

MOTIVATIONS FOR MATE CHOICE DISCRIMINATION IN AN
INTERGROUP DATING CONTEXT

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ABSTRACT

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Social psychological approaches to understanding intergroup bias often assume that the motivations underlying intergroup bias are the same for both men and women (e.g. Tajfel & Turner, 1979). An interdisciplinary perspective that integrates social psychological perspectives with evolutionary theory provides a framework for making predictions about instances in which the motivations for intergroup bias may differ between men and women. Over the course of human evolutionary history men and women have faced unique adaptive challenges in their interactions with outgroups, particularly with outgroup *men*. Many intergroup interactions occur during times of intergroup conflict. For men, these interactions are typically characterized by aggressive and competitive striving for access to resources, but women's interactions often take the form of sexual victimization at the hands of the invading group. These distinct adaptive challenges likely gave rise to different psychological mechanisms for processing and responding to information about members of different groups, particularly *men* of the outgroup. Given the importance of reproductive choice in female mating strategies, women may have evolved psychological mechanisms for avoiding outgroup men in the service of protecting reproductive choice. Previous research has documented preliminary evidence for such mechanisms, finding that women's bias against outgroup men increases when threats to reproductive choice would be most costly, such as when women are in the fertile window of their menstrual cycle, when they

appraise themselves as particularly vulnerable to sexual coercion, and when they assess the outgroup as physically formidable or threatening. The present research builds on these findings by examining the influence of these mechanisms in an intergroup mating context. Specifically, the research examines gender differences in responses to unsolicited dating requests made by experimentally manipulated opposite-sex ingroup and outgroup members, with a particular emphasis on the unique motivations that underlie women's intergroup dating preferences. Results indicate that men are more willing to say yes to date requests overall, but neither men nor women show a strong ingroup dating preference. However, consistent with predictions, women that appraise themselves as being particularly vulnerable to sexual coercion and who are also in the fertile window of their menstrual cycle are less likely to say yes to date requests from outgroup members, but not ingroup members. This research builds on a growing body of literature providing evidence for a suite of psychological adaptations in women to protect reproductive choice.

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INTRODUCTION

In 2008, the United Nations Security Council (UNSC) unanimously voted to pass a resolution that would permit rape and other forms of sexual violence to be considered war crimes, crimes against humanity, or acts of genocide. The resolution was prompted by the fact that, during armed conflict, “women and girls are particularly targeted by the use of sexual violence” and that “such acts...in some situations have become systematic and widespread, reaching appalling levels of brutality” (UNSC Resolution 1820, p. 1-2). Although wars and conflicts between groups are primarily fought by men, women are often the victims of sexual aggression at the hands of the invading group. Moreover, anthropological evidence suggests that group raiding and warfare are significant predictors of rape frequency across a diverse sample of tribal societies (Sanday, 1981).

These findings suggest a historical pattern of intergroup interactions that differ between men and women. Whereas men’s interactions with outgroup men during times of conflict have typically been characterized by aggressive and competitive striving for access to resources, women’s interactions with outgroup men have often resulted in sexual victimization. From an evolutionary perspective, this suggests that men and women may have faced unique adaptive challenges with respect to intergroup contact. Different adaptive challenges likely gave rise to different psychological mechanisms for processing and responding to information about members of different groups, particularly *men* of the outgroup (McDonald, Navarrete, & Sidanius, 2011). As a result, men and women are expected to differ in the underlying motivations that drive prejudiced behavior against outgroups. Men’s prejudice is expected to be motivated by the goal of obtaining increased access to resources, whereas women’s prejudice is expected to be motivated by the goal of protecting reproductive choice.

Recent research has found preliminary, but compelling evidence in support of these predictions (Chang, Lu, Li, & Li, 2011; McDonald, Asher, Kerr, & Navarrete, 2011; Navarrete, McDonald, Molina, & Sidanius, 2010; Van Vugt, De Cremer, & Janssen, 2007). Yet, much of this research has either focused primarily on predictions regarding the motivations underlying *men's* intergroup biases, or has not tied these motivations to actual behavioral outcomes. Here, the focus is on how the female psychology of intergroup relations may have been shaped by an evolutionary history of sexual violence during intergroup conflict, and how this evolved psychology is reflected in biased attitudes and behavior in an intergroup mating context.

The Role of Parental Investment and Sexual Selection in Sex-Differentiated Reproductive Strategies

Although research suggests that men and women are more similar than they are different (Hyde, 2005), the ways in which men and women differ may have significant consequences. Parental investment theory (Trivers, 1972) provides a useful framework for understanding such sex differences. This theory begins with the observation that males and females differ quite dramatically in the minimum level of parental investment that is required to produce offspring. Males' obligatory investment ends after fertilization, but females bear the costs of placentation, gestation, birthing, and lactation. As the lower investing sex, males benefit to a greater extent than females from the monopolization of mating opportunities. This incentivizes competition among men for mating access to females (Trivers, 1972) and may have led to the use of sexually coercive and aggressive mating tactics to increase reproductive success (Thornhill & Palmer, 2000).

In non-human animals, male reproductive strategies that include the use of forced copulation are quite common and can be found across animals, including insects, fish, reptiles,

birds, and mammals (Lalumière, Harris, Quinsey, & Rice, 2005). In some species, males have evolved specialized physical traits that increase their ability to force copulation on resisting females. For example, in an insect species of water strider, *G. odontogaster*, males have evolved a grasping apparatus that is used exclusively during mating, the length of which (naturally and when experimentally manipulated) is associated with increased copulatory success (Arnqvist, 1989b; Arnqvist, 1992b). In the few examples of animal species in which males invest more in offspring, such as the pipefish, these roles are reversed, such that there is greater competition among females for access to mating opportunities (Lalumière, et al., 2005).

As the sex with higher levels of obligatory parental investment, females have less to gain than males from increased access to mating opportunities. Female's reproductive fitness is better optimized by seeking out high-quality mates in order to increase the reproductive fitness and success of offspring. This reproductive strategy prioritizes reproductive choice. Females benefit when they are able to select mates of high genetic quality and/or mates that signal a willingness to invest resources in shared offspring. Subversion of this choice via sexually coercive mating tactics would have detrimental consequences for female's reproductive fitness. Additionally, males that engage in coercive mating tactics are unlikely to provide the resulting offspring with the resources needed to increase offspring survival and fitness. Female victims of sexually coercive mating attempts may also be at an increased risk of being abandoned by their partner in order to avoid the costs of cuckoldry (Thornhill & Palmer, 2000). Given the potential reproductive advantage gained by the use of sexually coercive mating tactics among men, such tactics may have been a persistent enough threat to females throughout human evolutionary history that selection would have favored mechanisms for avoiding individuals and situations that pose a threat of sexual coercion.

In non-human animals, physical traits and behavioral strategies have been observed that reduce the success or likelihood of forced copulation attempts by males. For example, females of the insect species of water striders, *G. incognitos*, have elongated spines along their abdomen that appear to serve the function of increasing the space between the female's abdomen and that of males attempting to force copulation (Arnqvist & Rowe, 1995). In orangutans (*P. pygmaeus*), females exhibit a preference for mating with large adult males. This preference may be, in part, to garner protection from smaller adult males that often use forceful mating tactics to copulate with females (Fox, 2002).

Recent research suggests that human females may also be equipped with adaptations for avoiding and preventing sexual coercion. Using the logic described above, threats to reproductive choice are most costly for females when they result in conception. The risk of conception for females is not constant across the menstrual cycle, rather, conception risk peaks in the days immediately preceding and following ovulation (Wilcox, Dunson, Weinberg, Trussell, & Baird, 2001). Given this fluctuation, mechanisms for avoiding sexual coercion would be most useful when conception risk is elevated. Outside this window of increased threat, such avoidance mechanisms may impose unnecessary costs on the individual, such as lost opportunities for foraging and social exchange.

