

SPECIAL REPORT

Why are males injured more than females?

J Richard Udry

Everybody who works in the field of injuries knows that after infancy, and before old age, males engage in more behavior that exposes them to the risk of injury, experience more injuries, and die more frequently from injuries. For example, in the US, among 15 to 19 year olds, males are 2.5 times as likely as females to die of any unintentional injury, and about five times as likely to die of homicide or suicide. The sex difference is most pronounced in drowning, where males are more than 10 times as likely to die as females of the same age. No category of injury, and hardly any risk behavior fails to show the higher male rate. The same is true for all countries that keep such statistics.

Why is this so? (Bear with me. I'm sure you already know the answer.) The usual answer of both specialist and layman is that the socialization process leads males, from the time they are little boys, to engage in more risky behavior than females, and to be supervised less by someone who might protect them from risk. This explanation is the only one available under our present gender theory. Derived from the social sciences, prevailing gender theory attributes all sex differences in behavior to differential socialization and differential normative constraints.

This theory provokes certain puzzling comparisons. Observations made on other primates, and even other mammals, show the same sex differences in injury and death-by-injury patterns. In fact primates show overall patterns of sex differences in behavior that are surprisingly parallel to those of humans. For example, juvenile rhesus monkeys show the same differences in toy preferences by sex that human children show at age 3, when tested with human toys such as balls, dolls, and trucks. Harlow showed four decades ago that juvenile rhesus monkeys show the same sex differences in rough-and-tumble play and aggressive behavior that human children do.

At this point we can look for reconciliation in one of two directions. We can use a different theory for humans than for other primates. The two theory route works best if we abandon evolutionary models for humans and opt for special creation. For humans the cause is gender socialization. For other animals the cause is fundamental biological sex differences.

Or we can try to fit our human gender theory to non-humans. Actually it doesn't sound like such an outlandish idea for chimpanzees. Female chimp children stay close to their mothers, while male toddlers wander, get into

fights, and do other dangerous things. This occurs because their mothers are saying to the little girl chimps, "it's OK for your brother to do that, but nice little girl chimps don't, etc." Even for lions we might imagine that boy lions use their fathers as role models, while girl lions, etc.... For chickens this argument begins to be a stretch. A few readers may feel that perhaps the socialization model of sex differences doesn't fit other animals very well.

Yet psychological researchers have shown us for years that theories of socialization and parental modelling of sex differences don't fit humans very well either. Maccoby and Jacklin concluded that "socialization pressures, whether by parents or others, do not by any means tell the whole story of the origins of sex differences".¹ For example, children do not resemble their same sex parents to any greater degree than they resemble adults of the same sex generally. But the currently prevailing theory of sex differences in the social sciences was never based on scientific observation.

Maybe what we need to do is to keep the human socialization models for us alone, and go with a biological theory to explain sex differences in other animals. This strategy leads us deep into commitment to creationism.

There is already a fine theory for sex differences in behavior among mammals, including primates. This theory has been shaping up for a thousand years. In its primitive form it says that there is something about the testicles of a bull that makes him behave differently from a cow. In its modern form, the details of the primate theory are well specified.

For primates, the theory goes something like this. (For other animals the timing and the details are different variations on the same general model.) In mid-gestation, the testes of the male fetus produce huge quantities of testosterone. The testosterone not only masculinizes the genital anatomy, but also permanently masculinizes the brain. Female fetuses do not experience this, and in the absence of testosterone they develop as females, with female brains. As juveniles, the sex hormones of maturity further distinguish the biology of the sexes. Thirty years of experimental data confirm that it is the prenatal sex differences in hormone experience and the subsequent actions of adult hormones on this prenatal foundation that are responsible for almost all sex differences in the behavior of primates. Detailed experiments show it is possible to change

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the sex dimorphic behaviors (and only the sex dimorphic behaviors) through altering the timing and dosage of prenatal hormone exposure, without affecting the genitalia at all. For example, female monkeys whose mothers were treated with testosterone during pregnancy later exhibit rough and tumble play more similar to males than to untreated females.² Not surprisingly, primate and human reproductive biology are quite alike.

Scientists prefer theoretical parsimony, and would rather not have two theories if one will do. How does the primate theory work on humans as an explanation of our sex dimorphic behavior? Actually, rather well. Using clinical samples of humans with unusual prenatal hormone experience, together with appropriate control groups, consistent relationships predicted by the primate theory have been found between differences in prenatal hormone experience and differences in gendered behavior. My own recent work has shown that on samples of normal women, we can make good predictions of their degree of adult masculinity/femininity using measures of prenatal and adult hormone exposure alone.³

Fortunately, we can integrate the biological and the hormone theory rather than discard one. If the primate theory holds for humans, this does not mean socialization is irrelevant in shaping human sex differences, but only that socialization is built on a biological foundation that already predisposes male and female humans to different behavior. International sex socialization differences may explain international variation in how big the sex difference is in particular injury rates, or changes in these differences over time, but they won't explain the universal sex differences in the first place. An integrated theory holds that societies build gender roles on the observed differences in the natural behavior predispositions of the sexes, elaborating to greater or lesser degree the differences nature provides.

Maybe now is the time to entertain a change in our theories, and join the primate clan. Boys get injured more than girls, not because of their parents' benighted encouragement or even callous indifference to boys' recklessness, but in spite of their parents' best efforts to protect them.

The best argument for sticking with our old theories is that a new theory introduces a slippery slope. Once having admitted kinship with primates, and accepting a biological explanation for sex differences in human behavior that cause injury and deaths from injury, we can't stop there. Next comes the sex difference in aggressiveness, violence, crime, sexual behavior, occupational preferences, personality, disease, infant care.

Yes, we will have to accommodate these sex difference by acknowledging the biological basis of most of them.

What are the policy implications of the "new" theory? (I call it a new theory because it should replace the current prevailing theory. Actually, before the present century, no one doubted the biological basis of human sex differences.) Should we say about males, "let them get injured—it is biological, and nothing can be done about it"? Only a social scientist would conclude this. Social wisdom has always known that many people are naturally predisposed to do things we preferred they not do, including injuring themselves and others. We know plenty of ways to reduce injury rates for everyone by creating a safer environment. But this strategy will still leave males with higher injury rates.

1 Maccoby EE, Jacklin CN. *The psychology of sex differences*. Standord, CA: Standord University Press, 1974:382–3.

2 Goy RW. Experimental control of psychosexuality. *Philosophical Transactions of the Royal Society of London B* 1970;259:149–62.

3 Udry JR. The nature of gender. *Demography* 1994;31:561–73.

Notice

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