

Original Article

Effects of Context and Relative Rank on Mate Choice and Affiliation Ratings

P. Lynne Honey, Department of Psychology, Grant MacEwan College, Edmonton, Canada. Email: HoneyL@MacEwan.ca (Corresponding author).

Chad D. Coulombe, Department of Psychology, Grant MacEwan College, Edmonton, Canada.

Abstract: Female dominance has not often been studied as a factor in mate choice and other social interactions. When it has been examined, there have been a number of conflicting findings. The present study was designed to clarify interpretations of a study conducted by Brown and Lewis (2004) that found that men prefer subordinate women in a workplace context. We presented participants with information about the relative rank of physically attractive targets, in two very different contexts (work-related and recreational). We found that the context in which rank cues are presented has an impact on affiliation ratings, but that cues of rank do not affect mate choice ratings. Future studies of effects of dominance must take into account the context in which they are presented, and recognize that rank may not be a sufficient indicator of dominance for the purpose of mate choice by both men and women.

Keywords: dominance, mate choice, attraction, sex differences

Introduction

Social dominance in humans results when individuals within a group vary in their ability to control resources and achieve status or prestige (Hawley, 1999). There are a number of traits that are correlated with or predict social dominance, including physical size, aggression, masculinity, and rank, but also persuasion, cooperation, and friendship. The roles of these various interactive traits have not been fully elucidated, that is there is no obvious evidence that any one of these traits is a necessary component of social dominance, and it is likely that there are varying ways in which socially dominant traits or attributes may combine to allow an individual to compete with others in the group for access to valued items or opportunities.

Academic study of dominance and dominant behavior has focused primarily on dominance by men. There is good reason for researchers to focus on the expression and perception of dominance in men. Across many species, men tend to be larger and more

aggressive than women (see Alexander, Hoogland, Howard, Noonan, and Sherman, 1979 for a review). Competition among men can be fierce and has direct fitness consequences, leading to sexual selection for traits associated with defeating other men due to access gained to women as well as direct female choice (Darwin, 1871). Within humans, where moderate sexual dimorphism exists for traits like body size (e.g., Gustafsson and Lindfors, 2009) and physical aggression (see Campbell, 1999 for a review), we find significant effects of dominance in how men are perceived by women, and for reproductive success (Egan and Angus, 2004; Hopcroft, 2006; Perusse, 1993). When it comes to rank, famous examples of exceptionally dominant men who monopolize the reproduction of many women seem to point to such dominance as an adaptive male characteristic. Betzig (1986) describes the “Genghis Khan effect,” which seems appropriate given that Khan and his male relatives are theorized to be the ancestors of approximately 16 million modern humans (Zerjal et al., 2003). Additionally, nearly 20% of men in northwestern Ireland are likely to have descended from a single warlord from the 5th century (Moore, McEvoy, Cape, Simms, and Bradley, 2006) which further emphasizes the potential effects that male rank can have on reproductive success.

Interest in male dominance, however, does not explain why female dominance has been relatively ignored. Women vary a great deal in traits like aggression, assertiveness and other personality measures associated with dominance (see Hyde, 2005). Certainly there are differences in rank among women, where some women have greater access to resources than others or have authority over others. In an extreme example, it has been demonstrated that adolescent women in an institutional setting establish a dominance hierarchy through aggressive and sometimes violent behavior but the highest ranked women tended to neither aggress nor experience aggression from others. They also claimed more “territory” within the institution and had more opportunities to solicit attention from men (Deutsch, Esser, and Sossin, 1978). Although women in a less-structured environment may demonstrate different forms of leadership, or become leaders for different types of tasks compared to men, women do take leadership roles and demonstrate dominance (Eagly and Karau, 1991). What fitness consequences might be associated with such differences among women?

In a comprehensive review, Ellis (1995) outlined a variety of ways in which dominance may be linked to reproductive success among women in non-human mammal species. Some obvious measures of reproductive success include number of offspring born, and number that survive infancy. Other, more indirect correlates of reproductive success or potential include age of onset of sexual activity, reproductive suppression (or harassment) of other women, number of partners or copulations, and length of reproductive lifespan. Among non-primates (rodents in particular), Ellis (1995) documented that female dominance is strongly associated with reproductive success, and among some primates there appears to also be a predictive relationship between rank and reproductive success. Interestingly, reproductive success measured by number of offspring who *survive* is more likely to be tied to mothers’ rank than is absolute number of offspring *born* (as in Pusey, Williams, and Goodall, 1997). In a recent study of effects of maternal rank among baboons, sons of high-ranking mothers had lower levels of circulating stress hormones than did sons of lower-ranking mothers (Onyango, Gesquiere, Wango, Alberts, and Altmann, 2008). It should be noted that the mothers rank at the time of conception was key, rather than her rank at the time of measurement. In fact, the men in this study were 4-6 years past the point

of maternal care, and many had outlived their mothers. Further evidence of such rank effects on offspring is seen among hyenas, where dominant women' high androgen levels in late gestation predict dominant behaviors among their offspring, compared to the offspring of lower-ranked women who also had lower gestational androgen levels (Dloniak, French, and Holekamp, 2006). Although it is not the case that female dominance is consistently predictive of reproductive success, neither is male dominance (Ellis, 1995). Based on Ellis' review, it does appear, however, to be one important factor among non-human mammals.