Evidence for the existence of psychological mechanisms designed to avoid sexual coercion has been found in a variety of domains. For example, women in the ovulatory window of the menstrual cycle have been shown to display increased hand grip strength after being exposed to cues of sexual coercion, but no such effect occurred for women in the other phases of the menstrual cycle (Petrallia & Gallup, 2002). Women are also more likely to avoid activities that may put them at increased risk of sexual assault, such as going to a party alone in the

evening or walking alone in a park or forest, when conception risk is elevated (Chavanne & Gallup, 1998; Bröder & Hohmann, 2003). Additionally, women in the fertile window of the menstrual cycle exhibit a greater tendency to infer coercive intent among male strangers than women in other phases of the menstrual cycle (Garver-Apgar, Gangestad, & Simpson, 2007). All of these findings converge in support of the hypothesis that women may be equipped with mechanisms for avoiding threats to their reproductive choice, when those threats pose the greatest potential cost.

Given the evidence described above, the likelihood of being raped should decline during the fertile window of the menstrual cycle. However, the available data suggest that modern rape frequencies do not significantly vary across the different phases of the menstrual cycle (Fessler, 2003). A number of potential explanations could account for this finding. For example, research has documented increased attraction among men to women in the fertile window of their menstrual cycle (Doty, Ford, Preti, & Huggins, 1975; Guéguen, 2012; Miller, Tybur, & Jordan, 2007; Pipitone & Gallup, 2008; Roberts et al., 2004). This increased attraction when conception risk is elevated may lead to an increased likelihood of using sexually coercive mating tactics. Failure to consider this potential variation in the base rates of sexual coercion across the menstrual cycle would make it difficult to draw conclusions about the effectiveness of anti-coercion mechanisms. Researchers have also hypothesized that women in the fertile window of the menstrual cycle may exert greater effort resisting sexual assailants (Thornhill & Palmer, 2000). This may lead to an increased likelihood of being injured and subsequently reporting the sexual assault via hospital records. This potential variability in reporting rates across the menstrual cycle could obscure any actual decrements in rape frequency when risk of conception is heightened. Differences between ancestral and contemporary environments, such as the

increased use of alcohol and drugs, may also act to reduce the effectiveness of rape-avoidance mechanisms in modern environments. Despite evidence suggesting that rates of sexual assault do not decline during the fertile window of the menstrual cycle, it is still an open question as to whether psychological mechanisms for avoiding sexual coercion are effective in contemporary environments.

Starting from the simple observation that males and females differ in their obligatory levels of parental investment, it is possible to extend the logic of the theories of parental investment and sexual selection to provide a distal explanation for why men sometimes resort to the use of sexually coercive mating tactics, and why women are inclined to avoid individuals and situations that pose a threat of sexual coercion. In the next section, with the addition of research from anthropology, this logic is extended further to suggest that outgroup men may have historically posed a greater threat of sexual coercion than ingroup men. And that, as a result, women may be equipped with specific psychological mechanisms for avoiding sexually coercive threats from *outgroup* men in particular.

Intergroup Conflict and Threats to Reproductive Choice

Throughout history, intergroup conflict has provided greater affordances for sexual violence to be perpetrated against women, especially by men of the invading group (Lalumière, Harris, Quinsey, & Rice, 2005). Reviewing historical evidence on the association between war and rape, Lalumière and colleagues (2005) summarize that “Mass rape has been perpetrated by American soldiers in Vietnam, Pakistani soldiers in Bengal, German soldiers on the Eastern front in the Second World War, [and] Soviet soldiers during the invasion of Germany...” (p. 25). During the Japanese occupation of the then capital of China, Nanking, historians have suggested that 20,000 women were raped (Chang, 1998; Roland, 2007). The Warburton Commission,

established to investigate the treatment of Muslim women during the Bosnian War, estimated that between 10,000 and 60,000 Muslim women were raped (Buss, D.E., 1998). Using data from Murdock & White's (1969) Standard Cross-Cultural Sample, Sanday (1981) examined correlates of rape frequency in 75 tribal societies. Results indicated four significant predictors of rape frequency: degree of interpersonal violence, ideology of male toughness, raiding other groups for wives, and war. The Yanomamö tribes of Southern Venezuela and Northern Brazil provide a perfect illustration of the association between intergroup raiding and rape. Based on the anthropological work of Napoleon Chagnon (1988), Wrangham and Peterson (1996) describe the intergroup raids of the Yanomamö: "The stated object of a raid is to kill one or possibly two men and escape. If the raiders can do so without risking losses, however, they may abduct a woman from the enemy village. The abducted woman will be raped by all the raiders, taken to their village, raped by the remaining men in the village, and then given as a wife to one man. She can expect to spend the rest of her life with her new companions" (p. 67). Though it is difficult to provide precise estimates of the frequency of rape during military and tribal conflicts, the weight of evidence suggests that, throughout human history, intergroup conflict has sharply increased a woman's risk of becoming the victim of sexual violence (Brownmiller, 1975; Epp, 1997; Lawson, 1989; Mezey, 1994; Niarchos, 1995; Rosenman, 2000; Seifert, 1996).

Proximally, many features of warfare may lead to an increase in sexual violence, including the absence of consenting heterosexual mating options, antagonistic attitudes toward the victims' group, and a reduced likelihood of punishment or retaliation (Smuts, 1996). Distally, the ultimate function of intergroup conflict may be to extract reproductive resources. This includes the direct acquisition of females from the outgroup, as well as the acquisition of resources that indirectly increase one's mating opportunities, such as increased social status as a

soldier or warrior, or greater access to territory and food resources. This association between mating and warring has been demonstrated empirically in research showing that men, but not women, are more likely to endorse statements supporting war after they are primed with attractive members of the opposite sex as opposed to unattractive members of the opposite sex or national flags (Chang et al., 2011).

Given that violent intergroup conflict may have been even more common in prehistoric societies than has been the case in modern or historical societies (see e.g., Keeley, 1996; Pinker, 2012), the association between sexual coercion and outgroup men may have been quite strong for women throughout human evolutionary history. As a result, outgroup men may have posed a more probable threat of sexual assault than ingroup men, controlling for the time women spent in proximity to members of each group (Navarrete, McDonald, Molina, & Sidanius, 2010; Wrangham & Peterson, 1996). For these reasons, women may have evolved more specific psychological mechanisms for protecting reproductive choice within intergroup contexts.

This theoretical framework lends itself to the generation of a number of predictions regarding the motivations underlying intergroup bias among women. For example, women should exhibit greater levels of bias against outgroup men than outgroup women, given that outgroup men have historically posed a greater threat to women's safety and reproductive choice. Women's bias against outgroup men should increase when threats to reproductive choice are most costly, that is, when conception risk is elevated. Women who appraise themselves as being particularly vulnerable to threats to their reproductive choice, or who are most fearful of sexual coercion, are expected to exhibit heightened levels of intergroup bias. Outgroup men that are perceived as a greater threat to reproductive choice as a function of heightened physical formidability are also likely to be the target of increased bias given that such men would be more

capable of effectively constraining a woman and compromising her reproductive choice.

Research in support of each of these predictions is provided below.

Empirical Support for a Gendered Psychology of Prejudice

In recent years, research has accumulated providing support for the notion that women's intergroup bias reflects, at least in part, a motivation to protect reproductive choice. In a series of studies, Navarrete, McDonald, Molina and Sidanius (2010; Studies 3 and 4) showed that women's racial bias is elevated among women who appraise themselves as being particularly vulnerable to, or fearful of, sexual coercion, even when controlling for domain-general fearfulness. Importantly, this elevated bias was directed primarily against *outgroup males* and not outgroup females or ingroup members. These findings complement a large literature originating within Social Dominance Theory finding that intergroup bias is primarily directed at minority *men* across a large variety of samples (reviewed in McDonald, Navarrete, & Sidanius, 2011).

