

Research Report

Sex Differences in the Emergence of Leadership During Competitions Within and Between Groups

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ABSTRACT—*This experiment investigated potential gender biases in the emergence of leadership in groups. Teams played a public-goods game under conditions of intra- or intergroup competition. We predicted and found a strong preference for female leaders during intragroup competition and male leaders during intergroup competition. Furthermore, during intragroup competition, a female leader was more instrumental than a male leader in raising group investments, but this pattern was reversed during intergroup competition. These findings suggest that particular group threats elicit specific gender-biased leader prototypes. We speculate about the evolutionary and cultural origins of these sex differences in the emergence of leadership.*

Leadership is a universal feature of human societies and affects their destinies in many important ways (Bass, 1990; Bennis, 2007). Humans have very little difficulty in recognizing leadership potential in each other (Lord, Foti, & DeVader, 1984), and when groups form, leadership emerges quickly and automatically (Van Vugt & De Cremer, 1999). It seems that humans are naturally inclined to engage in leader-follower relations (Brown, 1991), yet there is a high rate of leadership failure in society today (Van Vugt, Hogan, & Kaiser, 2008). Leadership and followership serve several key group functions. Resource sharing requires a mechanism such as leadership for maintaining group unity and managing intragroup conflicts (Van Vugt, 2006). Leadership and followership are also instrumental in coordi-

nating collective group actions against external threats, such as attacks by out-groups (Alexander, 1987).

EVOLUTION, SEX, AND LEADERSHIP

An evolutionary approach has the potential to generate many novel hypotheses about leadership psychology that can be empirically verified in experimental research (Simpson & Kenrick, 1997; Van Vugt et al., 2008). Evolutionary thinking, combined with insights from sociocultural theory, suggests that there may be differential preferences for male versus female leaders in different group contexts. We expect that, all else being equal, there will be a preference for female leadership under conditions of intragroup competition and a preference for male leadership under conditions of intergroup competition.

This hypothesis ultimately originates from sex differences in human mating strategies, which have shaped the minds and bodies of men and women differently (Buss & Schmitt, 1993; Geary, 1998). It is important to women to invest resources in creating and maintaining supportive social networks for the protection of themselves and their children (Silk, 2007; Taylor, Klein, Lewis, & Gruenewald, 2000). Women may therefore have a stronger interest in keeping the group together than men do, and, as a result, perhaps women are more motivated, and better equipped, to act as intragroup peacekeepers (Van Vugt et al., 2008). For men, it can sometimes be attractive to invest their resources in forming coalitions to engage in intergroup aggression, as the spoils of an intergroup victory enhance their mating opportunities substantially (Chagnon, 1988; Tooby & Cosmides, 1988; Van Vugt, De Cremer, & Janssen, 2007). Thus, men might be more keen (and able) than women to take on leadership roles during intergroup competitions.

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These innate differences, possibly in interaction with culture-specific gender roles (Eagly & Karau, 1991), predict sex-specific variations in the emergence and effectiveness of leadership across different group contexts. Accordingly, we hypothesized that group members have a bias to prefer a female leader when facing an intragroup competition and a male leader when facing an intergroup competition. Furthermore, we predicted that these biases reflect consensual beliefs about the perceived effectiveness of female and male leaders in different contexts (cf. leader “prototypes”; Lord et al., 1984). Finally, we explored whether groups actually perform better under female leaders when facing intragroup threats and under male leaders when facing intergroup threats.

PRELIMINARY EVIDENCE AND THE PRESENT RESEARCH

A study from our leadership research program allowed for a preliminary investigation of the hypothesized sex differences in the emergence of leadership. Participants were asked to imagine they were citizens of a hypothetical country (Taminia) in the middle of a presidential election. In one scenario, their country was at war with another country (intergroup conflict), and in another scenario, their country was facing civil unrest (intragroup conflict). Subsequently, each participant ($N = 45$; 27 women and 18 men) was asked to make a profile of his or her ideal leadership candidate, including the candidate's sex. There was a strong preference for a female leader in the intragroup-conflict scenario (75.6% vs. 24.4%), $\chi^2(1, N = 45) = 11.76$, $p < .001$. Conversely, voters chose a male leader in the intergroup-conflict scenario (91.1% vs. 8.9%), $\chi^2(1, N = 45) = 30.42$, $p < .001$. Preferences were not affected by the voters' own sex, $\chi^2(1, N = 45) < 1$ for intragroup conflict and $\chi^2(1, N = 45) = 2.93$, $p = .10$, for intergroup conflict.