Results among humans are not entirely clear. Some studies on effects of female dominance for mate choice indicate that female dominance has no effect on male choice (Fletcher, Tither, O'Loughlin, Friesen, and Overall, 2004; Sadalla, Kenrick, and Versure, 1987). When cues of dominance are portrayed as "masculine" traits, then women who possess those traits are perceived as less attractive (Keisling and Gynther, 1993). Buss (1981) has demonstrated, however, that men and women express dominance in different ways. According to Buss, men are more likely to express dominance in an egoistic or agentic manner, where personal goal attainment is enhanced. Women are more likely to express dominance in a more prosocial or communal manner, where both personal and group interests are furthered. Additionally, men seem to prefer or respect agentic expressions of dominance, and women seem to respect prosocial expressions. This is consistent with a meta-analysis (Eagly and Karau, 1991) that reviewed gender differences in the emergence of leadership. Thus, conceptualizing female dominance in masculine terms may be counterproductive to understanding effects of female dominance. To add further texture to the topic, it has been demonstrated that female dominance may interact with physical attractiveness, such that dominance may play a greater role in reproductive success when a female is not highly attractive (Gutierrez, Kenrick, and Partch, 1999; Kenrick, Neuberg, Zierk, and Krones, 1994). Once again, when we examine the literature on male dominance, cues about male dominance may not always be preferred by women. For example, we find that men perceived as dominant via cues of facial hypermasculinity seem to be *less* preferred for long-term relationships (Little, Jones, Penton-Voak, Burt, and Perrett, 2002) which may be due to attributions about character and parenting potential (e.g., Perrett et al., 1998). Such attributions are not surprising, given that such men describe themselves as investing less in parenting and relationship maintenance (Waynforth, 2002).

If female rank has any influence on reproductive success, its effects may differ across individuals or environmental conditions. In a study that determined that men sometimes attend to female dominance cues, Brown and Lewis (2004) presented photographs and descriptive paragraphs to participants, and asked them to evaluate and rate the targets on a variety of measures. The authors found that men were more likely to find a subordinate female attractive for long-term relationships. Interestingly, they found no effect of male rank on female choice, nor did rank appear to impact affiliation ratings (willingness to socialize with the target) by same- or opposite-sex participants. There are some potential confounds to the interpretation of these data.

Primarily, the context in which Brown and Lewis' (2004) descriptions were framed may have influenced responding. Paragraphs were written to describe individuals in one of three levels of dominance as indicated by rank, and those ranks were relative to the subject in the experiment. For example, the subject was to imagine that the target was his or her assistant, coworker, or supervisor, depending on the experimental condition. Placing these

descriptors in a workplace setting may invoke power dynamics that will alter mate choice decisions in a manner that is not reflective of attraction, per se. Although the authors were careful to indicate that there were no rules in this particular workplace against employee fraternization, participants may still have been more cautious about such relationships. A second potential problem relates to the photographs used in the study. The authors were careful to use one male and one female photograph that had been selected by independent raters to be roughly equal in both age and attractiveness, but no information was provided as to how attractive or how old those photos were perceived to be. Thus, it is possible that participants were using cues about age, particularly for judging the suitability of female targets for long-term relationships. Further, other researchers have found that dominance interacts with attractiveness for judgments of female targets such that cues of subordination tend to be more appealing in physically attractive targets (Gutierrez et al., 1999; Kenrick et al., 1994), so effects should be interpreted accordingly. Without knowledge of the approximate age or attractiveness of the photos, we cannot fully interpret Brown and Lewis' (2004) results.

In the present study, our goal was to replicate the basic methodology used by Brown and Lewis (2004), while attempting to remove the potential confound of “workplace romance” and use photographs that were selected for similarity, but also for cues of age and attractiveness that would be generally appealing to our undergraduate sample. We hypothesized that women would demonstrate a greater preference for a higher-ranked man when that man was not perceived to be her immediate supervisor (which would differ from Brown and Lewis' results), and that men would be most attracted to a lower-ranked woman (consistent with Brown and Lewis' results). Further, we predicted that cues of rank would have a larger impact on mate choice ratings in the recreational context than in the work-related context.

Materials and Methods

Participants

A total of 426 undergraduates at Grant MacEwan College (a liberal arts institution in northwestern Canada) participated in this study for course credit in an introductory psychology course. From that sample, we used data from 137 male and 271 female participants. All participants answered questions about their willingness to affiliate with the target, and we asked participants to answer mate choice questions only if they were sexually attracted to individuals who are the sex of the target. Eighteen participants provided answers that were consistent with homosexual orientation, but here we have reported data only from individuals who provided answers consistent with heterosexual orientation. It is possible, however, that there are members of our sample who are bisexual, or did not respond in a manner consistent with their actual sexual orientation.

The focus group that rated the photos (described later) was comprised of 10 male and 15 female senior undergraduate students ($M = 21.8$ yrs \pm 0.09 *SEM*) who did not participate in the study. These students were recruited for voluntary participation from a senior-level History of Psychology course.

Procedure

Participants were randomly assigned to one of 12 experimental conditions in a 2 (Participant Sex) X 2 (Target Sex) X 2 (Work/Recreation Context) X 3 (Relative Rank) between-subjects design. Our dependent variables were ratings of willingness to affiliate with the target in both sexual and non-sexual situations. We also included a manipulation check question, which is described in a later paragraph.