Biases against outgroup members also appear to be related to fertility, as research has shown that White women in the fertile window of the menstrual cycle exhibit heightened levels of racial bias against Black males. This effect was even stronger among women who reported a greater fear and vulnerability to sexual coercion (Navarrete et al., 2009). These findings suggest that women's bias against outgroup men may function to protect reproductive choice by avoiding individuals that may have historically posed a greater threat of sexual coercion, particularly when those threats would be most costly, and among women who are most vulnerable to such threats.

Recent research has expanded on these findings by investigating how women's prejudice varies as a function of fertility as well as non-consciously held perceptions of the threat posed by men of the outgroup (McDonald et al., 2011). In this study, women's implicit evaluations of

outgroup men using both Black and White women as research participants, was examined. Results indicated that women's implicit racial bias was significantly predicted by their risk of conception, but only among women who associated the racial outgroup with physicality (McDonald, Asher, Kerr, & Navarrete, 2011). Specifically, women who were in the fertile window of the menstrual cycle, and who also perceived the outgroup as physically threatening, exhibited more implicit prejudice than women who were not fertile or who did not view the outgroup as physically threatening. From a functional perspective, women may be more biased against outgroup men who pose a physical threat because those men are more capable of effectively constraining a woman's behavior and reproductive choice.

The Role of Social Categorization in Intergroup Bias

Modern-day intergroup conflict is often defined along racial or ethnic lines, however, for most of our evolutionary history the geographic distribution of different racial groups would have made it very unlikely that an individual would have encountered a member of a different racial group (Stringer & McKie, 1997). Instead, humans lived in small bands, or coalitions, of between 10 and 50 individuals that often came into conflict with neighboring bands. Rather than being defined by race or ethnicity, coalitional groups were likely identified by features such as style of dress, shared dialect, and the display of coalitional badges or markings (Kurzban, Tooby, & Cosmides, 2001). Given this evolutionary history, it is unlikely that the human mind evolved cognitive mechanisms to process information specifically about racial groups, instead, it is much more likely that humans evolved to process information about coalitional groups. As a result, the human mind may use simple categorization processes as a heuristic for identifying members of ingroups and outgroups. Indeed, research on *minimal groups* has demonstrated that individuals assigned to a novel group on the basis of arbitrary criteria (e.g. whether you are an

underestimator or overestimator of dots; Tajfel, Billig, Bundy, & Flament, 1971) still exhibit an intergroup bias, that is, they allocate more rewards to fellow ingroup members than outgroup members. Even though group membership is largely irrelevant to the task, the simple act of categorization is sufficient to produce intergroup bias. These findings can be understood within the context of a coalitional group psychology in which any cues that aid social categorization, however arbitrarily formed, provide an index of one's coalitional group membership. More than just a random group of individuals, coalitions are capable of engaging in coordinated action and therefore represent a greater threat to the ingroup. Indeed, research suggests that groups of similar individuals are perceived by others as more antagonistic (Dasgupta, Banaji, & Abelson, 1999). From this perspective, racial bias may be a byproduct of a more basic coalitional bias in which skin tone is used as an indicator of coalitional group membership. Subsequently, the same mechanisms that produce intergroup bias in a racial context should also produce intergroup bias in a coalitional context without the presence of racial cues.

In a critical test of this idea, McDonald and colleagues (2011) conducted a follow-up study to that described above, where women of all ethnicities were assigned to one of two *minimal groups* (Tajfel, et al., 1971) on the basis of a color-perception task. After this assignment, participants were asked to wear a t-shirt that matched the color of their minimal group for the rest of the experimental session. Participants then completed measures assessing their implicit bias against the outgroup (individuals wearing the opposing color t-shirt) and the extent to which they implicitly associated those outgroup members with physicality. Despite the fact that the groups had been divided along arbitrary lines, the same pattern of effects emerged as with racial groups. That is, fertile women who associated the minimal outgroup with physicality

exhibited more bias against them—even though they had no previous experience with the outgroup, and group categories were clearly trivial.

These results provide compelling evidence that the mechanisms by which women's evaluations of outgroup men become more negative with increasing fertility do not depend on a specific racial context, and may instead be tied to a more general psychological system that evolved to detect and respond to coalitional groups. This system likely relies on more basic categorization processes that respond to even minimal cues of group membership.

In summary, previous research suggests that women's intergroup bias is, at least in part, driven by an unconscious motivation to protect reproductive choice. Evidence for this claim includes the finding that women's intergroup bias is primarily directed at outgroup men, and that this bias is elevated among women that would be most vulnerable to threats to their reproductive choice. This includes women who are in the fertile window of their menstrual cycle, women who appraise themselves as being particularly vulnerable to sexual coercion, and women who perceive the target outgroup to be physically formidable. Importantly, these mechanisms are not specific to a racial group context. Rather, the psychological mechanisms appear to operate at a broader level that responds to simple cues indicating a coalitional group membership.

The Current Research

Women's intergroup bias is thought to function, at least in part, to motivate women to avoid targets that have historically posed a significant threat to their reproductive choice. Yet, research in this area has not yet linked this motivation to a behavioral outcome. Previous research has taken as an assumption that women's implicit biases against outgroup men will lead to discriminatory behavior, but these assumptions have not yet been tested. Discriminatory behavior should be most apparent in contexts where women's reproductive choice is most

readily threatened, such as contexts that provide short-term mating opportunities. To address these questions, the present research compares men and women's responses to intergroup mating requests. Given the goal of protecting reproductive choice and the potential threat to this goal that outgroup men pose, women are predicted to be less willing than men to accept dating requests from outgroup members. This should be particularly true when threats to reproductive choice are most costly, that is, when women are fertile, and when they appraise themselves as particularly vulnerable to sexual coercion or assess the outgroup member to be physically formidable or threatening. Previous research has already documented that women exhibit a stronger ingroup dating preference, but only with pre-existing group memberships, such as race (Fisman, Iyengar, Kamenica, & Simonson, 2006; Sprecher, Sullivan, & Hatfield, 1994). The present research uses minimal groups so that group membership can be randomly assigned. This enables conclusions to be drawn about intergroup bias from a coalitional perspective, without contamination from pre-existing stereotypes about, and biases against, racial groups. The present research also examines the role of conception risk, vulnerability to sexual coercion, and perceptions of outgroup target formidability in motivating intergroup bias among women.

To assess mating decisions, the present research employs a modified version of the research paradigm on dating propositions developed by Clark and Hatfield (1989). In their classic study, research confederates approached attractive students on a college campus and said, "I have been noticing you around campus. I find you to be very attractive." Then the confederate made one of three possible requests: (1) "Would you go out with me tonight?" (2) "Would you come over to my apartment tonight?" or (3) "Would you go to bed with me tonight?" Across two studies (collected in 1978 and 1982), results indicated that the rates of acceptance for the latter two requests differed significantly between males and females (Table 1). Specifically, men were

much more likely to respond positively to requests to go back to the requestors apartment (Study 1: 69% versus 6%; Study 2: 69% versus 0%) and to requests to go to bed with the requestor (Study 1: 75% versus 0%; Study 2: 69% versus 0%). These findings were also replicated in a later study (Clark, 1990). The large gender differences in positive responses are consistent with an evolutionary perspective in which women, as a result of their larger parental investment, have less to gain than men from securing access to many short-term mating opportunities and tend to have higher standards for selecting short-term mates.

