A Test of an Evolutionary Hypothesis of Violence Against Women: The Case of Sex Ratio

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A low sex ratio, where there are fewer men than women, has been associated with increasing rates of men's same-sex aggression. This is surprising, given the relative surplus of mates and presumably lowered mate competition in low sex ratio societies. Two competing hypotheses—a "culture of violence" hypothesis and a functional, evolutionary hypothesis—may account for this finding. The current research tests which of these hypotheses explains another facet of men's aggression—violence against women. Correlations supported an evolutionary perspective of violence against women: higher sex ratio societies, where women are scarce, were significantly more likely to be tolerant toward rape and were significantly more likely to aggress against wives. These results suggest refinement of a culture of violence perspective. They also replicate and extend previous research on sex ratio imbalances and men's aggression toward women.

Introduction

Following the principle of supply and demand, when women are scarce, men are predicted to compete more intensely over mates (e.g., Guttentag & Secord, 1983; Pedersen, 1991; Schmitt, 2005). Mounting evidence suggests that, as far as men's same-sex aggression goes, the pattern is instead the opposite: societies with an excess of women are related to higher rates of collective aggression (i.e., warfare; Ember, 1974) as well as men's same-sex individual aggression (homicide and assault; Barber, 2000; Barber, 2009; Lim, Bond, & Bond, 2005). Given that men commit more than 90% of homicides (Daly & Wilson, 1988), it seems surprising that societies with more men than women are less violent.

Societies at war, which are associated with an excess of women (Ember, 1974), are also societies that socialize for increased interpersonal violence (Ember & Ember, 1994), suggesting a possible explanation for this conundrum. Warfare, socialization for aggression in boys' late childhood, as well as mothers sleeping closer to babies, accounted for 80% of the variance in homicide and assault rates in an analysis of nonstate societies (Ember & Ember, 1994). Additionally, measures of individual aggression—homicide, assault, theft, and trespass—were inter-correlated (Ember & Ember, 1994), suggesting that warring societies may be more violent due to socialization for warriors. Thus, this counterintuitive relationship between an excess of women and men's interpersonal violence may be an artifact of the warring that causes a decrease in numbers of men.

If so, warfare and its accompanying socialization for aggression should explain the frequency of violence against women, too. An alternative explanation for men's aggression is that it serves an evolutionary function. Men's same-sex aggression is often associated with status and may serve as a barometer of mating competition (Daly & Wilson, 1988). Thus, an excess of women may be related to men's same-sex aggression because there's an excess of mating opportunities (e.g., Kokko & Jennions, 2008; Schacht, Rauch, & Borgerhoff Mulder, 2014). Violence against women likely serves a different purpose, however: associated with sexual jealousy, it may serve to keep a mate from straying (Shackelford, Goetz, Buss, Euler, & Hoier, 2005; Wilson & Daly, 1993)—a function of extreme importance for men in societies where women are scarce.

Thus, the purpose of this study is to investigate whether variation in rates of violence against women is better predicted by warfare, supporting a "culture of violence" hypothesis, or by sex ratio—the number of men per 100 women—supporting an evolutionary perspective of men's aggression against women. A scarcity of women (a high sex ratio) has been associated with female homicide victimization (Avakame, 1999) and intimate partner violence (D'Alessio & Stolzenberg, 2010) in the U.S., and with intimate partner violence in India (Bose, Trent, & South, 2013). This research will test whether this pattern extends cross-culturally to small-scale, nonstate societies.

Culture of Violence Hypothesis: Societies at war may socialize their children to be aggressive due to a need to produce courageous warriors. War may also directly affect interpersonal violence rates by legitimizing violence toward men and women. Data will support this hypothesis if measures of violence against wives (wife beating) or sexual aggression against women (rape) correlate positively with frequency of overall warfare.

Functional Violence Hypothesis: Men's violence against women serves, in part, to retain his mate and prevent infidelity. Data will support this hypothesis if men's aggression toward women correlates positively with men's need to retain a mate—i.e., in high sex ratio societies where women are relatively scarce.

Method
Sample
To test these hypotheses, this study used codes from the Standard Cross-Cultural Sample, which consists of 186 societies representative of the variation in the ethnographic record (Murdock & White, 1969). I used this sample because of the generalizability of the results given the diversity of cultures and the availability of relevant codes published by previous investigators.

Codes and Variables
The majority of codes derive from World Cultures, a journal that publishes articles and databases of cross-cultural research. Because frequencies and rates are rarely reported in ethnographies, most data are ordinal—coded as low, moderate, or high. Available data vary for each measure, because some societies are missing data on sex ratio, for example. In some cases, the cross-section between available data is low; that is, some societies report sex ratio, others report the frequency of wife beating, but fewer of them report both. I list the sample size for each analysis in the Results.