We presented each participant with a paragraph describing a single target individual (see below), and a photograph. Paragraphs varied by context (work-related versus recreational) and by relative rank (subordinate, equal or superior to the participant). The paragraphs we presented were based on those used by Brown and Lewis (2004), but we had the target work for a different company, or play for a different soccer team, in order to reduce the likelihood that participants would answer based on potential repercussions of engaging in a relationship with the target (e.g., getting fired, or asked to leave the team).

High rank/work related/man target example:

Please imagine that you work for a company, and that company has sent you to a convention to learn about new software for your office. You have been seated next to John, who works for a different company across town. John works in a position that would be equivalent to that of your immediate supervisor (the person that you report to on a daily basis, who is responsible for employee discipline and for rewarding reliable or creative performance). John seems like a nice man, he has a good sense of humor, and he is friendly.

Low rank/recreational/woman target example:

Please imagine that you play for a recreational soccer team, where you are a veteran player, and you are attending a local tournament. You have just met Sarah, who is friendly and has a good sense of humor. You've really enjoyed talking to her about your most recent game, and about local restaurants. Sarah is a rookie on her team (she's only been playing for a few months), and has a lot of great restaurant suggestions for you.

In the equal rank conditions, targets were described as holding the same job as the participant, or having equivalent soccer experience as the participant.

We selected photographs in a manner similar to that used by Brown and Lewis (2004). Thirty portrait photographs (15 male and 15 female) from a stock-photography website (www.sxc.hu) were presented to a group of raters who evaluated the photos for age and attractiveness. The raters were all senior students who did not participate in the study. Based on those ratings, we selected one male and one female photograph. Both photos were rated as attractive (Male, $M = 8.4 \pm 0.19$ SEM; Female, $M = 8.5 \pm 0.24$ SEM), and were perceived as within an age range that would be attractive to an undergraduate population (see Kenrick, Keefe, Gabrielidis, and Cornelius, 1996). The man was perceived to be approximately 27 years old ($M = 26.8 \pm 0.9$ SEM) and the woman was perceived to be approximately 25 years old ($M = 25.1 \pm 1.1$ SEM). We chose photos that appeared to be in their mid-20s so that it would be somewhat believable that these targets could be supervisors in a work-related setting, without being dramatically older than our typical participant population.

Participants read the paragraphs, then viewed the photo, and were then asked to

give their impressions of the targets. We used the same questions used by Brown and Lewis (2004), so all participants rated the extent to which they would like to work for the target, work with the target, or have the target work for them. They were then asked how much they would enjoy exercising, or going to a party with the target. Opposite-sex participants also rated the desirability of the target for dating, marriage or a one-time sexual encounter. Finally, as a manipulation check, participants were asked to rate the relative dominance of the target using the question “When you compare [the target] to yourself, how much power or status do you think [the target] has?”. All ratings were provided by the participant making an X along a line, between options similar to “not at all” and “very.” We then measured the distance (mm) from “not at all” to the participant’s X. Responses could vary between 0 and 12.4 mm (thus, 6.2 mm was the absolute midpoint of the scale).

Results

Manipulation check

For analyses of the manipulation check, we performed a 2 (Participant Sex) X 2 (Target Sex) X 2 (Work/Recreation Context) X 3 (Relative Rank) ANOVA. There was a main effect of rank, $F(2, 384) = 30.15, p < 0.0001$. Further, there was an interaction of context with rank, $F(2, 384) = 13.91, p < 0.001$, and a three-way interaction of context, rank and target sex, $F(2, 384) = 7.52, p = 0.001$. Further analyses of these significant interactions revealed that low-ranked men in the work-related scenario were seen as less powerful than were women described in the same way, $t = -3.16, p = 0.003$, and also much less powerful than equal-ranked men, $t(60) = -6.13, p < 0.0001$. When men and women were described as equal-rank in the workplace setting, male targets were rated higher for power, $t(57) = 3.31, p = 0.002$. Further, low-ranked men were rated much lower in the workplace setting than in the soccer setting, $t(69) = -4.16, p < 0.0001$, but equal-ranked men were rated more highly in the workplace setting than in the soccer setting, $t(64) = 3.06, p = 0.003$. There was no significant difference in ratings for high-rank men and women in neither the workplace nor the recreational setting, or for men and women described as “rookies” in the recreational scenario. Thus, participants did perceive that they would have power over targets described as subordinate, but this effect was somewhat more pronounced in the workplace setting, and differed by sex in the workplace setting (Figure 1a). In particular, low-ranking men in the workplace setting were seen as particularly subordinate, but equal-ranked men were rated higher than the midpoint of the scale. In the recreational setting, there was less differentiation by rank, although all “coaches” got higher ratings (Figure 1b).

Figure 1a. Mean \pm SEM ratings of target person in the workplace context for the question “When you compare [the target] to yourself, how much power or status do you think [the target] has?”

