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SEX DIFFERENCES IN INTERGROUP AGGRESSION AND VIOLENCE: THE MALE WARRIOR HYPOTHESIS

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Abstract

The social science literature abounds with examples of human tribalism, the tendency to categorize individuals on the basis of their group membership and treat ingroup members benevolently and outgroup members malevolently. I argue that this tribal inclination is an evolved response to the threat of intergroup violence and warfare that were endemic in ancestral human environments (and are still common today). Here I hypothesize that intergroup conflict has profoundly affected the social psychology of human males in particular – the male warrior hypothesis -- and present evidence consistent with this claim. I also discuss implications of this hypothesis for managing intergroup relations in our society.

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Alien biologists collecting data about different life forms on Planet Earth would no doubt come up with contradictory claims about human nature. They would witness our capacity to help complete strangers in sometimes large groups yet they would also observe many incidents of extreme violence, especially between groups. To make sense of the data, the alien researchers would probably conclude that humans are a fiercely tribal social species. Some time ago, Charles Darwin speculated about the origins of our tribal nature: "A tribe including many members who, from possessing in a high degree the spirit of patriotism, fidelity, obedience, courage, and sympathy, were always ready to aid one another, and to sacrifice themselves for the common good, would be victorious over most other tribes; and this would be natural selection." (1871, p. 132).[1] Unfortunately Darwin's brilliant insight was ignored for more than a century by fellow scientists, yet it is now gaining impact. Here I offer an evolutionary perspective on the social psychology of intergroup relations, presenting new insights and evidence about human intergroup psychology.

Social scientists are increasingly adopting an evolutionary approach to develop novel hypotheses and integrate data on various aspects of human social psychology.[2-3] The evolutionary approach is based on the premise that the human mind is a product of evolution by natural selection in the same way as human physiology. My field, evolutionary social psychology, proposes that the human mind is essentially social, comprising many functionalized mechanisms to cope with the challenges of group living. One such specialized mechanism is coalition formation. Forming alliances with other individuals confers considerable advantages in procuring and protecting reproductively relevant resources – such as food, territories, mates, or offspring.[4] Coalitional pressures may have led over evolutionary time to the emergence

of some rather unique human traits such as language, theory of mind, culture, and warfare. Some theorists argue that intergroup challenges created pressures on humans to live in larger groups, producing an increase in brain size to make the most of group living.[4-7] According to this hypothesis, our social brain is essentially a coalitional or tribal brain.

In search of the origins of our tribal brain it is useful to make a distinction between *proximate* and *ultimate* causes. An act of intergroup violence (such as a fight between rival gangs or war between two nations) could be explained at two different levels. First, why did this group attack the other? This proximate question interests most sociologists, political scientists, historians, and social psychologists. Second, one could ask why humans have evolved this apparent tendency to engage in intergroup aggression – this ultimate question interests many evolutionary-minded biologists and social scientists. Addressing both questions produces a more complete picture, but they are different and should not be confused.[2,8]

In terms of ultimate (evolutionary) causes, there are two classes of explanations generally invoked. The first treat intergroup aggression as a by-product of a highly developed in-group psychology. Being a highly social and cooperative species, humans likely possess tendencies to help and favour members of in-groups.[9] As a by-product of this, people will show indifference, or worse, a dislike for members of out-groups. The second class of ultimate explanations focuses explicitly on people's psychological dispositions with respect to outgroups. The argument is that humans likely evolved specific adaptations for dealing with intergroup threats because such situations provided important reproductive challenges for ancestral humans. I believe that this hypothesis is ultimately more persuasive because it accounts for the highly textured psychological and behavioural reactions to outgroups. People do not have some hazy negative feelings toward outgroups. In some instances, outgroups

motivate desires to dominate, exploit or kill; in other instances, they inspire desires to exclude and avoid. Recent work on prejudice, stereotyping, and intergroup processes that recognizes this textured nature of intergroup psychology has generated many new insights and empirical findings.[6,10-12] Given the complexity of intergroup relations, there are probably many different psychological tendencies pertaining to interactions with outgroups depending upon the specific intergroup threat. For the purpose of this article, I focus on the threat of intergroup aggression.

