbell 1992) is a feature of patriarchal societies (e.g., El-Zanty et al. 1995). Cultural attitudes associated with patriarchal values have undergone socially induced changes in Western nations, particularly over the last 40 years. These attitudinal changes have led to changes in the cost-benefit contingencies involved in partner violence. There are strong negative reputational costs attached to male violence towards women (Felson 2002), and when female victims have recourse to legal and social sanctions against violent men, female victimization decreases, and the level of male victimization increases (Archer 2006a).

Overall, the evidence indicates a different operation of evolutionary and social forces according to the sex of the opponent. Sexual selection provides the more comprehensive explanation for same-sex aggression, and a mix of evolutionary conflicts of interest and social roles for between-sex aggression. The sexual selection account presented here for same-sex aggression incorporates both consideration of context-dependent variations in behavior and the operation of social roles. In this account, the proximal causes of social roles are viewed as being derived from a complex interaction between innate dispositions, social development, and context-dependent reactions. Social roles feed back into this process, affecting the contingencies influencing behavior. They are not viewed as guiding the process, as in social role theory (Eagly et al. 2004, p. 270). They have their ultimate origins in evolutionary history, one that involves a sexually selected adaptive complex, containing psychological dispositions as well as the physical sex differences emphasized in Eagly and Wood's biosocial theory.

ACKNOWLEDGMENT

I thank Alice Eagly and Derek Heim for helpful comments on earlier drafts of this article.

Correspondence should be addressed to John Archer, School of Psychology, University of Central Lancashire, Preston, PR1 2 HE, Lancashire, UK [e-mail: jarcher@uclan.ac.uk].

NOTES

1. Based on the features they have in common, Archer and Coyne (2005) concluded that the earlier term "indirect" and the later term "relational" aggression refer to the same activities, and sex differences are similar whichever term is used. I therefore use the original term "indirect" in this article.

2. Dawkins and Carlisle (1976) pointed out that emphasis on past investment determining which sex would desert involved the "sunk cost" fallacy, the crucial variable being the replacement cost of deserting. However, past investment usually provides an indication of the future investment needed to produce offspring to the same stage as those that were lost.

3. Wood and Eagly's use of the term "biosocial" differs from the typical use of this term, which is to refer to an approach that is specifically concerned with how genes and environment interact in development (e.g., Raine et al. 1997).

4. In these and all the studies of children mentioned in this article, play-fighting ("rough and tumble play") is excluded from consideration, and has been studied separately, since it is motivationally distinct from physical aggression (Blurton Jones 1972; Boulton 1994).

5. If it were the case that men were answering with other men in mind and women with their male partners in mind, we should expect a standardized difference for general questionnaires that is mid-way between the values where the sex of the opponent is specified. It is not. This deduction needs to be tested directly in future studies by asking respondents which sex of opponent they had in mind when completing the questionnaire.

6. In simple hunter-gatherer societies, the rates of within-group aggression are relatively low (Knauft 1991), although rates of between-group aggression may be high (Wrangham et al. 2006).

7. GEM is a national-level variable derived from a combination of: (1) the proportion of women in managerial, administrative, professional, and technical posts; (2) their share or earned income; and (3) their parliamentary representation.

8. These analyses are now contentious since a reanalysis controlling for income, latitude, and region found that mate preferences were then unrelated to gender empowerment (Gangestad et al. 2006a). Eagly and Wood (2006) argued that by controlling for these, variables closely related to the equality of the sexes were removed. However, these variables are not conceptually related to women's empowerment, and consequently they can more reasonably be interpreted as ecological variables influencing mate choice (Gangestad et al. 2006b).

Open Peer Commentary

Ultimate and proximate influences on human sex differences

doi:10.1017/S0140525X09990483

Drew H. Bailey, Jonathan K. Oxford, and David C. Geary

Department of Psychological Sciences, University of Missouri, Columbia, MO 65211.

dhbd45@mizzou.edu jkoc52@mizzou.edu GearyD@missouri.edu
<http://web.missouri.edu/~gearyd/>

Abstract: We agree with Archer that human sex differences in aggression are well explained by sexual selection, but note that "social learning" explanations of human behaviors are not logically mutually exclusive from "evolutionary" explanations and therefore should not be framed as such. We discuss why this type of framing hinders the development of both social learning and evolutionary theories of human behavior.

Debate regarding the origins or even existence of sex differences began with Darwin's (1871/1901) seminal contribution and continues to this day. Denials of so-called biological influences on sex differences are less common than they once were, but arguments that such influences are trivial in relation to social-psychological ones are common (Hyde 2005). Evaluations of the relative influence of these mechanisms often pit "evolutionary" against "social learning" explanations (e.g., Wood & Eagly 2002). Archer proposes that, "the magnitude and nature of sex differences in aggression, their development, causation, and variability, can be *better* explained by sexual selection than by the *alternative* biosocial version of social role theory" (target article, Abstract; emphasis added). We argue that Archer's review, along with many previous contributions to this debate, assume, either implicitly or explicitly, that sexual selection and social learning are *alternative* explanations – but in fact, they are not necessarily so.