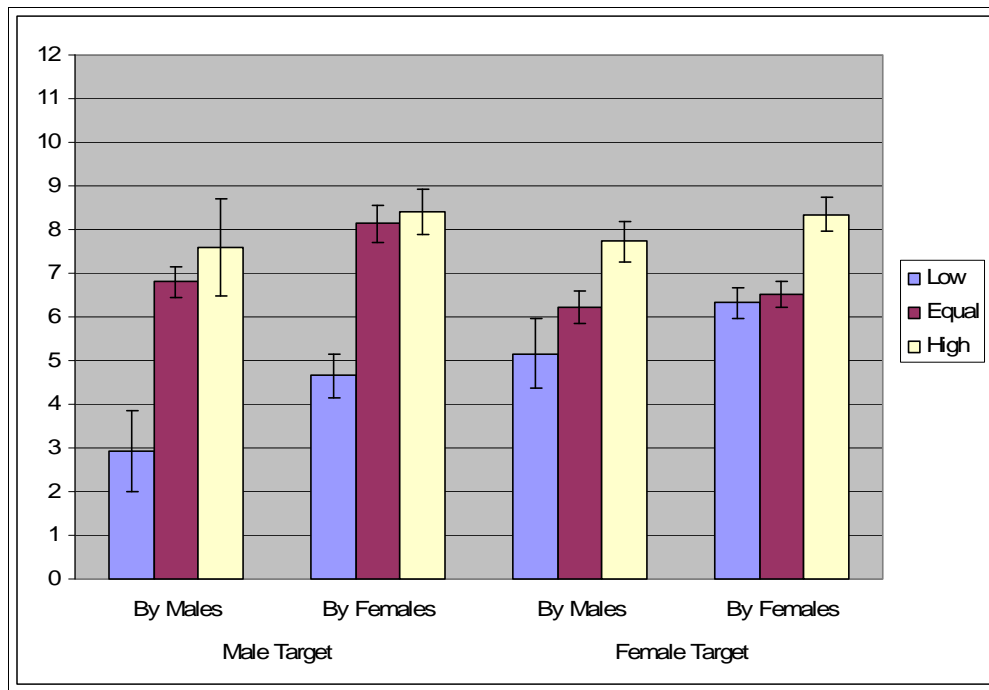
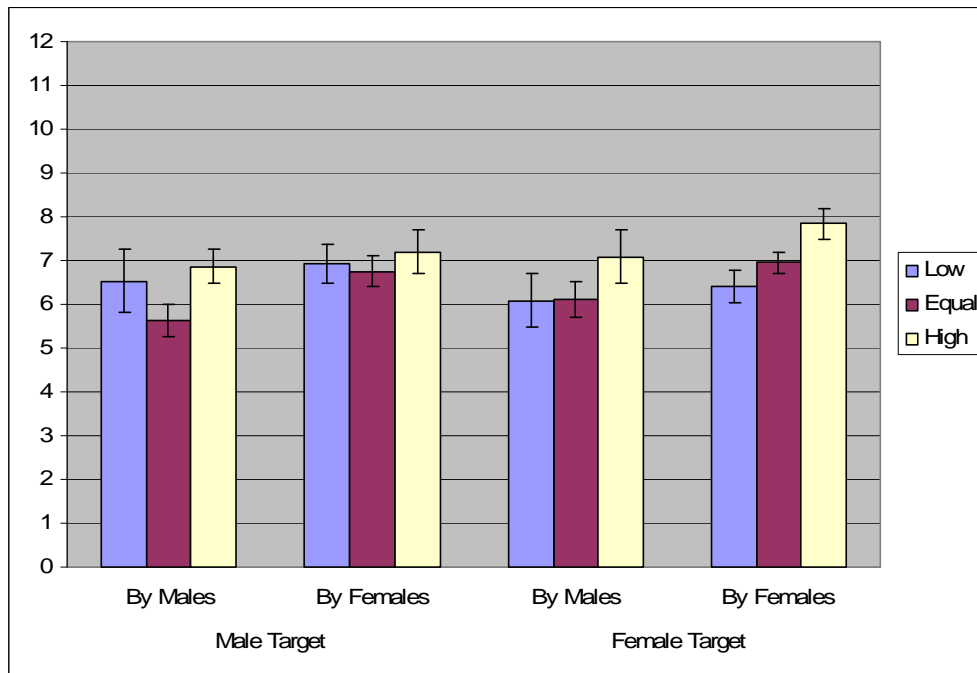


Figure 1b. Mean \pm SEM ratings of target person in the recreational context for the question “When you compare [the target] to yourself, how much power or status do you think [the target] has?”



Mate-choice ratings

See Figure 2a for data related to long-term mate ratings and Figure 2b for data related to short-term mate ratings. For analyses of mate choice ratings, we performed 2 (Target Sex) X 2 (Work/Recreation Context) X 3 (Relative Rank) ANOVAs. There was a main effect of target sex, such that female targets were given higher ratings by male participants for both long-term, $F(1, 203) = 30.83, p < 0.0001$, and short-term, $F(1, 203) = 85.03, p < 0.0001$, mating opportunities, when compared to ratings of male targets by female participants. Beyond this expected effect, there were no main effects of work/recreation context or relative rank. Further, there were no simple interactions among the variables. The only significant interaction was a context X rank X target sex interaction, $F(2, 203) = 3.14, p = 0.045$, on ratings of desirability for long-term relationships, such that there appears to be a different influence of rank cues on long-term mate choice ratings in the recreational setting, and those effects seem to differ by sex (Figure 2). Further analysis on data from the recreational context revealed a significant dominance X target sex interaction, $F(2, 114) = 3.459, p = 0.035$, and post-hoc contrasts indicate that high or equal-dominance women were rated more highly than low-dominance women, $t(44) = 2.15, p = 0.037$, but this pattern did not occur for male targets.

Figure 2a. Mean \pm SEM ratings of target person (by opposite-sex participants) as desirable for a long-term dating relationship, or potentially marriage.