Broude & Greene (1976) coded variables regarding the frequency of rape and the culture's attitude toward it as reported in ethnographies. Frequency of rape was coded as 1 = absent; 2 = rare, isolated cases; 3 = common, not atypical. I included the society's attitude toward rape as an additional test: within a culture of violence, sexual assault may be viewed as relatively acceptable. This variable was coded as 1 = accepted, ignored; 2 = ridiculed; 3 = mildly disapproved, token fine or punishment; 4 = strongly disapproved, severe punishment (e.g., severe whipping, exile, death). Note that it is coded such that increasing values indicate greater intolerance of rape.

Broude & Greene (1983) coded the frequency of wife beating. This was recorded as either 1 = present or 2 = absent. Earlier (Broude & Green, 1976), they note the difficulty in coding variables dichotomously (because although presence of a phenomenon is easy to establish in an ethnography, its absence is not), and erred conservatively by only marking the absence of a variable if this is explicitly stated by the ethnographer.

Ember & Ember (1992) provide interval data on sex ratio ($n = 60$). I also used their codes for overall frequency of warfare, defined as socially organized armed combat between members of different territorial units (e.g., communities). Frequency of warfare was coded by two coders as either: 0 = no resolved rating (between the coders); 1 = warfare seems to be absent or rare; 2 = warfare seems to occur once every three to ten years; 3 = warfare seems to occur at least once every two years; 4 = warfare seems to occur every year, but usually only during a particular season; 5 = warfare seems to occur almost constantly and at any time of year; 8 = don't know or unclear. Please see Ember & Ember (1992) for details on how their coders resolved ratings and for reliability data. After I excluded those cultures with no resolved rating and where the frequency of war was unclear (i.e., societies scored as 0 and 8), there were a total of 54 societies with sex ratio data. Appendix lists the societies used in each analysis.

Results
Preliminary analyses identified two statistical outliers with sex ratios greater than 3 standard deviations above the mean ($M = 103.89$, $SD = 20.51$): the Somali sample (166.7) and the Yanomamo (184.6). I did not include these outliers in subsequent analyses because their extreme number of males relative to females likely manifests uniquely, perhaps in their notorious levels of violence (e.g., Chagnon, 1988). This suggests they represent distinct cases to be explained, and though this is standard procedure for outliers deemed unique (Tabachnick & Fidell, 2013), future research should seek to explain their circumstances.

Frequency of warfare correlated negatively with sex ratio ($r = -.26$, $p < .05$, $n = 52$) indicating societies with fewer men engage in war more often, replicating previous research (Ember, 1974). Neither the frequency of rape ($r = .23$, $p > .05$, $n = 8$) nor wife beating ($r = .06$, $p > .05$, $n = 25$) was correlated with warfare. Society's intolerance of rape was correlated significantly positively with warfare ($r = .49$, $p < .05$, $n = 14$), indicating that warring societies are less tolerant of rape—contrary to the Culture of Violence Hypothesis. Sex ratio correlated significantly negatively with a society's intolerance toward rape ($r = -.52$, $p < .05$, $n = 14$), and significantly positively with the presence of wife beating ($r = .54$, $p < .01$, $n = 25$)—indicating high sex ratio societies, with a shortage of women, are associated with permissive attitudes toward rape and with violence toward women. Sex ratio was marginally significantly correlated with the frequency of rape ($r = .64$, $p < .10$, $n = 8$).

Discussion
Contrary to the Culture of Violence Hypothesis, societies that engage in frequent warfare were not associated with men's increased violence toward women. Indeed, warring societies were associated with a greater intolerance of rape, in direct contradiction to the Culture of Violence Hypothesis. If a culture of violence explains men's increased same-sex aggression when there is an excess of women, the results of this study indicate this Hypothesis must be refined. Boys in warring, lower sex ratio societies must, then, only be socialized for increased aggression toward other men. Additionally, the current finding that warring societies are intolerant of rape may be related to the phenomenon wherein successful warriors rape the defeated group's women (e.g., Chagnon, 1988). Perhaps societies engaging in frequent warfare compensate for this risk by discouraging rape of women in their own society.

As predicted by the Functional Violence Hypothesis, wife beating, as well as tolerance towards rape, increased with a scarcity of women—that is, they increased as men's need to retain a mate increased. The small sample size is a limitation of this dataset, and might lower our confidence in the results, except that these findings replicate previous within-society analyses of sex ratio and men's violence toward women (Avakame, 1999; Bose, et al., 2013; D'Alessio & Stolzenberg, 2010). Thus, although these data are themselves too few to be definitive, they are consistent with other studies, and their value lies in extending analyses to the broadest range of human cultural variation possible. These data suggest a widespread, universal pattern. Further, the lack of support for the Culture of Violence Hypothesis in this study corroborates the results

of another analysis finding that women's victimization was unrelated to overall rates of violent crime (Archer, 2006). In sum, these results are consistent with the hypothesis that men's aggression serves an evolutionary function, however abhorrent—whether it be increased violence toward women in high sex ratio societies, or increased same-sex violence in low sex ratio societies.

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