For the present research, the original paradigm was modified slightly. Participants signed up to participate in a psychological study purportedly investigating “Personality and Online Communication.” After completing a series of questionnaires, participants interacted with another participant (actually a confederate) online via Skype chat. Participants were not able to see their chat partner in real-time, but they were led to believe that a Skype profile photograph of an attractive member of the opposite-sex was their chat partner. They were also told that their own photograph was being displayed to their chat partner. After brief introductions, the confederate followed a nearly identical script as that used in the original studies to make one of the three requests. Each participant’s conversation with the confederate was saved and coded for whether the participant said yes or no to the request, as well as how willing they were to respond positively.

These changes to the original paradigm provide a safer environment for both the participant and the research confederate. This design also permits the collection of individual difference measures prior to the interaction, so that the role of personality in predicting responses can be examined. Although some of these changes make the setting less naturalistic (participants know they are taking part in a psychological study), the manipulation is structured so that

participants are led to believe the request is not part of the experiment. Much of recent research attempting to replicate the findings of Clark and Hatfield use vignette studies that simply ask participants to indicate how they think they would respond to the three requests (e.g. Conley, 2010). This approach may be more susceptible to self-presentation biases and, as a result, may not align with true behavioral responses. The methods adopted for the present study attempt to strike a balance between the naturalistic approach of the original study and the purely-hypothetical approach of vignette studies.

Given the departures from the original paradigm, Study 1 attempts to conceptually replicate the results reported by Clark & Hatfield (1989). Specifically, the prediction is that men will be more likely than women to agree to the latter two requests (i.e., going to the requestors' apartment and having sex with the requestor). Study 1 also serves the purpose of evaluating which of the requests produces the most variability in women's responses, so that individual difference predictors can be used to examine the motivations underlying women's intergroup dating biases. Using this request, Study 2 expands this paradigm to an intergroup context; participants interact with a member of the opposite sex that has ostensibly been assigned to the same minimal group as the participant or a different group from the participant. The hypotheses for this study are as follows: (H1) Overall, men will be more likely than women to say yes to the request, (H2) women will show a stronger ingroup dating preference (or outgroup bias) than men, (H3) the ingroup dating preference will be elevated among women with heightened conception risk and who appraise themselves as vulnerable to sexual coercion, and (H4) the ingroup dating preference will be elevated among women with heightened conception risk and who perceive the male requestor as physically formidable or threatening.

STUDY 1

Study 1 was conducted as a conceptual replication of the original Clark and Hatfield study (1989). This paradigm allows the evaluation of men and women's responses to mating requests along a continuum of short-term mating requests. In the original study, women were very unlikely to respond positively to the more sexual requests, but approximately half of the women responded positively to the date request. Results from the current study will be used to select a dating request for Study 2 that provides sufficient variability in women's responses. The date request could be used given that it produced good variability in the original study, however, those data were collected over 30 years ago, and significant changes have been made to the experimental procedure. As such, it is important to first examine the response rates of men and women in this modified version of the Clark and Hatfield (1989) paradigm.

Method

Participants

Participants were 133 Michigan State University students recruited through the Psychology Participant Pool. The composition of the sample was 58% female and 84% White, with an average age of 19.38 ($SD = 1.46$). Participants were excluded from the final sample if they reported a non-heterosexual sexual orientation ($n = 7$) or if they elected to have their data withdrawn following the debriefing that informed them of the use of deception ($n = 1$). This left a final sample size of 125.

Procedure

Participants signed up to participate in a psychological study ostensibly about personality and online communication. Prior to their scheduled session participants were instructed to submit a recent photograph of themselves that did not include other individuals. Participants were not

permitted to participate if they did not submit a photo in advance. Upon arrival, participants were told that the purpose of the study was to evaluate how people get to know each other during online interactions, and that they would be chatting online with another participant located in another lab.

After completing a set of personality questionnaires, the participant was permitted to begin chatting with the other participant (actually a confederate of the study). Once the interaction started, the research assistant excused him or herself to use the bathroom and remained outside of the lab until 5 minutes had elapsed. This was done to ensure that the participant did not try to notify the research assistant about the nature of the request during the online interaction (the research assistant was blind to experimental condition).

Participants engaged in the typed-conversation via Skype chat; all video communication was disabled. However, an attractive photograph (attractiveness was evaluated via pretesting and is described below) of the participant's ostensible chat partner was made visible via the confederate's Skype Profile. Participants were also led to believe that their own picture had been uploaded for their chat partner to view (to protect the identity of the participant from the confederate, their picture was not actually uploaded). Depending on the sex of the participant, the confederate introduced themselves as either Michael or Ashley (the two most popular baby names in 1992, around the time when most participants were likely to have been born) and then asked the participant if he or she is a psychology major. The participant typically returned this question, which the confederate responded to positively.

Following this, the confederate said, "I think I've seen you around campus before. I think you're really attractive," and then, based on a random assignment to condition, made one of three requests: (1) "Do you want to go out with me tonight?" (2) "Do you want to hang out at my place

tonight?” (3) “Do you want to have sex with me tonight?” The confederate waited for the participant’s response, confirming their seriousness if necessary. Following this, the confederate backed off the request by saying, “Sorry, that was really forward, maybe we should actually get to know each other more first! haha,” and then continued the conversation with a series of question prompts (e.g. What do you like to do for fun? Have you seen any good movies lately? What kind of music do you like?) until the other research assistant returned to the lab.

After 5 minutes, the research assistant returned and indicated that the online chat was over. Participants were then directed to a set of computer-administered follow-up questions that included three debriefing items probing for suspicion. Participants were then fully debriefed by the research assistant and given the opportunity to withdraw their data if they wished.

Materials and Measures

Chat Partner Photographs. A large sample of pictures of attractive young males and females was obtained online from royalty-free stock photo websites. Ratings of attractiveness (1 = Not at all Attractive, 4 = Moderately Attractive, 7 = Very Attractive) for these photos were obtained in a pre-test study from an independent sample of 50 participants (24 males, 26 females). Five photos from each gender pool were selected for use based on two criteria (1) having a high average rating of attractiveness, and (2) having a low standard deviation of ratings, that is, greater consensus among raters on the attractiveness of the photo. The average attractiveness of the male photos, as rated by the female participants, was 5.49 ($SD = .67$) and the average attractiveness of the female photos, as rated by the male participants, was 5.51 ($SD = .73$). An independent samples t-test indicated that these ratings were not significantly different from one another, $t(48) = .081$, $p = .936$, $d = .03$. Consensus among the raters indicated strong agreement for attractiveness levels (male photos rated by female participants: $r_{wg} = .85$, female

photos rated by male participants, $r_{wg} = .82$; calculations based on a slightly skewed null distribution, LeBreton & Senter, 2008). For each session, the photograph to be used was selected randomly from within the appropriate gender category (example stimuli can be obtained by contacting the author). A chi-square test indicated that yes/no response patterns did not differ across the different images for each gender (female images: $\chi^2(4) = 3.10, p = .542$; male images: $\chi^2(4) = 4.18, p = .382$), so all reported analyses are collapsed across the different images within gender.

Participant Responses and Willingness. The chat conversations between each participant and the research confederate were saved and then edited to remove cues to the gender of the participant (e.g., names were deleted). These conversations were then coded by two research assistants to create two dependent response variables. All interactions were coded as either a Yes (1) or No (0) to the request. If the participant did not clearly indicate a response, coders made a judgment about which direction the participant was leaning (e.g. the response “Well I don't know you so I don't know about that lol” was coded as a “no”). Responses were also coded for how willing the participant was to accept the request from 1 (Not at all willing) to 5 (Very willing). Inter-rater reliability was good for both measures. For the dichotomous response, coders agreed on 92% of responses (Kappa = .77, $p < .001$). For willingness ratings, coders agreed exactly on 71% of responses and ratings were strongly correlated, $r = .86, p < .001$ (Kappa = .60, $p < .001$). Discrepancies for both variables were resolved by the author.