Progress in our understanding of evolutionary and social learning influences on expressed sex differences is hampered by mutually exclusive contrasts of these classes of theories. By focusing on proximate mechanisms and implicitly assuming these are alternatives to an ultimate mechanism, social learning researchers prevent themselves from integrating ultimate level influences on human behavior, including the capacity to socially learn, into their models. Understanding evolutionary influences on social learning can inform evolutionary and social learning researchers alike (e.g., Öhman & Mineka 2001). Furthermore, evolutionary researchers who view social learning as an alternative to evolutionary theory might be missing many nuances in the ways in which evolved biases can be expressed in our species, and the evolved mechanisms that enable this variation in expression. We agree with many of Archer's concerns about the social roles model of sex differences in intrasexual aggression, and agree that sexual selection provides a very powerful and parsimonious explanation, and that the social roles model struggles on many dimensions. However, we ask Archer and others to reframe these arguments in terms of explicitly stated ultimate and proximate mechanisms. Sexual selection is necessary, in our view, for a complete understanding of the sex differences in intrasexual aggression but does not provide sufficient explanation for the variation in how men's competitive dominance-striving and behavioral aggression is expressed.

Intrasexual, male-male competition is found throughout the world, but the ways in which it is expressed can differ substantively from one culture or historical period to the next. Irons' (1979) concept of cultural success allows us to understand how ecology, cultural history, and current conditions influence how men express an evolved desire for status vis-à-vis other men. Pastoral raiders who steal another tribe's cattle to pay bride price and Wall Street raiders who seek hostile takeovers of competitor's companies may seem different on the surface, but they are not: Each of these activities is an expression of men's desire for control of the resources that affect their reproductive prospects and general well being in their culture. A Wall Street raider does not, of course, need that extra \$10 million to attract a bride or live well, but as long as there are other raiders who make more than he does, our ambitious raider will continue the struggle.

This said, we agree with Archer, that male-on-male behavioral aggression is a manifestation of our evolutionary history, and reflects a motivation to achieve social dominance and cultural status at a proximate level. But even the clearest indicators of an evolutionary history of male-male competition – the sex differences in physical size, other physical traits, and behavioral aggression – are expressed in more ways than are found in other species (Geary 1998).

Because they represent different levels of analysis, different types of data would be required to falsify hypotheses based on social learning and sexual selection. To falsify a social learning model, one would need to assess the proposed proximate

mechanisms, not contrast the model with one that focuses on ultimate mechanisms. As one example, boys and girls who were not exposed to their respective "social roles" should not be as sex-typed as their same-sex peers who were exposed to these roles. One type of evidence comes from children of parents who discourage sex-typing. These children have less sex-typed explicit beliefs about sex roles, in keeping with a social learning component, but have the same toy and play preferences as other children, inconsistent with a causal link between this knowledge and behavioral sex differences (Weisner & Wilson-Mitchell 1990). Male-typical behaviors in biological males raised as girls (Colapinto 2001; Reiner & Gearhart 2004) are especially difficult to reconcile with a strict social learning model of gender development.

These results and others (e.g., Berenbaum & Hines 1992) suggest sex-typed activities are influenced by prenatal exposure to androgens, a proximate mechanism in the expression of sexually selected traits. Boys' attraction to karate and baseball are consistent with male-male competition, but the fact that they are culturally specific variations of one-on-one and coalitional male-male competition suggests some forms of proximate social learning mechanisms are operating. Like Archer, we do not believe these mechanisms are the same as those identified in the social roles model. Rather, the activities that capture children's attention and that they wish to engage in, or not, are influenced by prenatal exposure to androgens, but the specifics of these activities (e.g., ice hockey) depend on exposure and the opportunity the activity affords for the expression of physical and social dominance and the formation of male coalitions (Geary et al. 2003).

In short, we believe that Archer is correct in his conclusions that male-male aggression is well explained by sexual selection and poorly explained by social roles. Our point is that by framing the argument in terms of evolutionary mechanisms versus social learning mechanisms, Archer and many others miss the opportunity to integrate these different levels of explanation. What are the proximate attentional, cognitive, motivational, and social learning mechanisms that enable boys and men to engage in sexually selected intrasexual competition in so many creative and varied ways?

Does sexual selection explain why human aggression peaks in early childhood?

doi:10.1017/S0140525X09990471

Christina Behme

Department of Philosophy, Dalhousie University, Halifax, Nova Scotia B3H 4P9, Canada.

Christina.Behme@dal.ca

Abstract: Archer provides seemingly compelling evidence for his claim that sexual selection explains sex differences in human aggression better than social role theory. I challenge Archer's interpretation of some of this evidence. I argue that the same evidence could be used to support the claim that what has been selected for is the *ability to curb* aggression and discuss implications for Archer's theory.

Before turning to the main point of my commentary I want to note that Archer's definition of sexual selection as involving "the choice of members of one sex by the other, and competition by members of one sex for access to the other" (target article, sect. 2.1.1) is not uncontested. Archer does not acknowledge, let alone resolve, the controversies surrounding historic and contemporary accounts of sexual selection (e.g., Andersson 1994; Cornwall & Perrett 2008; Cronin 1991; Darwin 1871/1901; Hubbard 1990; Johnstone 1995; Kirkpatrick & Ryan 1991; Leonard 2005; Miller 2006; Roughgarden et al. 2006; Stamos 2008; Wade &