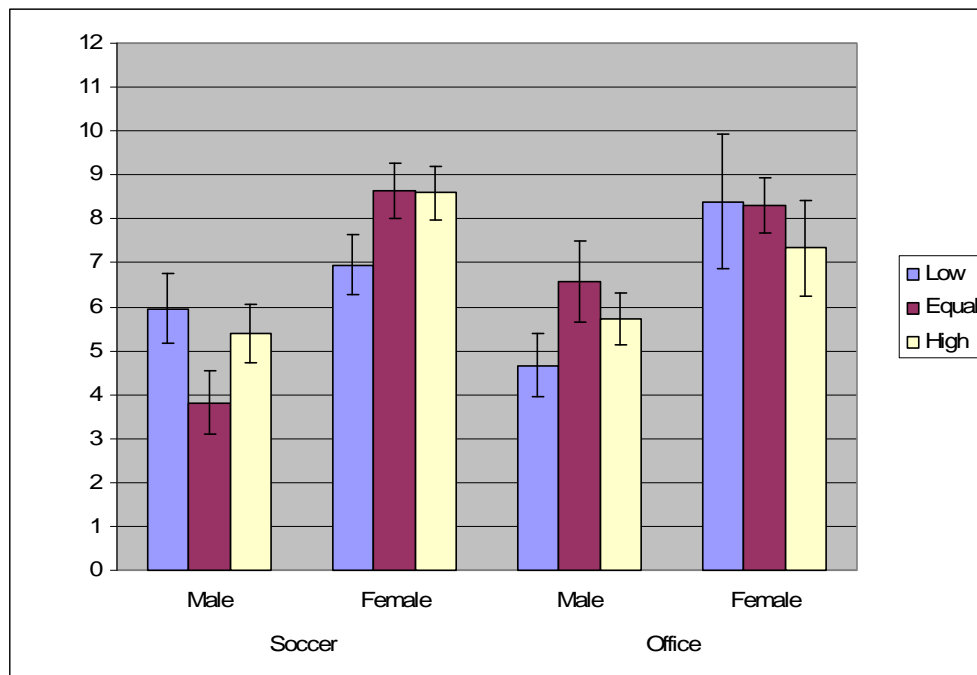
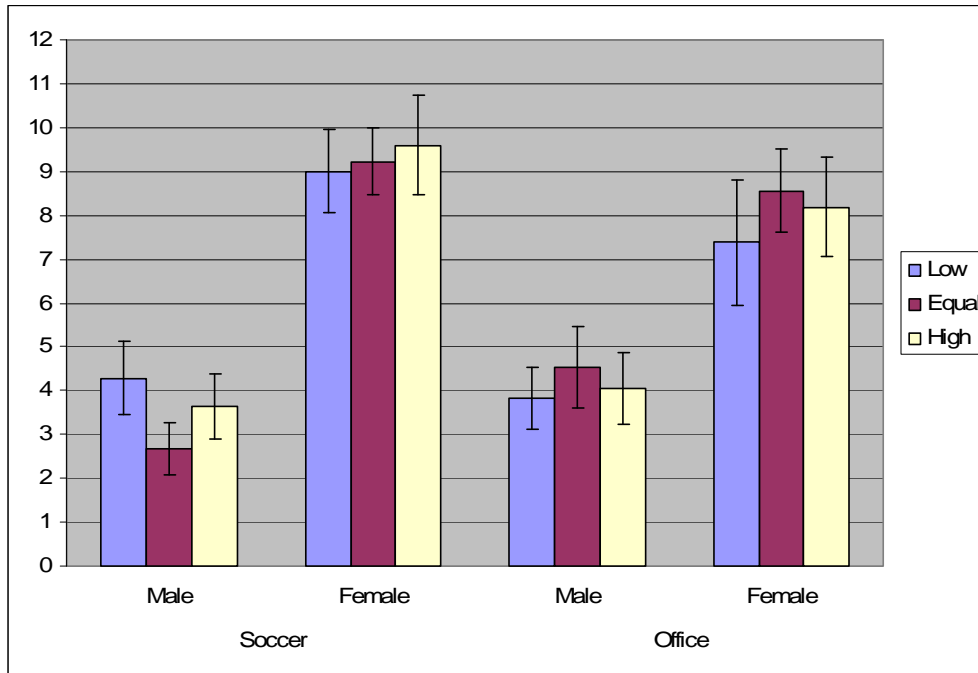


Figure 2b. Mean \pm SEM ratings of target person (by opposite-sex participants) as desirable for a short-term sexual encounter.



Affiliation ratings

For analyses of affiliation ratings, we performed 2 (Participant Sex) X 2 (Target Sex) X 2 (Work/Recreation Context) X 3 (Relative Rank) ANOVAs. There were main effects of context on willingness to work out with the target, $F(1, 384) = 35.77, p < 0.0001$, and to go to a party with the target, $F(1, 384) = 6.23, p = 0.013$. There were no main effects of relative rank on either affiliation question. There was a significant main effect of target sex on both working out, $F(1, 384) = 22.78, p < 0.0001$, and going to a party with the target, $F(1, 384) = 101.66, p < 0.0001$, such that female targets were given higher ratings for both activities. Participant sex had no main effect on the affiliation ratings. We found several interactions for the affiliation question about willingness to go to a party with the target. There was a context X rank interaction, $F(2, 384) = 3.78, p = 0.024$. Post-hoc analyses revealed that participants seemed to be less willing to go to a party with subordinates or superiors in the work-related setting, $t(173) = 2.285, p = 0.023$, but not in the recreational setting. Subordinate male targets in the work setting received the lowest ratings for going to a party, which is reflected in a context X rank X target sex interaction, $F(2, 384) = 5.09, p = 0.007$. Further, a rank X participant sex interaction, $F(2, 384) = 3.31, p = 0.038$, suggests that male participants are more willing to go to a party with equals or superiors, $t(73) = 2.00, p = 0.05$, compared to female participants. Results for the “Gym” question are presented in Figure 3a and results for the “Party” Question are presented in Figure 3b.