Suspicion Check. Following the online interaction, participants responded to three items attempting to probe for suspicion. The first two permitted open-ended responses: “What do you think the purpose of this study was?” and “Did you find anything odd or peculiar about this

study?” The third item asked participants to indicate on a 5-point scale how suspicious they were that their chat partner was not real (“Not at all suspicious” to “Very suspicious”).

Results

To evaluate whether there were gender differences in the overall likelihood of a positive response, a 2 (Gender) by 2 (Response: Yes or No) Chi-square test was performed. Results indicated that men were more likely to respond positively to the requests (44.2%) than were women (11.0%), $\chi^2(1) = 18.03, p < .001$. This finding was also confirmed when participant’s willingness to respond positively was considered. Men were more willing to respond positively ($M = 2.88, SD = 1.45$) than were women ($M = 1.77, SD = .86$), t -test with unequal variances, $t(76.25) = -4.97, p < .001, d = .77$.¹

Gender differences in response patterns were then tested separately by the level of request. Table 1 summarizes the findings and compares them to the original findings of Clark and Hatfield (1989). Contrary to previous research that failed to find gender differences in response to requests to go out on a date (Clark & Hatfield, 1989), men were significantly more likely to say yes to the date request (75.0%) than were women (8.7%), $\chi^2(1) = 18.03, p < .001$. Men were also more likely to say yes to the request to hang out at the requestors place (36.8%) than were women (21.7%), $\chi^2(1) = 1.16, p = .281$, but the effect was not statistically significant. Although there were fewer positive responses in the sex condition overall, the same gender difference was obtained. Men were more likely to say yes (23.5%) than were women (3.7%), $\chi^2(1) = 4.07, p = .044$. The same pattern of results was obtained when examining ratings of the participant’s willingness to respond positively by level of request. Men were more willing to go on a date than women (Men: $M = 3.63, SD = 1.41$; Women: $M = 2.04, SD = .77$; t -test with

unequal variances, $t(21.22) = -4.09$, $p = .001$; $d = 1.13$), more willing to hang out at the requestors place, though this was not statistically significant (Men: $M = 2.68$, $SD = 1.34$; Women: $M = 2.17$, $SD = .83$; t -test with unequal variances, $t(29.00) = -1.45$, $p = .158$; $d = .38$), and more willing to have sex than women (Men: $M = 2.41$, $SD = 1.42$; Women: $M = 1.19$, $SD = .62$; t -test with unequal variances, $t(19.94) = -.37$, $p = .003$; $d = .86$).

Table 1

Responses to Requests by Gender and Condition for Study 1 Compared to Results from Clark and Hatfield (1989)

Condition:	Percentage of Yes Responses (n/N)			Mean Willingness (SD)		
	1	2	3	1	2	3
Men	75%	37%	26%	3.63	2.68	2.41
	(12/16)	(7/19)	(4/17)	(1.41)	(1.34)	(1.42)
Women	9%	22%	4%	2.04	2.17	1.19
	(2/23)	(5/23)	(1/27)	(.77)	(.83)	(.62)
Clark & Hatfield (1989)	Percentage of Yes Responses (n/N): Study 1			Percentage of Yes Responses (n/N): Study 2		
	1	2	3	1	2	3
Men	50%	69%	75%	50%	69%	69%
	(8/16)	(11/16)	(12/16)	(8/16)	(11/16)	(11/16)
Women	56%	6%	0%	50%	0%	0%
	(9/16)	(1/16)	(0/16)	(8/16)	(0/16)	(0/16)

Note. Conditions for current study / Clark and Hatfield (1989) studies: 1 = “Do you want to go out with me tonight?” / “Would you go out with me tonight?”; Condition 2 = “Do you want to hang out at my place tonight?” / “Would you come over to my apartment tonight?”; Condition 3 = “Do you want to have sex with me tonight?” / “Would you go to bed with me tonight?”

The lower acceptance rates in response to requests to hang out at the chat partner's place and to have sex may be the result of increased levels of suspicion. Indeed, participants' suspicion that their chat partner was not real approached the ceiling of the 5-point scale, $M = 4.47$, $SD = .88$. To examine whether suspicion influenced participant's responses, and whether the influence of suspicion varied across conditions, a multiple regression analysis was performed predicting participants' willingness to respond positively to the request. Predictors were entered stepwise as follows (1) participants' suspicion, standardized, (2) participant gender, (3) two dummy codes for experimental condition, and (4) two interaction terms between standardized suspicion and the dummy codes for experimental condition. There was no statistical evidence for a significant main effect of suspicion ($b = -.17$, $\beta = -.13$, $t(118) = -1.03$, $p = .307$), nor an interaction between suspicion and experimental condition (change in $R^2 = .002$, $F(2,118) = .16$, $p = .854$).

Discussion

Previous research has found that men and women do not differ in their likelihood of responding positively to date requests, but diverge when requests are farther along the short-term mating continuum (Clark & Hatfield, 1989). The present findings document similar gender differences but do not exactly duplicate the original pattern of results, which may be in part attributable to changes in the experimental procedure or generational differences. In the current study men were more likely to respond positively to the date request than women, whereas there was no gender difference for date requests in the original study. Men and women did not differ significantly in their likelihood of saying yes to hanging out at the requestor's place, although rates of acceptance were higher for men. In previous research, men were significantly more likely to say yes to this request than women. The result from the original study that was clearly replicated using this procedure was that men were more likely to accept an invitation for casual

sex than women. The overall rates of acceptance, however, were much lower than the rates in the original study (23.5% versus 75% and 69%).

In previous research, the date request is argued to be a long-term mating request. Yet, because the request is presumably made on the basis of attraction alone, and no other attributes, it is likely interpreted as a more short-term request. Assuming this, the tendency for men to respond positively with greater frequency than women is not at all surprising. Yet, if the request was interpreted as a long-term mating request, then the significant gender difference may be the result of men and women evaluating their chat partner on different attributes. In long-term mating, both men and women tend to be more particular about mate selection, but focus on different attributes. Whereas men tend to place a higher value on attractiveness of mates, women tend to place a higher value on a potential partner's current or prospective earning potential (Buss & Schmitt, 1993). For the male participants in this study, cues of attractiveness were readily accessible via the photograph. However, for women, there were no cues to earning potential at the time the request was made. This discrepancy may have resulted in greater reluctance to respond positively among women.

The failure to find evidence of a significant gender difference in response to the request to hang out at the chat partner's apartment may be an issue of power, or the result of ambiguity in the interpretation of the request. The phrase: "Do you want to hang out at my place tonight?" may be interpreted as a benign request or as an invitation for casual sexual activity. A brief online survey of undergraduate students confirms the presence of this ambiguity. When asked what a member of the opposite sex hopes to happen when they invite you to hang out at their place, the majority of respondents indicate something intimate or sexual (68%; $n = 121$). However, a sizable proportion of individuals also indicate that they may just want to get to know

each other, watch a movie, order food, or hang out with friends (32%; $n = 56$). This ambiguity makes it difficult to interpret the lack of a gender difference in response rates to the request.

Another departure from the original findings is that men were less likely to respond positively to the *hang out* and *sex* requests than they were in the original studies. This could be a result of increased suspicion in online interactions (Donn & Sherman, 2002) or because the experimental context increased suspicion. The naturalistic setting of the original study should have eliminated concerns of suspicion that the request was not real, but these concerns were quite prevalent in the present study. Although there was no statistical evidence for a significant main effect of suspicion or an interaction between suspicion and experimental condition, the design of Study 2 was altered to reduce overall levels of suspicion. These changes, among others, are described below.

