



## Original Article

## Historical and experimental evidence of sexual selection for war heroism

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## ABSTRACT

We report three studies which test a sexual selection hypothesis for male war heroism. Based on evolutionary theories of mate choice we hypothesize that men signal their fitness through displaying heroism in combat. First, we report the results of an archival study on US-American soldiers who fought in World War II. We compare proxies for reproductive success between a control sample of 449 regular veterans and 123 surviving Medal of Honor recipients of WWII. Results suggest that the heroes sired more offspring than the regular veterans. Supporting a causal link between war heroism and mating success, we then report the results of two experimental studies ( $n$ 's = 92 and 340). We find evidence that female participants specifically regard men more sexually attractive if they are war heroes. This effect is absent for male participants judging female war heroes, suggesting that bravery in war is a gender specific signal. Finally, we discuss possible implications of our results.

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## 1. Introduction

Although frequency and scale of warfare under ancestral conditions are still subject to scientific debate (Fry & Söderberg, 2013; Keeley, 1996), evolutionary scientists have presented arguments that many aspects of human social behavior might be products of a deep evolutionary history of deadly intergroup conflict in humans (Alexander, 1987; Mathew & Boyd, 2011, 2014; Rusch, 2014a; van Vugt, de Cremer, & Janssen, 2007; Wrangham & Glowacki, 2012; Wrangham & Peterson, 1996). Selection pressures entailed by frequent intergroup conflict—which we define as coalitional aggression and defense against out-groups—may have selected, for instance, for such vicious social traits as out-group prejudice, xenophobia and dehumanizing out-groups, but also for virtuous social traits such as altruism, self-sacrifice, bravery, and heroism (Alexander, 1987; Bowles, 2009; Browne, 1999; Choi & Bowles, 2007; Lehmann & Feldman, 2008; Mead & Maner, 2012; Rusch, 2013; van Vugt, 2009). So far, at least two important questions remain unanswered about the origins, evolution, and psychology of intergroup aggression.

The first question is which selection mechanisms are responsible for producing a suite of cognitive and behavioral adaptations for intergroup aggression and the display of heroic behaviors in combat. Previous theories have mainly focused on either individual (Lehmann & Feldman, 2008; Mathew & Boyd, 2011, 2014; Tooby & Cosmides, 2010) or group selected fitness benefits (Bowles, 2006, 2009; Choi & Bowles, 2007)

resulting from partaking in intergroup aggression (also see de Dreu, Balliet, & Halevy, 2014; Rusch, 2014b).

The second question is why intergroup aggression, at least in humans, is almost exclusively the domain of men, as historical evidence shows (Archer, 2004; Goldstein, 2001, 2002; Keeley, 1996). Relative to women, not only do men participate more often in intergroup aggression, but they are also more supportive of warfare as a solution to international conflict in opinion polls, hold stronger tribal and parochial attitudes, make more unprovoked attacks in simulated war games in the laboratory, and contribute more to public goods when there is an intergroup threat (Chang, Lu, Li, & Li, 2011; van Vugt, 2009). This gendered difference in intergroup aggression has been dubbed the ‘male warrior hypothesis’ (Johnson et al., 2006; McDonald, Navarrete, & van Vugt, 2012; Sell et al., 2009; van Vugt et al., 2007).

Here, we suggest that heroism in warfare—i.e., voluntarily taking disproportionately high risks to act to the benefit of fellow in-group combatants, including displays of aggression towards members of out-groups as well as altruism towards in-groups—may be a sexually selected trait. In short, intergroup conflict offers an arena for men (but not for women) to show off their physical strength, courage, and leadership skills both to same sex rivals (intra-sexual selection) as well as to members of the opposite sex (inter-sexual selection)—here we focus on the latter. Our argument integrates various well-established theoretical perspectives on human evolution, including sexual selection theory, parental investment theory, and costly signaling theory (Buss & Schmitt, 1993; Darwin, 1871; Trivers, 2006; Zahavi, 1975). Importantly, our argument is able to explain why intergroup aggression is almost exclusively the domain of men.

How can men, but not women, use intergroup aggression to signal their qualities as a mate? Sexual selection theory assumes that humans

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have evolved to (a) signal attractive mate qualities to members of the opposite sex, and (b) pay attention to honest signals from the opposite sex. Thus, both men and women pay specific attention to traits conveying the genetic quality of potential mates. Yet, according to parental investment theory, men and women may be looking for somewhat different traits in potential mates (Roberts & Little, 2008; Trivers, 2006). In looking for mates, men pay more attention to cues of youth and fertility in women, whereas women pay more attention to cues of status, dominance, altruism and commitment in men. Women who pursue short-term sexual liaisons have been found to find men with masculine faces, strong upper bodies, and dominant personalities more sexually appealing, whereas for long-term relationships they seek out males with provisioning qualities (Barber, 1995; Buss & Schmitt, 1993; Kelly & Dunbar, 2001; von Rueden, Gurven, & Kaplan, 2011).