Figure 3a. Mean \pm SEM ratings of the extent to which participants would enjoy working out or playing sports with the target.

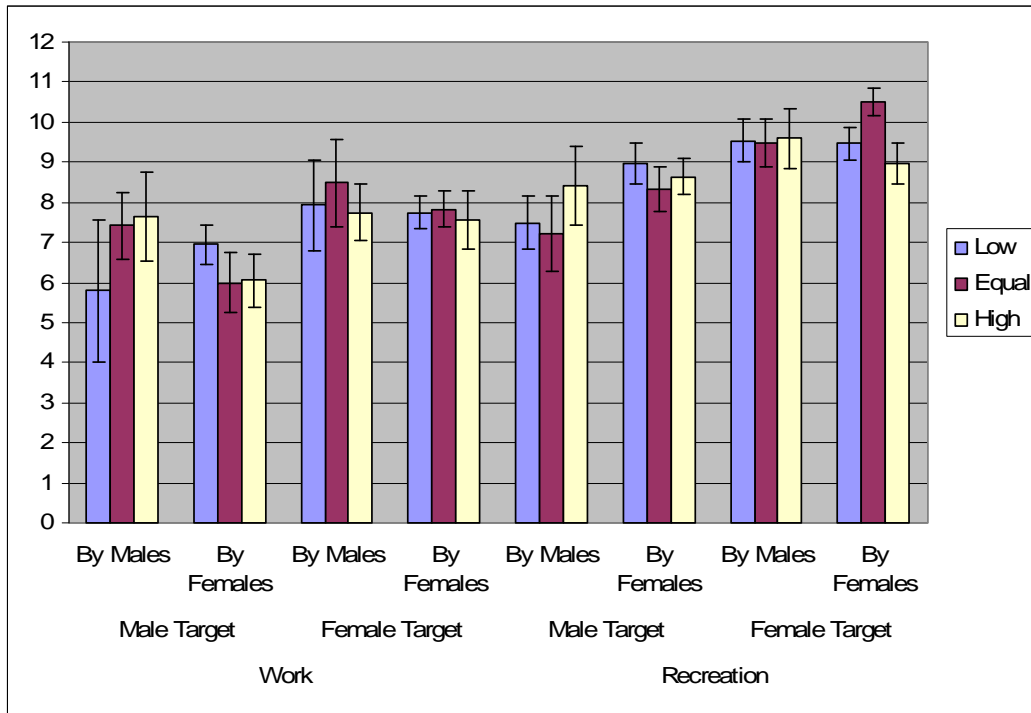
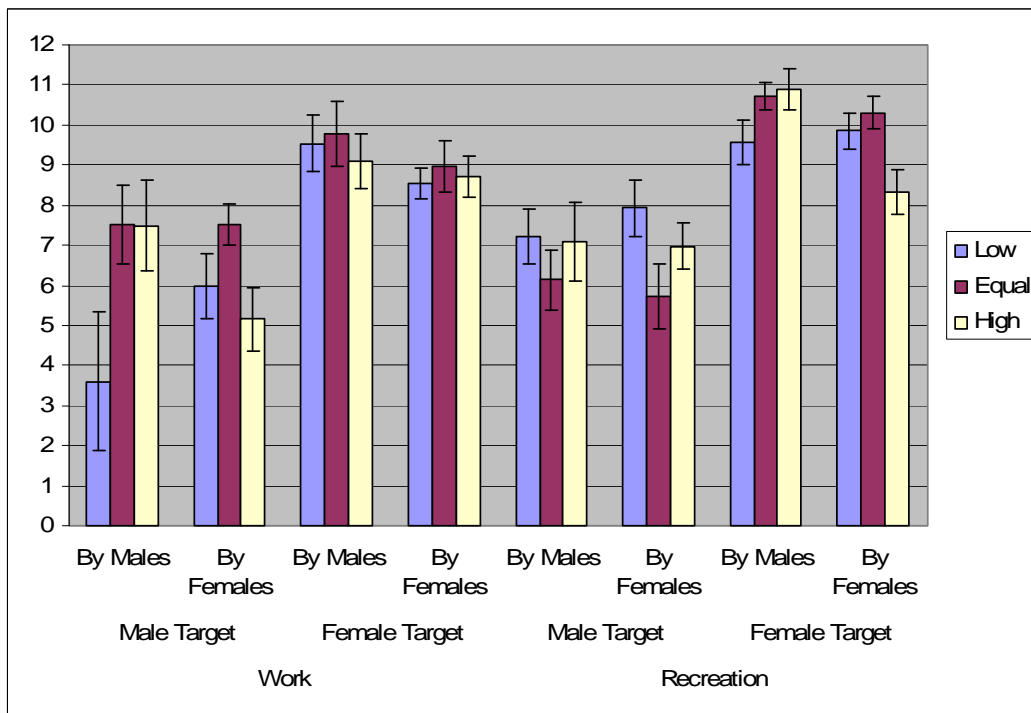


Figure 3b. Mean \pm SEM ratings of the extent to which participants would enjoy going to a party with the target.