STUDY 2

The results of Study 1 indicate that the modified version of the sexual requests paradigm conceptually replicates the gender difference in receptivity to short-term mating requests reported by Clark and Hatfield (1989). The purpose of Study 2 is to evaluate gender differences in responses to intergroup mating requests, with a particular emphasis on the motives underlying intergroup bias among women. To address these questions, several changes were implemented to the design described in Study 1. First, increased statistical power was needed to evaluate potential individual level predictors of women's intergroup bias. Rather than splitting participants across three different request conditions, only one request type was used. The ideal request is one that indicates a short-term mating context but still produces a significant amount of variation in women's responses so that individual difference predictors can be effective. Given the ambiguity of the "hang out" request and the low number of females responding affirmatively

to the “sex” request, the date request was used, but it was slightly modified to increase response rates. Specifically, participants were asked if they wanted to “hang out” sometime this week. This request is seemingly non-threatening as it provides participants with an opportunity to meet in person before deciding if they want to continue their interaction more seriously. As a result, the use of this request was expected to increase female response rates. Yet, it may still be considered a shorter-term request given that it was made prior to any significant exchange of personal information between the requestor and the participant, and was presumably made on the basis of attraction alone.

Heterosexual individuals not in romantic relationships were specifically recruited so as to reduce barriers to acceptance of requests. Female participants not currently using hormonal contraceptives were also recruited so that variation in conception risk could be used to predict response patterns. Selection of participants based on these features is an advantage of the current study design that would be more difficult in a naturalistic study.

To reduce suspicion among participants that their chat partner was not real, participants first interacted with two other “participants” (research confederates) that followed a script for a typical first-time interaction, and did not make any date requests. During the third interaction, participants were propositioned with the date request. Participants were expected to find the final interaction more believable given exposure to seemingly normal interaction partners. Additionally, because participants indicated surprise in the debriefing items about how quickly the request was made in Study 1, the request for Study 2 was made after a series of three question prompts instead of only one.

To manipulate group membership, participants were assigned to a minimal group (red, blue, or yellow) on the basis of a simple color perception task. Using this intergroup

manipulation, the predictions for Study 2 were: (H1) Overall, men will be more likely than women to say yes to the request, (H2) women will show a stronger ingroup dating preference (or outgroup bias) than men, (H3) stronger ingroup dating preferences will be associated with increased conception risk, particularly among women who appraise themselves as vulnerable to sexual coercion, and (H4) stronger ingroup dating preferences will be associated with increased conception risk, particularly among women who perceive the male requestor as physically formidable or threatening.

Method

Participants

Participants included 371 Michigan State University students enrolled in the Psychology Participant Pool. Heterosexual and single participants were preferentially recruited for participation via the description of participation requirements for the study, as were females that were not using hormonal contraceptives. Of those that participated, 21 individuals were dropped from all analyses due to experimenter error ($n = 12$), homosexual sexual orientation ($n = 6$), a large age discrepancy ($n = 2$),² and a serious language barrier ($n = 1$). Of the remaining 350 participants, 263 were female (75.1%) and the average age of the sample was 19.27 years ($SD = 1.66$). The racial/ethnic breakdown of participants was as follows:³ 279 White; 36 Black; 21 Asian; 9 Hispanic; 15 multiracial or “other.” A moderate proportion of the sample, 32.6% (114), reported being in a romantic relationship. Participants were randomly assigned to experimental condition, resulting in 53.1% of the sample being assigned to the ingroup condition (186) and 46.9% being assigned to the outgroup condition (164).

Procedure

Participants signed up for a two-part study purportedly exploring “Personality and Online Communication” via the online psychology participant pool. For the first part, participants completed a series of questionnaires online. For the second part, participants attended a lab session, but were instructed to submit, prior to their arrival, a recent digital photograph of themselves with no one else pictured. Upon arrival at their session, participants were assigned to either a red, yellow, or blue group on the basis of a color perception task. A computer monitor presented an image of a 56-block grid of two primary colors (randomly assigned: red and blue, red and yellow, or blue and yellow); which were dispersed randomly in equal proportion across the grid. On each of three trials, a grid was presented for 2 s, followed by a prompt to indicate which color on the grid was more prevalent. Following the third trial, participants were told that they more readily perceived whichever color they estimated as more prevalent on at least two of the three trials and were subsequently assigned membership to that group (e.g., “You tend to perceive BLUE more easily, you are in the BLUE group”). Participants wore a T-shirt matching their group assignment in order to remind them of their group membership throughout the rest of the experiment. The photograph submitted by the participant prior to their session was then digitally manipulated to add a colored border around the picture that matched the participant’s group membership color.

Following their group assignment, participants completed a stereotype implicit association test, or stereotype IAT (described in more detail below; Amodio & Devine, 2006), using minimal groups as the target groups (McDonald et al., 2011). Participants were then told that they would be interacting with three other participants online via Skype chat. In reality, they interacted with the same research confederate for each conversation. Video communication was

disabled but participants were able to view a photograph of the person presumed to be their chat partner. A colored border was added to each of these photographs so that it appeared as though each individual had been assigned to a red, blue, or yellow group, just as the participant had been. The participant's first two interactions always occurred with an ingroup member (the border around the pictures matched that of the participant's), the gender of which was counterbalanced. The third interaction always occurred with an attractive member of the opposite sex that was randomly assigned to be either an ingroup member (matching border color) or an outgroup member (non-matching border color). Each interaction lasted five minutes and was followed with a brief survey assessing the participant's perception of the chat partner.

The research confederate used a set of question prompts to guide the first two interactions (e.g. What do you like to do for fun?). For the third interaction, the confederate introduced him or herself as either Michael or Ashley depending on whether the participant was a male or female, and then asked the following questions, (1) "How are you?" (2) "What year are you?" (3) "What is your major?" After this, the research confederate typed to the participant, "Your picture looks really familiar, I think I've seen you around campus before," followed by, "I think you're really attractive. Do you want to hang out with me sometime this week?" If the participant indicated a yes response, the confederate continued the conversation with more question prompts. If the participant indicated a no response, the confederate was instructed to back off from the request by typing, "Sorry, that was really forward, maybe we should get to know each other more first, haha!" and then continued with the conversation prompts until five minutes elapsed. The research assistant then directed the participant to the final follow-up measures, a manipulation check, and items probing for suspicion. Upon completion, the research assistant fully debriefed the participant and provided them with the opportunity to withdraw their data.

Materials

Chat Partner Photographs. A large sample of pictures of attractive young males and females was obtained online from royalty-free stock photo websites. Care was taken to ensure that the photographs did not appear to be of posed professional models so as to reduce participants' suspicion that their chat partners were not real participants. Ratings of attractiveness (1 = not at all attractive, 4 = moderately attractive, 7 = very attractive) for these photos were obtained in a pre-test study from an independent sample of 186 participants (61 males, 125 females). An attractive male photograph and female photograph were selected for the third online interaction that would serve as the photographs for both the ingroup and outgroup condition (example stimuli can be obtained by contacting the author). Photos were selected on the basis of two criteria (1) having a high average rating of attractiveness and (2) having a low standard deviation for ratings, that is, greater consensus among raters on the attractiveness of the photo. The average attractiveness of the male photo, as rated by the female participants, was 4.85 ($SD = 1.44$) and the average attractiveness of the female photo, as rated by the male participants, was 4.75 ($SD = 1.51$). An independent samples t-test indicated that these ratings were not significantly different from one another, $t(184) = .43$, $p = .666$, $d = .07$. Consensus among the raters indicated strong agreement for attractiveness levels (male photos rated by female participants: $r_{wg} = .79$, female photos rated by male participants, $r_{wg} = .71$; calculations based on a slightly skewed null distribution, LeBreton & Senter, 2008).