The Psychology of Warfare

Intergroup conflict is ancient. Not only was intergroup conflict common in human ancestral environments, there is evidence that chimpanzees, our closest genetic relative which are also a group-living species, are highly territorial and that their intergroup encounters are often hostile1.[5,7,13] Fossil evidence of human warfare dates back at least 200,000 years, and it is estimated that as many as 20–30% of ancestral men died from intergroup violence.[14] Many present-day hunter–gatherer groups are just as territorial and violent.[15] Alexander (1987) argued that the biggest threat for early humans came from other groups, which instigated an evolutionary arms race to form ever larger coalitions.[5] As Kurzban and Leary (2001) noted, "membership in a potentially cooperative group should activate a psychology of conflict and exploitation of out-group members—a feature that distinguishes adaptations for coalitional psychology from other cognitive systems" (p. 195).[11]

From the perspective of coalitional psychology, it becomes clear that not all intergroup situations are equal; indeed, not all outgroups consist of coalitions of individuals who engage in coordinated action—think of the homeless, the elderly, or people with blue eyes. Humans are likely to have evolved coalition-detection mechanisms that are responsive to various indicators of tribal alliances, for example, "patterns of coordinated action, cooperation, and competition."[11] In modern

environments, heuristic cues such as skin colour, speech patterns, and linguistic labels—regardless of whether they actually signal tribal alliances—may engage these mechanisms.[11,12] Perhaps equally important, many other salient cues—gender, age, eye colour—may be far less likely to engage the coalitional psychology. We should note that although this coalitional psychology evolved in the evolutionary context of competition for resources (such as territories, food, and mates), this does not imply that it is contemporarily activated only within contexts involving actual intergroup conflict as proposed, for instance, by realistic conflict theory.[16]

Furthermore, the specific psychological reactions of individuals in intergroup contexts should depend on whether one's group is in the position of exploiter or exploited. For the would-be exploiters, desires to dominate—and the associated psychological tendencies—would be functional. For the exploited, desires to avoid or yield—and the associated psychological tendencies—would be functional. Of course, in many situations, a group's position as exploiter or exploited is transient or ambiguous so it is likely that the two psychological tendencies are activated in similar situations by similar cues and moderated by similar variables (e.g., social dominance theory).[17]

The Male Warrior Hypothesis

An important implication of the warfare hypothesis is that intergroup conflict may have affected the evolved psychologies of men and women differently. Intergroup aggression has historically involved rival coalitions of males fighting over scarce reproductive resources, and this is true for early humans as well as chimpanzees.[13,15] As a consequence, this aspect of human coalitional psychology may be more pronounced among men, an idea we refer to as the *male warrior hypothesis* (MWH).[6]

There is already considerable evidence for sex differences in morphology, psychology, and behavior that are functionally related to different selection pressures operating on men and women throughout human, primate, and mammal evolution.[18-21] Due to a combination of differences in parental investment and parental certainty men and women pursue somewhat different mating strategies yielding implications for social behavior.[22] In humans, as in most other mammals, mothers must invest more heavily and for a longer period in their off-spring and, as a consequence, engaging in openly aggressive acts to acquire resources, either individually or as part of a group, will be physiologically and genetically costlier for women.[18,21] Conversely, given the right conditions, it can pay for males to join forces in attacking others to acquire valuable reproductive resources despite the substantial risks involved.

Tooby and Cosmides' (1988) risk contract hypothesis specifies four conditions for the evolution of inter-group aggression in men.[23] First, the average long-term gains in reproductive success (i.e., mating opportunities) must be sufficiently large to outweigh the average costs (i.e., injury or death). Second, members of warfare coalitions must believe that their group is likely to emerge victorious in battle. Third, the risk that each member takes and the importance of each member's contribution to victory must translate into a corresponding share of benefits (cf. the free-rider problem). Fourth, when individuals go into battle they must be cloaked in a "veil of ignorance" about who will live or die. Thus, if an inter-group victory produces, on average, a 20% increase in reproductive success then as long as the risk of death for any individual coalition member is less than 20% (say 1 in 10 men) such warrior traits can be selected for potentially. This analysis presents not only a checklist for theoretical development, but also a set of specific hypotheses that can be tested with psychological and behavioral data.