These results provide initial evidence for sex biases in the emergence of leadership across different group contexts. However, this particular study was not designed to specifically test this hypothesis. Furthermore, the votes were hypothetical, and because there were no consequences, participants may have responded in a socially desirable manner. We therefore designed an experiment in which participants were allocated to small groups in which they played a public-goods game involving real monetary stakes (Van Vugt & De Cremer, 1999). Prior to the game, they were asked to choose between a female and a male candidate to lead their group during the game. We manipulated whether intragroup or intergroup competition was salient and examined both voting patterns and group performance. For exploratory purposes, we added to the design a control condition and a condition in which both intra- and intergroup threats were activated.

METHOD

Fifty undergraduate students (26 men, 23 women, 1 student whose sex was unknown; median age = 21.0 years) at an English

university participated in this study for money. They were randomly assigned to one of four experimental conditions (intragroup competition, intergroup competition, combined intragroup and intergroup competition, and neither competition). The students participated in a step-level public-goods game, an investment task in which they made decisions on how much money to invest in a private versus a group fund.

Five participants of different sexes were invited to the lab simultaneously. Upon arrival, each participant was assigned the letter code C and was told that he or she was in a group with members A, B, D, and E. Each participant was seated in a separate cubicle in front of a computer that administered all further instructions.

In the intragroup condition, the study's aim was to “examine how well individual players are doing in group investment games and compare the results between individual players within each of the groups.” In the intergroup condition, participants were told that the experiment was being carried out simultaneously at various English universities with the aim to “examine how well groups of players from different English universities are doing in these group investment games and compare the results between different universities”; a list of participating universities appeared on the screen, to validate this information. In the combined condition, both inter- and intragroup comparisons were made salient. No information about these comparisons was provided in the control condition, which thus was a standard step-level public-goods game.

Before the game started, each group elected a leader to raise group investments. Participants were required to submit some details about themselves (their first name, age, course of study, and hobbies). The computer then (supposedly randomly) selected two individuals, A and E, as leadership candidates (C was never selected). The (fictitious) female candidate (A) was described as “Sarah, a 21-year-old university student in law. Her hobbies are exercise, traveling, and going out with friends.” The male candidate (E) was described as “Peter, a 20-year-old university student in English literature. His hobbies are reading, making music, and attending parties.” For half of the participants in each condition, the names were reversed, but as this did not make a difference in the results, we collapsed the data across this factor. Before playing the game, participants cast their vote for their preferred candidate leader (0 = female, 1 = male) and rated the candidates' expected effectiveness at maintaining positive intragroup relationships and winning intergroup competitions (1 = female better, 3 = equal, 5 = male better).

Each individual then received a £3 (approximately \$6) endowment to play the step-level public-goods game. Any amount of this endowment could be invested in a group fund, and the participant kept the rest for his or her private fund. If the total group investment exceeded the step level (or provision point) of £12 (i.e., if each player, on average, put 80% into the group fund), each player received a £5 bonus on top of what he or she had put in his or her private fund. If the total group investment

was less than the step level, each player lost his or her group investment.¹ Several practice sessions were run to ensure that each participant understood the game. Half the participants were then told that the female candidate had been elected as leader, and half were told that the male candidate had been elected as leader.

After making an investment, participants received feedback about the outcome. Each participant then received a careful debriefing and got the money he or she had earned, before being thanked and dismissed.

RESULTS

Perceived Leader Effectiveness

As hypothesized, the female candidate was perceived to be better than the male at maintaining intragroup relationships ($M = 2.43, SD = 1.10$), $t(48) = -3.64, p < .001$, whereas the male was rated better than the female at winning intergroup competitions ($M = 3.39, SD = 1.13$), $t(48) = 2.40, p < .03$ (both means depart from 3, the scale's midpoint).

Votes

A statistical test on the vote, using the experimental condition (intragroup, intergroup, combined, control) as the independent variable, produced a significant effect, $\chi^2(3, N = 49) = 17.24, p < .001, \eta^2 = .06$ (see Fig. 1). The results were as predicted and consistent with the data from the pilot study: The female was much preferred in the intragroup condition (93.3% vs. 6.7%), but there was a strong preference for the male in the intergroup condition (78.6% vs. 21.4%). The votes were split equally between the male and female (50%–50%) in the control condition. Yet in the combined condition, the female was preferred to the male (75% vs. 25%). A logistic regression analysis showed that voting patterns did not differ between male and female participants, $\chi^2(3, N = 49) = 1.54, p = .68$.