Discussion

We did not find that men demonstrated a greater affinity for low-ranking women, nor did we find that women demonstrate a greater willingness to choose high-ranking men. Instead, we found very little effect of dominance, based on rank, on mate choice questions even though participants were clearly able to discriminate among the various levels of dominance within the workplace setting, and were at least able to differentiate superiors from others within the recreational setting. Relative dominance, as indicated by rank, did appear to affect affiliation decisions, but not mate choice. Further, the effects of dominance cues seem to be mediated by the context in which they are expressed. Work-related settings may be more structured by hierarchical dominance, such that our perception of rank is a more salient cue in those contexts. In our recreational context, participants did not seem to differentiate players by rank, although coaches were seen as more dominant. Perhaps in the more social context of playing recreational sport, rank is less obvious and exerts less control over our behavior or attitudes. Interestingly, although rank may be seen as more salient in the workplace setting, such cues may actually inhibit mate choice behaviors in the workplace. For long-term mate choice, in particular, there were greater differences among ratings of targets, by rank condition, in the recreational setting compared to the work-related setting, whereas there was somewhat more uniformity across dominance conditions in the work-related setting.

We found that context had a greater effect on affiliation decisions in this study than did rank. This result suggests that researchers should be aware that the context of a written scenario can be an experimental confound. In Brown and Lewis' (2004) study, the authors suggested that men attend to cues of dominance and demonstrate a preference for subordinate women, yet it is also possible that male participants in that study were responding to potential consequences of engaging in relationships with superiors or coworkers. If the power-structure in work-related settings makes us attend more to cues of rank, then it is to be expected that participants would respond in a manner that reflects not only mate choice decisions, but also an awareness of the dangers of dual relationships in the workplace.

An alternative explanation for the relative absence of main effects of rank in our study is that rank is not a particularly important aspect of person perception. We do treat people differently based on rank or perceived authority, but it is also the case that some "superiors" are not respected regardless of their position in a hierarchy. Do we attend more to dominant behaviors rather than relative rank? As previously described, researchers have found a number of powerful effects of both male and female dominance, using both hierarchical dominance cues (rank) or behavioral dominance cues (assertiveness). It would be worthwhile to determine whether behavioral cues are more salient than hierarchical cues by explicitly contrasting effects of those cues for affiliation decisions.

It is also possible that the absence of effect of rank is due to small sample sizes in some conditions. Although we had sufficient observed power to feel confident in our significant results, there was lower power for several of our analyses where no effect was found. It would be worth replicating this study with a larger sample (especially a larger sample of men) in order to be sure that we are not making a Type II error.

We interpret our results as evidence that cues of rank, at least in this sort of study, are not sufficient to affect mate choice in any consistent way. It is entirely possible,

however, that the physical attractiveness of our targets was sufficiently high as to mask any effects of dominance. If cues about dominance are “luxury” traits in the evaluation of women, in particular, (Li, Bailey, Kenrick, and Linsemeier, 2002) then it is to be expected that a target who is very physically attractive might be rated highly regardless of dominance level. Further, the photos that we used were not selected for relative masculinity or femininity. We know that cues of facial masculinity affect perception of dominance (Perrett et al., 1998) so the photos we selected may have been confounding participants’ impressions of the targets.

Dominance, whether hierarchical or behavioral, does not likely have linear effects on impression formation in social situations. There are multiple factors that interactively influence the perception of dominance, including rank, physical size, relative masculinity, assertiveness, aggression, and the ability to persuade or coerce others. In short, there are varying ways to be dominant (Buss, 1981) and this can result in differential preferences. Further, as we, and Brown and Lewis (2004), have demonstrated, dominance of a target is perceived in a manner that is relative to the participant, and may be dependent upon a participant’s beliefs about dominant individuals. Finally, as we have demonstrated in this study, the environment in which cues are evaluated may have an important influence on the efficacy of dominance cues for impression formation. So, if dominance is not a singular trait, we cannot expect dominance to have singular effects. Future research must systematically contrast and isolate parcels of variables associated with dominance in order to determine which variables have the greatest (potentially interactive) effects, and also determine what environmental cues mediate these effects.

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References

- Alexander, R. D., Hoogland, J. L., Howard, R. D., Noonan, K. M., and Sherman, P.W. (1979). Sexual dimorphisms and breeding systems in pinnipeds, ungulates, primates, and humans. In N. A. Chagnon and W. Irons (Eds.), *Evolutionary biology and human social behavior* (pp. 402-435). North Scituate, MA: Duxbury Press.
- Betzig, L. L. (1986). *Despotism and differential reproduction: A Darwinian view of history*. Hawthorne, NY: Aldine.
- Brown, S. L. and Lewis, B. P. (2004). Relational dominance and mate-selection criteria: Evidence that men attend to female dominance. *Evolution and Human Behavior*, 25, 406-415.
- Buss, D. M. (1981). Sex differences in the evaluation and performance of dominant acts. *Journal of Personality and Social Psychology*, 40, 147-154.
- Campbell, A. (1999). Staying alive: Evolution, culture and women’s intra-sexual aggression. *Behavioral and Brain Sciences*, 22, 203-214.
- Darwin, C. (1871). *The descent of man and selection in relation to sex*. London: Murray.
- Deutsch, R. D., Esser, A. H. and Sossin, K. M. (1978). Dominance, aggression, and the functional use of space in institutionalized female adolescents. *Aggressive Behavior*, 4, 313-329.
- Dloniak, S. M., French, J. A., and Holekamp, K. E. (2006). Rank-related effects of