Even without compensating individual benefits, a male tribal psychology could have evolved via group selection.[24,25] Multilevel selection theory holds that if there is substantial variance in the reproductive success among groups, then group selection becomes a genuine possibility. As Darwin himself had noted (see his earlier quote), groups in which self-sacrifice is more common will fare better, especially if there is competition between groups. Although participating in intergroup competition may be personally risky because of the risk of death or injury, genes underlying propensity to serve the group can be propagated if group-serving acts contribute to group survival.[1]

One condition conducive to group-level selection occurs when the genetic interests of group members are aligned, such as in kin groups. In kin-bonded groups, individuals benefit not just from their own reproductive success, but also from the success of their family members (concept of inclusive fitness). Interestingly, ancestral human groups appear to have been based around male kin, with females moving between groups to avoid inbreeding (so-called patrilocal groups). This could offer another explanation for why men rather than women would have been more concerned about intergroup conflict (i.e., intergroup conflict would have consequences for their inclusive fitness). The same patrilocal structure is incidentally found in chimpanzees. The males of these groups also engage in coalitional aggression.[7,13]

These evolutionary models do not preclude the possibility that cultural processes may be at work that could exacerbate or undermine these stronger male tribal instincts. In fact, many of the evolved propensities are likely to be translated into actual psychological and behavioral tendencies by socialization practices and cultural norms. Thus, it is entirely possible that, in certain environments, it could be advantageous for societies to turn females into warriors. A modern day example is

Israel, a country at war with surrounding nations. To increase the size of their military, Israel has actively recruited female soldiers, and it currently has the most liberal rules regarding the participation of females in wars.[26] We would expect the socialization practices among Israeli girls to match those of boys, potentially overriding any evolved psychological sex differences.

Evidence from the Behavioral Sciences

Evidence for various aspects of this male warrior phenomenon can be found throughout the behavioural science literature, for instance, in anthropology, history, sociology, political science, biology and psychology. Across all cultures, almost any act of inter-group aggression and violence, for instance, warfare, genocide, rebellion, terrorism, street-gang and hooligan violence, is perpetrated by coalitions of men.[26,27] Evidence of male-to-male inter-group violence goes back as far as 200,000 years ago (e.g., mass graves containing mostly male skeletons with evidence of force).[14] On average death rates due to warfare among hunter-gatherers are 13% (according to archaeological data) and 15% (according to ethnographic data), suggesting strong selection pressures operating on ancestral males.[24] The figure is sometimes even higher. Among the Yanomamö in the Amazon Basin an estimated 20-30% of adult males die through tribal violence.[15] This compares to less than 1% of the US and European populations in the 20th century. Furthermore, male warriors in traditional societies are held in higher esteem, and they have more sexual partners and children, suggesting a direct reproductive benefit -- the so-called "Duke of Marlborough" effect. This relationship might still be operative in modern society. A US-study revealed that male youth street gang members have more sexual partners than ordinary young males.[28] In some societies, military men also seem to have greater sex appeal.[29] Thus, there may be reputational benefits associated with "warrior" behavior, which could make it a profitable strategy for men in particular.[30]

Further, a classic social psychological study, the Stanford prison experiment, which highlighted some disturbing aspects of human inter-group psychology, was conducted with males only.[31] Similarly, in economic game experiments involving competing teams researchers frequently only use males groups (in a personal communication, one of the authors, Gary Bornstein suggested that female groups were less competitive). Finally, the primate literature reveals that among chimpanzees adult males form coalitions to engage in violence against members of neighbouring troops.[7] This suggests that there is phylogenetic consistency between intergroup violence in humans and one of our most closely related species.