A sexual selection perspective thus suggests that men have evolved a psychology to obtain such desirable mate qualities and to signal to women that they possess these traits. We believe that one domain in which they can signal many of these desirable qualities is through participating in coalitional conflicts with other groups, i.e. warfare. Our argument is that by showing heroism in intergroup conflict heroic males convey that they are in excellent physical shape and possess outstanding personal qualities (Gangestad & Simpson, 2000; Kelly & Dunbar, 2001). Simply taking part in a war effort may not be a strong enough signal, though, as this participation might also be motivated by prospects of direct individual benefits (Rusch, 2014b) or, particularly under modern conditions, participation might even be mandatory and desertion punished by the in-group (Mathew & Boyd, 2014; Sääksvuori et al., 2011). Displaying heroism in combat and surviving this ordeal, however, may be a reliable and costly signal of someone's outstanding mate qualities as it is an honest signal of outstanding physical and psychological attributes.

Correlational anthropological data already indicate that men's reproductive success is linked to their warrior status. Chagnon, e.g., reports that among the Yanomami, a warrior tribe in the Amazonian rain forest, men who have killed enemies—the “unokias”—have more wives and sire more offspring (Chagnon, 1988; but see Beckerman et al., 2009). Similar observations have recently also been reported for the Nyangatom in East Africa (Glowacki & Wrangham, 2015). Recent evidence from the rural Amazonian community of Conambo in Ecuador shows, furthermore, that the local women there are more sexually interested in male warriors relative to non-warriors (Escasa, Gray, & Patton, 2010). For modern societies, a sociological study among Los Angeles youth boy gangs shows that gang members have more sexual liaisons than same age peers (Palmer & Tilley, 1995; also see Pellegrini & Bartini, 2001; Pellegrini & Long, 2003). Finally, an online dating study found that US soldiers are the second most successful profession to obtain dates, with only highly paid lawyers being more desirable (Hitsch, Hortaçsu, & Ariely, 2010). Given the considerable risks involved and the comparably low salaries of soldiers, this is quite a surprising finding. Yet, it can be understood if we acknowledge that bravery in warfare is a signal that females have evolved to pay attention to. Our study adds to this literature by showing that heroism seems to have had a similar positive effect on the reproductive success of US-American war heroes from WWII and by presenting causal evidence of a context and gender specific preference of contemporary women for male war heroes.

Our research hypotheses are the following: (1) War heroes enjoy greater reproductive success compared to non-heroic regular soldiers. (2) Women find male warriors more attractive, when they display heroism in warfare. (3) Women show increased attraction to male war heroes; but men are not more attracted to female war heroes.

## 2. Three studies on the relation between war heroism and sexual attractiveness

We investigated our hypotheses in three studies, combining both archival data and vignette studies. In study 1, we relied upon an archival

dataset which provides a good test of our hypotheses because of its high ecological validity. We studied the reproductive success of real war heroes, surviving recipients of the US Medal of Honor in World War II, to see if there are indications that war heroes enjoy greater reproductive success than regular soldiers. We complement the correlational findings of the archival study with two follow-up scenario studies. These test whether heroism in war causally affects female preferences in mate choice and whether women and men vary in their mate preferences for war heroes. Considering the significant physical risks involved, we hypothesize that, all else being equal, male warriors are deemed sexually more attractive and female warriors sexually less attractive by the opposite sex (see Campbell, 1999).

### 2.1. Study 1

#### 2.1.1. Materials and methods

To examine the reproductive success of real war heroes, we gathered data on US veterans of WWII (also see Rusch & Störmer, 2015). These include all 464 Medal of Honor recipients (as of September 2013) and 449 regular veterans of WWII. There are various reasons for choosing this sample. First, the time difference between today and WWII is long enough. Accordingly, almost all of the veterans have passed away by now, so that their individual reproductive histories are complete. Second, WWII is recent enough, so that a sufficient number of sources with information on individual biographies are available. Third, much of the reproductive phase of these soldiers falls within the time before contraceptives became publicly available in the early 1960s. However, directly after WWII, the US demography showed a sharp rise in birth rates (the ‘baby boom’). We therefore include the birth years of all soldiers in the following analyses to control for this and other potential cohort effects.

We compare war heroes with regular veterans of WWII. This is a valid control group because a majority of the US-American soldiers of WWII were conscripted to conduct their military service in the war (about 61%; Flynn, 1993), and because a large share of all US-American men aged 18–45 at the time served during WWII. A control group of regular American adult males would potentially introduce a sampling bias, because there may be many different reasons, including health issues (which would affect their reproductive success), why these men did not participate in WWII.

*Heroes sample:* The list of the 464 Medal of Honor recipients of WWII is available from various sources (e.g. [history.army.mil](http://history.army.mil)). We started by collecting all biographical data available online on these soldiers. Most information was gathered from obituaries and newspaper articles. Of the 464 Medal of Honor recipients, though, only 198 survived WWII. Of these 198 surviving Medal of Honor recipients we were able to obtain offspring data for 123 (i.e., 62%).

*Regular veterans sample:* We constructed a reference sample of 449 WWII veterans by searching a huge online database of obituaries, [legacy.com](http://legacy.com), using ‘WWII’ as the search term. Since this search yielded a huge number of results, we conducted 26 refined searches, one for every letter of the alphabet used as the first letter of the last name, and then sampled that veteran from every results page, whose obituary included most biographical information. Using this sampling method, we found information on the number of offspring for all 449 of these individuals.

#### 2.1.2. Results

We use a generalized linear model to analyze the data. The units of analysis are surviving veterans of WWII. The dependent variable is number of offspring, assumed to follow a Poisson distribution. We use a logistic link function. The model consists of intercept, year of birth to control for cohort effects, and a dichotomous grouping variable coding whether the individual received the Medal of Honor (recipient = 1,

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