The photos for the first and second interaction partners were selected to (1) have a lower average rating of attractiveness than the photos for the third interaction partner and (2) have a low standard deviation for ratings. The average attractiveness of the male photo, as rated by the female participants, was 2.87 ($SD = 1.24$) and the average attractiveness of the female photo, as

rated by the male participants, was 2.74 ($SD = 1.38$). An independent samples t-test indicated that these ratings were not significantly different from one another, $t(184) = -.67, p = .504, d = .10$. Paired sample t-tests indicated that these photographs were rated significantly less attractive than the same gender photograph used for the third interaction (female photos: $t(60) = 9.43, p < .001, d = 1.50$; male photos: $t(123) = 11.98, p < .001, d = 1.37$). Consensus among the raters indicated moderate agreement for attractiveness levels (male photos rated by female participants: $r_{wg} = .53$, female photos rated by male participants, $r_{wg} = .65$; calculations based on a slightly skewed null distribution, LeBreton & Senter, 2008).

Predictors of Intergroup Dating Preferences

Conception Risk. Risk of conception varies throughout the menstrual cycle, peaking in the time surrounding ovulation (days 11-15). To assess conception risk, female participants were asked to report the dates of the beginning of their last two menstrual periods, using calendars to help make their estimates. Subtracting the two dates provided an estimate of cycle length. Current cycle day was determined using the forward counting method (Wideman, Montgomery, Levine, Beynnon, & Shultz, 2013). Participants were also given the opportunity to report the date of onset of their next menstrual cycle by completing a brief online survey on the day that their next menstrual period began, and earned one additional course credit for doing so. When this prospective data was available it was used in combination with the most recent menstrual cycle onset to calculate cycle length instead of using both retrospective dates. Participants who were pregnant or currently late for their menstrual period, using hormonal contraceptives, or reported non-standard cycle lengths, (less than 20 days or greater than 40 days), were excluded from relevant analyses.

Conception risk values were estimated by mapping participants' cycle day onto actuarial data from women attempting to become pregnant (Wilcox, Dunson, Weinberg, Trussell, & Baird, 2001). The actuarial data is separated into three categories: women with regular cycles, women with irregular cycles, and all women. Women's cycle day was mapped onto the conception risk values from the appropriate category, based on whether the participant reported an irregular menstrual cycle (i.e. one that has varied by more than 2 weeks within the last 6 months). If the participant was unsure of their cycle regularity, the data from the "all women" category was used. Conception risk values ranged from .00 to .094 ($M = .03$, $SD = .03$), with higher values indicating a greater probability of conception, were intercourse to occur.

Vulnerability to Sexual Coercion. Self-appraised vulnerability to sexual coercion (VSC) of female participants was measured using the 30-item Fear of Rape Scale (Senn & Dzinis, 1996). The items on the scale assess behavioral vigilance against past and potential threats (e.g., "Before I go to bed at night I double check to make sure the doors are securely locked"), wariness of men (e.g., "I am wary of men"), and explicit fear of sexual assault (e.g., "I am afraid of being sexually assaulted"). Participants were instructed to indicate the extent to which they agree or disagree with each item on a 7-point scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). A composite score of all of the items was created ($M = 4.14$, $SD = .82$) that exhibited good reliability (Cronbach's $\alpha = .91$).

Indirect Assessment of Target Formidability. To assess the extent to which participants associate the minimal outgroup with physical formidability, the stereotype Implicit Association Test was used (stereotype IAT; Amodio & Devine, 2006). The stereotype IAT was used to evaluate how strongly participants associated the outgroup with the concept "Physical" relative to their association of the ingroup with the concept "Mental." The task presents

participants with paired categories (e.g. Blue Group and Physical versus Yellow Group and Mental) at the top left and right corners of the computer monitor. Representative stimuli from each category appear in the center of the monitor and the participant's task is to quickly sort the stimuli into the proper paired category. After a series of trials, the category pairings are switched (e.g. Blue Group and Mental versus Yellow Group and Physical) and participants perform the sorting task again. A difference score is calculated (Greenwald, Nosek, & Banaji, 2003) comparing the speed with which participants are able to make these two sets of categorizations. If participants are faster when the blue group is paired with physical than when it is paired with mental, it suggests that the blue group is perceived by the participant to be more closely associated with the concept physical than mental, or alternatively, that the yellow group is more closely associated with the concept mental relative to physical.

The stereotype IAT was presented to participants using the color groups that the participant viewed during the color perception task. The representative stimuli for the color group categories were images of White males (taken from the NimStim Database; Tottenham et al., 2009) from the chest up that had been digitally manipulated to appear as if they were wearing a red, blue, or yellow t-shirt. Targets wearing the same color t-shirt as the participant were considered an ingroup member, whereas targets wearing the opposing color were considered an outgroup member. The representative stimuli for the physical and mental categories included words such as muscular, strong (physical category), brainy, and library (mental category). Example stimuli are provided in Appendix A (Table 1A) and the supplemental figures provided by McDonald and colleagues (2011). The data were scored so that higher values indicate a stronger association between the participant's outgroup and the concept physical, or alternatively, the participant's ingroup and the concept mental ($M = -.03$, $SD = .46$).

Direct Assessment of Target Formidability. Following each online interaction, participants answered a series of questions about their impression of their chat partner. These items included the extent to which they found their chat partner dominant and aggressive, as well as the attributes likeable, intelligent, attractive, moral, and disgusting. Responses were recorded on a 7-point scale ranging from 1 (Not at all) to 7 (Very much so). The attributes dominant and aggressive were moderately correlated ($r = .53, p < .001$). The average of these two items was used as an indicator of the extent to which participants perceived their chat partner as physically formidable or threatening.

Assessment of Intergroup Dating Preferences

Participant Responses and Willingness. The chat conversations between each participant and the third interaction partner were saved and then edited to remove any cues to the gender of the participant. These conversations were then coded by two research assistants for whether the participant said Yes (1) or No (0) and how willing the participant was to say yes to the request from 1 (Not at all willing) to 5 (Very willing). When responses were unclear, coders were instructed to make a judgment about which direction the participant was leaning. Coders agreed on 91.67% of cases for the yes/no response ($Kappa = .83, p < .001$). There was less exact agreement for the willingness variable, but the ratings were highly correlated ($r = .88, Kappa = .529, p < .001$). Discrepancies between the coders were resolved by a third, independent coder.

Manipulation and Suspicion Check

As a manipulation check to ensure that participants noticed their chat partner's group assignments, following the last set of ratings for the third interaction, participants were asked to indicate to which color group each of their three chat partners belonged. The large majority of participants were able to accurately recall the group membership of their chat partners: first

interaction partner 90%, second interaction partner 84%, third interaction partner 80%. This provides evidence that the experimental manipulation was salient to participants.

Participants then completed two open-ended items probing for suspicion: “What do you think the purpose of this study was?” and “Did you find anything odd or peculiar about this study?” Following this, participants were asked to indicate how suspicious they were that their chat partners were not real, from 1 (Not at all suspicious) to 5 (Very suspicious). The average level of suspicion among participants was 3.49 ($SD = 1.44$), which is significantly less than the average suspicion reported in Study 1 ($M = 4.47$, $SD = .88$; t -test with unequal variances, $t(359.73) = 8.90$, $p < .001$). This suggests that the changes in procedure for Study 2 were effective in reducing participants’ suspicion. Levels of suspicion did not differ between experimental conditions, $t(348) = 1.53$, $p = .878$. However, suspicion was correlated with participants willingness to respond positively to the date request, $r = -.13$, $p = .017$, such that more suspicious participants were less likely to say yes to the request than those that were less suspicious. For this reason, suspicion was included as a covariate in the analyses that follow.