Psychological Mechanisms Underlying Male Warrior Phenomenon

The MWH offers an integrative, conceptual framework in which findings from diverse literatures including anthropology, biology, political science, and sociology can be woven into a coherent story. However this approach runs the risk of being a "just so" story about the role of warfare in shaping human psychology. It would be more persuasive if we could make specific predictions about the psychological mechanisms underlying the male warrior hypothesis and test these predictions in carefully controlled studies. In the remainder I review the psychological literature on sex differences in intergroup cognition and behaviour to test various aspects of the male warrior hypothesis. I will be focusing in particular on areas such as inter-group relations, intra-group dynamics, political support, self-esteem, and social development. Naturally, not all out-groups are alike and we should expect sex differences to emerge only when an outgroup constitutes a coalitional threat.[31]

Intergroup Aggression

A first generic prediction from the MWH is that there will be sex differences in the willingness to initiate, plan, and participate in acts of intergroup aggression. On the whole men are expected to be more belligerent than women. We can test this

prediction in various ways. While a variety of studies across human and non-human primates suggest that this is the case, more recent studies have tested these predictions in controlled experimental conditions.[32]

First, we can look at how men and women make decisions in war games simulated in the laboratory. Upon being told that they are the leader of a fictitious country interacting with leaders of other countries, a study by Johnson et al. (2006) found that men are significantly more likely to attack another country without provocation.[33] Moreover, warfare is most intense when men are playing against other men despite not knowing the sex of their rivals. As the authors noted: "Even though players were unaware of the identity or gender of their opponent, wars and unprovoked attacks were highest among male–male dyads, next most common among mixed dyads, and least common in female–female dyads (p. 2516)."[33] Men also expressed higher positive illusions about winning these simulated intergroup conflicts, a belief that increased the probability that they would attack their opponent.[33] Finally, another study analyzing the same dataset found that more male-typical 2D:4D ratios, which are thought to index pre-natal testosterone exposure, predicted aggression in the wargame experiment, over and above sex (i.e., 2D:4D explained variance in aggression *within* as well as between sexes.[34] These sex differences also emerge when individuals play economic games between groups: All male groups tend to be more competitive than all female groups or mixed-sex groups.[35]

Second, there is some evidence that men and women differ in their involvement in competitive inter-group encounters in the real-world.[36] When asked to indicate the frequency of various categories of social interactions over the past month men reported more group-to-group interactions (M = 18.47, SD = 73.48) than women (M = 12.77, SD = 59.68). Furthermore, men rated these interactions as more

competitive (*M*male vs. female = 3.17 vs. 2.31, *SD*'s = 2.50 and 2.22; scale is 1 = very cooperative, 5 = very competitive).[36]

Intergroup Prejudice and Stereotyping

The MWH further predicts that men are more likely to derogate outgroup members, especially when they constitute a coalitional threat. One specific form of outgroup derogation is infrahumanization -- considering individuals less than human – which might play a role in inducing intergroup violence.[37]. The rationale is that by considering an out-group member as sub-human or animal-like, it will be psychologically easier to treat them badly. In a recent study we did, men and women -- all Christians -- were asked to describe a Christian or Muslim target using either human (e.g., civil) or animal-typical (e.g., feral) words. [36] Christian men were more likely to describe the Muslim target in animal-typical ways, thus showing some evidence of infra-humanization (Figure 1). It remains to be seen whether infrahumanization strategies are particularly likely when outgroup targets are male, as the MWH would predict.

Intergroup biases such as racism and ethnocentrism also appear to be more strongly held among men than women. Several experiments yield a greater sensitivity of out-group stereotypes for in-group men, especially under conditions of inter-group threat. Mark Schaller and colleagues have shown, for example, that men are more strongly affected by cues of ambient darkness when using danger-relevant stereotypes.[12] The notorious out-group homogeneity effect disappears when in-group members are shown faces of angry out-group males rather than females.[38] Again we would expect this tendency to be particularly pronounced among in-group males.

Intra-Group Dynamics

The MWH also predicts potential sex differences in intra-group dynamics as a result of inter-group threat. Being successful in inter-group competition requires

membership of a strong, cohesive and coordinated in-group.[6] Intergroup efforts might be thwarted by free-riders, individuals who do not contribute to any intergroup activity but nevertheless profit from the spoils of an intergroup victory. Based on the MWH we argued that men would be more likely to respond to intergroup threats through cooperating with their in-group, thus reducing the free-rider problem. Consistent with this prediction, in public good games we found that men raised their group contributions but only when we activated a symbolic competition between groups.[6] In Exp. 1 Van Vugt et al. found that during intergroup competition 92% of men contributed to the public good but only 53% of women (Figure 2). As an extension of this idea, in another study we found that in inter-group competition men showed greater in-group loyalty by sticking with the group when it was more (financially) attractive to leave.[36]

A further prediction concerns differences in leadership emergence and effectiveness in times of intergroup conflict. In a recent study we found that when two equally suited candidates vied for the position of group leader, groups preferred the male leader (78%).[39] A male leader was also more likely to raise group contributions during intergroup competition. Interestingly, when the problem shifted towards competition between in-group members virtually all groups chose a female leader (Figure 3).