- maternal androgens on behaviour in wild spotted hyenas. *Nature*, 440, 1190-1193.
- Eagly, A. H., and Karau, S. J. (1991). Gender and the emergence of leaders: A meta-analysis. *Journal of Personality and Social Psychology*, 60, 685-710.
- Egan, V., and Angus, S. (2004). Is social dominance a sex-specific strategy for infidelity? *Personality and Individual Differences*, 36, 575-586.
- Ellis, L. (1995). Dominance and reproductive success among nonhuman animals: A cross-species comparison. *Ethology and Sociobiology*, 16, 257-333.
- Fletcher, G. J. O., Tither, J. M., O'Loughlin, C., Friesen, M., and Overall, N. (2004). Warm and homely or cold and beautiful? Sex differences in trading off traits in mate selection. *Personality and Social Psychology Bulletin*, 30, 659-672.
- Gustafsson, A., and Lindenfors, P. (2009). Latitudinal patterns in human stature and sexual stature dimorphism. *Annals of Human Biology*, 36, 74-87.
- Gutierrez, S. E., Kenrick, D. T., and Partch, J. J. (1999). Beauty, dominance and the mating game: Contrast effects in self-assessment reflect gender differences in mate selection. *Personality and Social Psychology Bulletin*, 25, 1126-1134.
- Hawley, P. H. (1999). The ontogenesis of social dominance: A strategy-based evolutionary perspective. *Developmental Review*, 19, 97-132.
- Hopcroft, R. L. (2006). Sex, status, and reproductive success in contemporary United States. *Evolution and Human Behavior*, 27, 104-120.
- Hyde, J. S. (2005). The gender similarities hypothesis. *American Psychologist*, 60, 581-592.
- Keisling, B. L., and Gynther, M. D. (1993). Male perceptions of female attractiveness: The effects of targets' personal attributes and subjects' degree of masculinity. *Journal of Clinical Psychology*, 49, 190-195.
- Kenrick, D. T., Keefe, R. C., Gabrielidis, C., and Cornelius, J. S. (1996) Adolescents' age preferences for dating partners: Support for an evolutionary model of life history patterns. *Child Development*, 67, 1499-1511.
- Kenrick, D. T., Neuberg, S. L., Zierk, K. L., and Krones, J. M. (1994). Evolution and social cognition: Contrast effects as a function of sex, dominance and physical attractiveness. *Personality and Social Psychology Bulletin*, 20, 210-217.
- Li, N. P., Bailey, J. M., Kenrick, D. T., and Linsemeier, J. A. W. (2002). The necessities and luxuries of mate preferences: Testing the tradeoffs. *Journal of Personality and Social Psychology*, 82, 947-955.
- Little, A. C., Jones, B. C., Penton-Voak, I. S., Burt, D. M., and Perrett, D. I. (2002). Partnership status and the temporal context of relationships influence human female preferences for sexual dimorphism in male face shape. *Proceedings of the Royal Society of London, B*, 269, 1095-1100.
- Moore, L. T., McEvoy, B., Cape, E., Simms, K., and Bradley, D. G. (2006). A Y-chromosome signature of hegemony in Gaelic Ireland. *The American Journal of Human Genetics*, 78, 334-338.
- Onyango, P. O., Gesquiere, L. R., Wango, E. O., Alberts, S. C., and Altmann, J. (2008). Persistence of maternal effects in baboons: Mother's dominance rank at son's conception predicts stress hormone levels in subadult men. *Hormones and Behavior*, 54, 319-324.
- Perrett, D. I., Lee, K. J., Penton-Voak, I., Rowland, D., Yoshikawa, S., Burt, M., Henzi, S., Castles, D., and Akamatsu, S. (1998). Effects of sexual dimorphism on facial

- attractiveness. *Nature*, 394, 884-887.
- Perusse, D. (1993). Cultural and reproductive success in industrial societies: Testing the relationship at proximate and ultimate levels. *Behavioral and Brain Sciences*, 16, 267-322.
- Pusey, A., Williams, J., and Goodall, J. (1997). The influence of dominance rank on the reproductive success of female chimpanzees. *Science*, 277, 828-831.
- Sadalla, E. K., Kenrick, D. T., and Vershure, B. (1987). Dominance and heterosexual attraction. *Journal of Personality and Social Psychology*, 52, 730-738.
- Waynforth, D. (2002). Evolutionary theory and reproductive responses to father absence: Implications of kin selection and the reproductive returns to mating and parenting effort. In C. Tamis-LeMonda and N. Cabrera (Eds.), *Handbook of Father Involvement*. Mahwah, NJ: Erlbaum.
- Zerjal, T., Xue, Y., Bertorelle, G., Wells, R. S., Bao, W., Zhu, S., Qamar, R., Ayub, Q., Mohyuddin, A., Fu, S., Li, P., Yuldasheva, N, Ruzibakiew, R., Xu, J., Shu, Q., Du, R., Yang, H., Hurles, M. E., Robinson, E., Gerelsaikhan, T., Dashnyam, B., Mehdi, S. Q., and Tyler-Smith, C. (2003). The genetic legacy of the Mongols. *American Journal of Human Genetics*, 72, 717-721.