Group Investments

Tests on group investments (£0–£3) showed a significant interaction between sex of the leader and experimental condition, $F(3, 33) = 4.01, p < .02, \eta^2 = .08$ (see Fig. 2).² As hypothesized, in the intragroup condition, investments were higher under a female than under a male leader ($M_s = £2.51$ vs. £1.84, $SD_s = 0.50$ and 1.12), $t(13) = -1.47, p = .08$. Conversely, in the intergroup condition, investments were higher under a male

¹The step-level public-goods game is a cooperative group task with a coordination element. The game has multiple equilibria. If i denotes the player ($i = 1, 2, \dots, n$), v_i denotes the investment of player i (between £0 and £3), c^* denotes the step level (£12), and b denotes the bonus (£5), then the payoff of player i is $1 - v_i$ if $\sum v_i < c^*$ and is $1 - v_i + b$ if $\sum v_i \geq c^*$. If $c^* > 1$, there is an equilibrium where $v_i = 0$. If $c^* < n$, there are multiple equilibria where $\sum v_i = c^*$.

²People's votes made no difference in their group investments, so we collapsed the data across this factor.

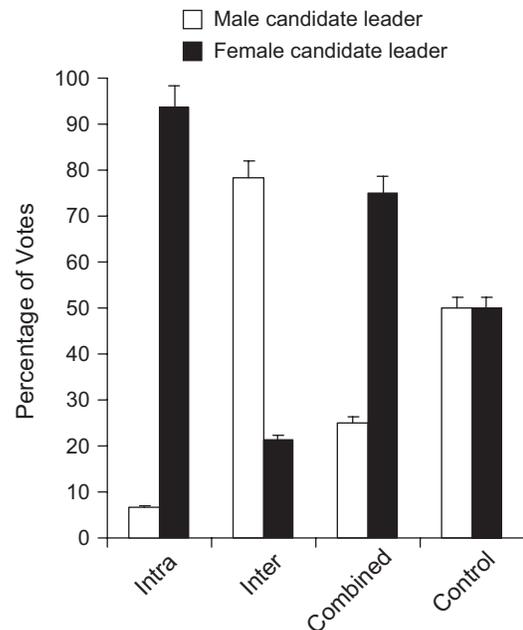


Fig. 1. Percentage of votes as a function of sex of candidate and experimental condition. Error bars represent standard errors above the mean.

than under a female leader ($M_s = £2.43$ vs. £1.58, $SD_s = 0.67$ and 1.01), $t(12) = 1.89, p < .04$. Groups with male leaders and groups with female leaders did not differ in their investment in either the combined condition (male leaders: $M = £2.08, SD = 0.74$; female leaders: $M = £1.83, SD = 1.07$) or the control condition (male leaders: $M = £1.99, SD = 1.25$; female leaders: $M = £2.06, SD = 0.91$), both $t_s < 1$.

There was also an interaction between the leader's and participant's sex, $F(1, 33) = 7.47, p < .01, \eta^2 = .04$, and a marginal

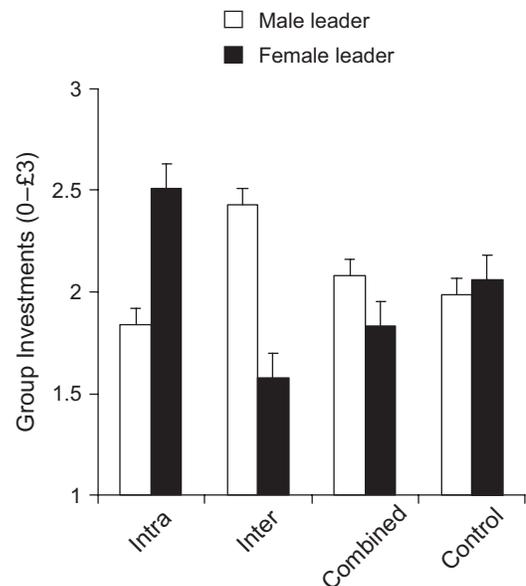


Fig. 2. Mean investment in the group fund as a function of sex of leader and experimental condition. Error bars represent standard errors above the mean.

three-way interaction among these factors and experimental condition, $F(3, 33) = 2.56, p < .08, \eta^2 = .04$. In the intragroup condition, women invested considerably more in the group when the leader was female ($M = \text{£}2.80$) than when the leader was male ($M = \text{£}0.73$). Conversely, in the intergroup condition, men invested more in the group when the leader was male ($M = \text{£}3.00$) rather than female ($M = \text{£}2.18$). Unfortunately, there were too few cases for meaningful statistical tests on these differences.