Consistent with the MWH, there is some evidence that male and female groups have different group dynamics. Whereas female groups are more egalitarian, groups of males form more hierarchical groups and these hierarchies tend to be more stable over time. The difference in group structure corresponds with sex differences in leadership style. Hierarchy formation is an effective response in dealing with intergroup conflict requiring an urgent, coordinated response.[40]

These claims are backed up by research on developmental differences in social play. Boys play in larger groups than girls and more often play complex competitive team games, which sometimes involve the use of weapons such as toy guns and swords.[20] Boys also put greater social pressure on team members to conform to group norms during play activities and they have more transient friendships with a larger number of peers than girls.[20,41]

Tribal Politics

The MWH predicts sex differences in political attitudes towards inter-group conflict. We hypothesized that men would show relatively stronger political support for warfare as a solution to conflict between countries. We tested this prediction using data from a random selection of 10 recent national and international opinion polls that we were able to find on the Internet and found consistent sex differences (sometimes large, other times small but always in the same direction).[36] For instance, a Washington Post-poll in 2003 (N = 1,030) asked the question "Do you support the US having gone to war in Iraq?" to which 82% of men agreed versus 72% of women. As another example, a recent poll by Gallup News (N = 7,074) found that 46% of men (vs. 37% of women) disagreed with the question "Do you think the Iraq war was a mistake?"

We also expected men to have a stronger preference for between-group dominance hierarchies, which is the inevitable outcome of intergroup competitions. To test this prediction, we asked an international survey of people to complete the short 10-item social dominance orientation scale.[17] This 7-point scale contains items such as "Some groups of people are simply inferior to others;" "We should do what we can to equalise conditions for different groups" "To get ahead in life, it is sometimes necessary to step on other groups." Consistent with other data, we found that men

were significantly more socially dominant (M = 2.56, SD = 1.13) than women (M = 2.28, SD = 1.0).[36]

Tribal Self-concept

A final prediction is that men and women should differ in self-concept. According to the MWH men's self-concept is primarily derived from the associations with larger tribal groups, whereas women's self-concept is derived primarily from connections with other individuals. Consistent with this prediction men indeed have a more collective sense of self that is more strongly derived from their group memberships and affiliations. Gabriel and Gardner (1999) asked students to describe themselves by completing the statement "I am…" They found that male students were twice as likely to make statements referring to a tribal association (e.g., "I am a member of a fraternity").[42] In a recent study, we asked 100 people around the University of Kent campus to indicate their favourite colour and to explain why they picked this particular colour. Among men, almost 30% mentioned a tribal association (e.g., their favourite football team, the colours of the flag of their country of origin); none of the women did so.[36]

Implications for Intergroup Relations

I presented a framework for studying the social psychology of intergroup relations from an evolutionary perspective. This analysis suggests that not all intergroup relations are alike because not all out-groups are alike. How people interact with members of outgroups is determined in part by the specific challenges (and opportunities) these groups present to the ingroup. When such challenges correspond to evolutionarily relevant threats—threats that were significant enough in ancestral social environments that humans have evolved to deal with them—they elicit a specific intergroup psychology. Here I discussed the threat of intergroup aggression and argued that it has produced a distinct evolved ingroup–outgroup

psychology, consisting of an interrelated set of functional cognitive and behavioural responses, to neutralize the intergroup threat.

Based on evolutionary reasoning, I argued that over evolutionary time men must have been particularly affected by this intergroup threat, and dubbed this the male warrior hypothesis. I reviewed the literature on sex differences in intergroup psychology in light of predictions from the male warrior hypothesis and found them to be generally supportive. Further tests are needed. For instance, some outgroups are more likely to be infrahumanized (they are considered animal-like) whereas others dehumanized (they are considered robot-like). It would be interesting to know which of these strategies is more likely against which outgroups (depending upon their size, strength, competence, etcetera) and whether such tendencies are stronger in male-male intergroup interactions. Furthermore, in addition to warfare there might be a host of other significant ancestral group challenges that have created their own unique intergroup psychology which I did not discuss here. Disease avoidance is one example and we would expect a different set of functional responses to a contagion threat from an outgroup (e.g., avoidance rather than aggression).[31,43] Moreover we would not necessarily expect differential reactions from men and women when a disease threat is salient. There is some evidence that women show greater intergroup prejudice when in their most fertile phase, thus when the risk of contagion is highest.[44]

The evolutionary framework makes various suggestions for interventions to improve intergroup relations. When outgroups pose a coalitional threat interventions might be targeted specifically at male-to-male interactions because they are the most likely perpetrators and victims of intergroup aggression. In terms of their objectives, interventions will be particularly successful when they eliminate the sense of threat associated with particular outgroups altogether. Attempts must be made to

individuate members of such outgroups, for instance, by accentuating their personal achievements rather than the achievements of their group (e.g., British Asian doctors). A second aim of interventions is to alter the perceptual cues that elicit threat responses towards particular outgroups such as new immigrant groups. For instance, language, dress code, and particular rituals or customs serve as tribal markers, and the less noticeable they are the more these outgroups will receive positive treatment. Thus, for the sake of attenuating the effects of coalitional psychology, it is important for societies to make it easier for new immigrant groups to adopt the language and customs of the ingroup. Third, interventions might be focused on changing the specific cognitive and affective responses towards outgroups. However, if it is true that these responses are evolved, then the link between threat and response might be difficult to inhibit or extinguish (cf. fear of snakes and spiders).[45] Nevertheless, we suspect that frequent positive interactions with members of outgroups will over time reduce initial aversion or hostility. For instance, the Jigsaw class room experiments demonstrate that cooperative relations between members of different ethnic groups are a good means of reducing prejudice.[46]

Coda

The social psychological literature on intergroup relations is rich and diverse. It is relatively mute about the origins of tribal tendencies in humans and therefore lacks a coherent framework for understanding why different outgroups elicit vastly different responses. I presented a preliminary framework, inspired by insights from evolutionary psychology and biology, that links particular intergroup challenges, notably warfare, to particular functional responses. Although such responses may have emerged because they were adaptive in ancestral times, they might not necessarily be functional in modern times. Nonetheless, understanding why particular out-groups elicit particular emotions, cognitions, and behaviours and in

whom is the first step towards a sensible policy to improve intergroup relations in our society.

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Table 1. Domains of evidence, hypothesized psychological mechanisms, and predictions from Male Warrior Hypothesis.

Domain of Evidence	Psychological Mechanism	Prediction	Supported
1. Inter-group aggression	Propensity to engage in inter-group aggression	Men are more likely to make unprovoked attacks in war games	Yes
		Men have more competitive inter-group experiences	Yes
2. Inter-group prejudice	Infra/de-humanization of antagonistic out-groups	Men are more likely to infra-humanize members of out-groups	Yes
3. Intra-group dynamics	Greater cooperation with ingroup in response to threat	Men contribute more to group during intergroup competition	Yes
	Displaying in-group loyalty during inter-group conflict	Men are more likely to show in-group loyalty during inter-group conflict	Yes
	Male leadership bias in intergroup settings	Groups show stronger preference for male leaders during intergroup competition	Yes
4. Tribal Politics	Support for intergroup aggression	Men show stronger political support for warfare in opinion polls	Yes
	Preferences for and justifcation of hierarchies between groups	Men score higher on social dominance orientation scale	Yes
5. Tribal self-concept	Spontaneous activation of inter-group association	Men are more likely to make spontaneous tribal associations when defining themselves	Yes

Figure Captions

Figure 1. Evidence for infra-humanization when Christian males ascribe fewer human-like words and more animal-like words to Muslim targets.[36]

Figure 2. Intergroup competition increases public good contributions among males in particular.[6]

Figure 3. Intergroup competition increases the preference for male leaders, whereas intragroup competition increases the preference for female leaders.[39]