DISCUSSION

This research examined potential sex differences in the emergence of leadership in ad hoc groups. Our findings revealed that the preference for male versus female leadership varies systematically with the nature of group threat. During intragroup competitions, people prefer a female leader, whereas in intergroup competitions, they prefer a male leader. These results were supported by data from a mock-election study showing that people vote for a female president when there is internal conflict, but switch to a male president when their country is at war (cf. Little, Burriss, Jones, & Roberts, 2007).

We speculate that such gendered leadership prototypes are a residual of human evolutionary history that still affects the way people evaluate and respond to leadership in society today (Van Vugt et al., 2008). Consider this: Raids, battles, and wars have been a significant force throughout human history, and men have always played a more active role in doing the fighting than women have (Goldstein, 2003; Keegan, 1994); better male warriors achieve more status and reproductive success in traditional societies (Chagnon, 1988). Finally, compared with women, men adopt a more hierarchical leadership style (Eagly & Johnson, 1990), which is perhaps better suited to engage in intergroup aggression (Browne, 2007).

Whereas intergroup competition activated a male leadership prototype, intragroup competition elicited a female leadership prototype. The female candidate was rated better at fostering positive intragroup relationships. This result is consistent with meta-analytic research showing that women leaders adopt a more egalitarian, personalized, and communal leadership style than male leaders do (Eagly & Johnson, 1990). Historically, women have taken on peacekeeping roles in groups (De Groot & Peniston-Bird, 2000; Goldstein, 2003), perhaps because they are more concerned with preserving group harmony (Baumeister & Sommer, 1997; Geary, 1998).

These gendered leader prototypes may even precede human evolution. In the chimpanzee (with whom humans shared a common ancestor about 5 to 7 million years ago; Wrangham & Peterson, 1996), adult males take the lead when patrolling group boundaries. Yet peacekeeping duties—for instance, intervening in fights between group members—are often taken on by high-status females (De Waal, 2006; Goodall, 1986; Silk, 2007).

Two other findings deserve brief attention. First, an unexpected finding was the preference for a female leader when both intergroup and intragroup threats were salient. Although this finding needs replication, one potential explanation concerns the public-goods game, which pits individual against collective interests. This context might make intragroup threats more salient than intergroup threats. An alternative explanation is that female leaders are more trusted in dealing with complex group problems than male leaders are, perhaps because, as data suggest (Eagly & Karau, 1991), females possess a more flexible leadership style. Second, there were performance differences between groups with male leaders and groups with female leaders, and these differences varied with the specific group threat. Group investments rose under a female leader during intragroup competition and under a male leader during intergroup competition. Group investments went up even further when the leader's and participant's sex and the group threat all matched. These results expand and qualify the findings regarding the male-warrior hypothesis (Van Vugt et al., 2007) by showing that in intergroup competitions, men sacrifice more for their group, but only if the group has a male (as opposed to a female) leader.

In generalizing the experimental findings, we must note that leaders of real-world groups also face various other challenges, for instance, enforcing rules and norms, developing a vision, and maintaining positive relations between groups (Van Vugt et al., 2008). It is not yet clear whether there are gender-specific leadership prototypes for any of these issues. In addition, we are not saying that all male leaders are more effective in intergroup competitions and all female leaders are more effective in intragroup competitions. There are famous historical examples of highly successful female war leaders—Margaret Thatcher, Golda Meir—and highly successful male peace leaders—Nelson Mandela, Mahatma Gandhi. Our findings suggest that, all else being equal, an intragroup conflict activates a female leader prototype and an intergroup conflict activates a male leader prototype. Finally, where do these prototypes come from? We suspect that they emerge from a combination of evolved decision rules (e.g., “when at war, follow a masculine-looking leader”) and culture-specific gender role stereotypes.