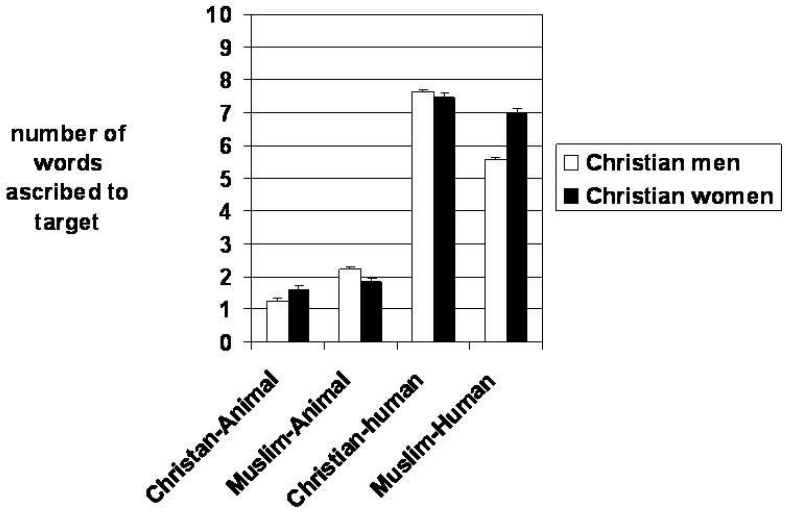

Figure 1. Evidence for infra-humanization when Christian males ascribe fewer human-like words and more animal-like words to Muslim targets.36
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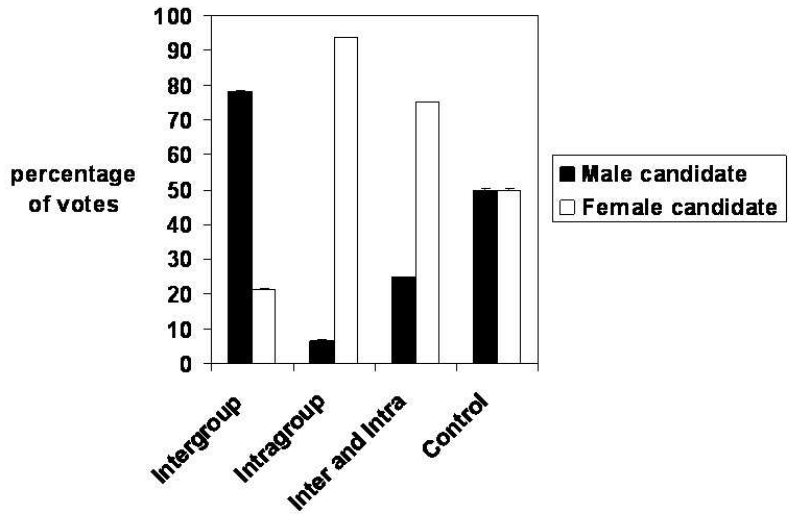

Figure 3. Intergroup competition increases the preference for male leaders, whereas intragroup competition increases the preference for female leaders.39
254x190mm (96 x 96 DPI)

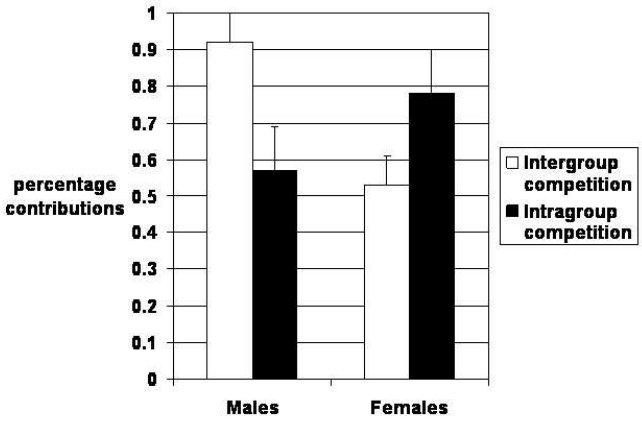

Figure 2. Intergroup competition increases public good contributions among males in particular.6
254x190mm (96 x 96 DPI)