Limitations of this research are worth noting. First, payoffs in the experiment (maximum earning of £8) were not very substantial, so we do not know for sure if these gender biases will also be found when the payoffs of good leadership are considerable (e.g., the U.S. presidency); we suspect they will. Furthermore, the intergroup manipulation concerned a competition for social prestige, rather than an actual conflict. We believe that this manipulation tapped into a war psychology, but we cannot be certain without collecting additional data.

To summarize, we found support for sex-biased leadership preferences in response to intra- and intergroup threats. Awareness and understanding of these often implicit sex biases contribute to modern leadership practice.

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REFERENCES

- Alexander, R.D. (1987). *The biology of moral systems*. London: Aldine.
- Bass, B.M. (1990). *Bass and Stogdill's handbook of leadership: Theory, research, and managerial applications* (3rd ed.). New York: Free Press.
- Baumeister, R.F., & Sommer, K.L. (1997). What do men want? Gender differences and the two spheres of belongingness. *Psychological Bulletin*, *122*, 38–44.
- Bennis, W. (2007). The challenges of leadership in the modern world. *American Psychologist*, *62*, 2–5.
- Brown, D. (1991). *Human universals*. Boston: McGraw-Hill.
- Browne, K. (2007). *Co-ed combat: The new evidence that women should not fight the nation's wars*. New York: Penguin.
- Buss, D.M., & Schmitt, D.P. (1993). Sexual strategies theory: A theory of human mating. *Psychological Review*, *100*, 204–232.
- Chagnon, N.A. (1988). Life histories, blood revenge, and warfare in a tribal population. *Science*, *239*, 985–992.
- De Groot, G., & Peniston-Bird, C. (2000). *A soldier and a woman*. New York: Longman.
- De Waal, F. (2006). *Our inner ape*. London: Granta Books.
- Eagly, A.H., & Johnson, B.T. (1990). Gender and leadership style: A meta-analysis. *Psychological Bulletin*, *108*, 233–256.
- Eagly, A.H., & Karau, S.J. (1991). Gender and the emergence of leaders: A meta-analysis. *Psychological Bulletin*, *60*, 685–710.
- Geary, D.C. (1998). *Male, female: The evolution of human sex differences*. New York: American Psychological Association.
- Goldstein, J. (2003). *War and gender*. Cambridge, England: Cambridge University Press.
- Goodall, J. (1986). *The chimpanzees of Gombe: Patterns of behavior*. Cambridge, MA: Harvard University Press.
- Keegan, J. (1994). *A history of warfare*. Toronto, Ontario, Canada: Key Porter Books.
- Little, A.C., Burriss, R.P., Jones, B.C., & Roberts, S.C. (2007). Facial appearance affects voting decisions. *Evolution and Human Behavior*, *28*, 18–27.
- Lord, R.G., Foti, R.J., & DeVader, C.L. (1984). A test of leadership categorization theory. *Organizational Behavior and Human Performance*, *34*, 343–378.
- Silk, J.B. (2007). The adaptive value of sociality in mammalian groups. *Philosophical Transactions of the Royal Society B*, *362*, 539–559.
- Simpson, J.A., & Kenrick, D.T. (1997). *Evolutionary social psychology*. Mahwah, NJ: Erlbaum.
- Taylor, S.E., Klein, L.C., Lewis, B.P., & Gruenewald, R.A.R. (2000). Biobehavioral responses to stress in females: Tend-and-befriend not fight-or-flight. *Psychological Review*, *107*, 413–429.
- Tooby, J., & Cosmides, L. (1988). *The evolution of war and its cognitive foundations* (Institute for Evolutionary Studies, Technical Report No. 88-1). Santa Barbara: University of California.
- Van Vugt, M. (2006). Evolutionary origin of leadership and followership. *Personality and Social Psychology Review*, *10*, 354–371.
- Van Vugt, M., & De Cremer, D. (1999). Leadership in social dilemmas: Social identification effects on collective actions in public goods. *Journal of Personality and Social Psychology*, *76*, 587–599.
- Van Vugt, M., De Cremer, D., & Janssen, D.P. (2007). Gender differences in cooperation and competition: The male-warrior hypothesis. *Psychological Science*, *18*, 19–23.
- Van Vugt, M., Hogan, R., & Kaiser, R.B. (2008). Leadership, followership, and evolution: Some lessons from the past. *American Psychologist*, *63*, 182–196.
- Wrangham, R., & Peterson, D. (1996). *Demonic males: Apes and the origins of human violence*. London: Bloomsbury.

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