Results

Relationship Status and Responses to Date Request

A sizable minority of participants in the sample indicated that they were currently involved in a romantic relationship (35.0% of females and 25.3% of males). Participants in romantic relationships were less willing to say yes to the date request than those not in a romantic relationship (relationship $M = 2.64$, $SD = 1.53$; single $M = 3.58$ $SD = 1.60$; $t(348) = 5.32$, $p < .001$; $d = .58$). However, 47.4% of participants in relationships said yes to the date request (significantly more males: 86.4% than females: 38.0%; $\chi^2(1) = 16.63$, $p < .001$). Given that a substantial proportion of participants in relationships said yes to the date request, non-

single participants were included in the analyses that follow, but relationship status was included as a covariate given its association with participants' willingness to respond positively to the request.

Gender Differences in Responses to Date Request

Overall, 61.14% of participants said yes to the date request, but this differed significantly between males and females, $\chi^2(1) = 42.88, p < .001$. Among male participants, 90.80% said yes to the date request. In contrast, 51.33% of the female participants said yes. This pattern was also reflected in the willingness data; males were more willing to respond positively to the date request ($M = 4.40, SD = .98$) than were women ($M = 2.90, SD = 1.61$; t -test with unequal variances, $t(244.37) = 10.34, p < .001$). The effect size for this gender difference was large ($d = .93$). These findings support H1; men were more likely to respond positively to the date request than were women.

Gender Differences in Intergroup Dating Preferences

To examine gender differences in intergroup dating preferences, willingness to respond positively to the date request in the ingroup condition was compared to willingness in the outgroup condition, separately for males and females. Males in the ingroup condition had an average willingness of $M = 4.44 (SD = .88)$ versus $M = 4.36 (SD = 1.08)$ in the outgroup condition, $t(85) = 0.37, p = .713, d = .08$. Females in the ingroup condition had an average willingness of $M = 2.91 (SD = 1.68)$ versus $M = 2.90 (SD = 1.54)$ in the outgroup condition, t -test with unequal variances, $t(258.84) = 0.05, p = .964, d = .06$. These results suggest a small, non-significant, effect of group condition. Data for yes/no responses to the requests revealed the same pattern; 93% of men in the ingroup condition said yes to the request compared to 88.6% in the outgroup condition. Similarly, 60.4% of women in the ingroup condition said yes to the

request relative to 55.7% in the outgroup condition. To examine these effects controlling for relationship status and participant's suspicion, a multiple regression analysis was conducted with willingness to respond positively to the date request as the dependent variable. Participant gender, group condition (ingroup or outgroup chat partner), and their interaction were entered simultaneously as the predictors along with participant's relationship status and suspicion as covariates. Significant main effects emerged for suspicion ($b = -.17$, $\beta = -.15$, $t(344) = -3.25$, $p = .001$), relationship status ($b = -.83$, $\beta = -.24$, $t(344) = -5.10$, $p < .001$), and gender ($b = 1.46$, $\beta = .39$, $t(344) = 5.90$, $p < .001$). Neither the main effect of group condition ($b = .05$, $\beta = .02$, $t(344) = .302$, $p = .763$), nor the interaction between gender and group condition were statistically significant ($b = .00$, $\beta = .00$, $t(344) = 0.00$, $p = .997$). These findings provide little support for H2⁴, which stated that women would show a stronger ingroup dating preference than men.

Although there is a slight, non-significant, tendency for men and women to prefer ingroup members over outgroup members, the magnitude of the effect does not vary by gender.

Predictors of Women's Intergroup Dating Preferences

The next analysis examined whether women's intergroup dating preferences are moderated by individual risk factors, such as conception risk, vulnerability to sexual coercion, and the extent to which a women perceives the outgroup target as physically formidable or threatening (descriptive statistics for these variables can be found in Table 2).

Table 2

Descriptive Statistics for Female Participants in Study 2 by Group Condition

	Female Participants					Outgroup Mean (SD)
	1.	2.	3.	4.	5.	
1. Willingness	-	-.04	-.13	.04	-.14	2.90 (1.54)
2. Conception Risk	.03	-	.09	-.10	-.03	.03 (.03)
3. Vulnerability to Sexual Coercion	-.04	.01	-	-.06	-.07	4.18 (.84)
4. Stereotype IAT	.05	-.01	.03	-	-.04	-.07 (.47)
5. Dominance/Aggressiveness	-.16	-.28*	-.01	.03	-	3.16 (1.63)
Ingroup Mean	2.91	.03	4.11	.03	3.05	
(SD)	(1.68)	(.03)	(.83)	(.40)	(1.67)	

Note. * $p < .05$. Correlations in the top diagonal represent those participants in the outgroup condition; correlations in the bottom diagonal represent those participants in the ingroup condition

To examine this possibility, three multiple regression analyses were conducted. The first included the interaction of conception risk and women's vulnerability to sexual coercion (H3); the second and third included an interaction between conception risk and the association of the outgroup with physical formidability (H4; assessed indirectly via the stereotype IAT and directly via the evaluation of the chat partner as dominant and aggressive).

Conception Risk and Vulnerability to Sexual Coercion. The first analysis examined whether women who perceive themselves as more vulnerable to sexual coercion exhibit a greater bias against dating outgroup men when conception risk is high. A multiple regression analysis was conducted using only female participants with complete data on all relevant variables, and whose menstrual cycle data met the criteria for the scoring of conception risk (i.e. they were not

using hormonal contraceptives, were not pregnant or currently late for their menstrual period, and they reported cycle lengths between 20 and 40 days). This resulted in a sample size of 117 participants for the analysis. The dependent variable was participants' willingness to respond positively to the date request. The primary predictors included in the analysis were group condition—whether the date request came from an ingroup (0) or outgroup member (1), zero-centered conception risk, and zero-centered vulnerability to sexual coercion. All two-way and three-way interactions among these variables were also included. Participant suspicion and relationship status (0 = single, 1 = non-single) were entered as covariates.⁵

Table 3

Willingness Response to Date Request by Group Condition, Conception Risk, and Vulnerability to Sexual Coercion

Variable	<i>b</i>	β	<i>SE</i>	<i>t</i>
Suspicion	-.25	-.22	.11	-2.27*
Relationship Status	-.70	-.19	.33	-2.12*
Group Condition	-.41	-.13	.30	-1.37
Conception Risk	5.88	.11	6.53	.90
Vulnerability to Sexual Coercion	.41	.21	.25	1.67
Condition x C. Risk	-11.31	-.22	9.84	-1.15
Condition x VSC	-.94	-.47	.42	-2.21*
C. Risk x VSC	6.16	-.10	8.76	.70
Condition x C. Risk x VSC	-30.18	-.47	15.04	-2.01*

Note. * $p < .05$. Relationship status is coded 0 (single), 1 (non-single). Group condition is coded 0 (ingroup), 1 (outgroup). C. Risk = Conception Risk; VSC = Vulnerability to Sexual Coercion.

Results of the analysis (Table 3) revealed significant main effects of relationship status ($b = -.70$, $\beta = -.19$, $t(107) = -2.12$, $p = .037$) and suspicion ($b = -.25$, $\beta = -.22$, $t(107) = -2.27$, $p =$

.025), such that women in relationships and women who reported higher levels of suspicion (that their chat partners were not real) were less willing to respond positively to the date request. The predicted three-way interaction between group condition, conception risk, and vulnerability to sexual coercion was also statistically significant ($b = -30.18$, $\beta = -.47$, $t(107) = -2.01$, $p = .047$). Breaking down this interaction (Figure 1) revealed that the two-way interaction between conception risk and vulnerability to sexual coercion was not significant in the ingroup condition ($b = 7.39$, $\beta = .12$, $t(60) = .85$, $p = .396$) but was marginally significant in the outgroup condition ($b = -24.77$, $\beta = -.39$, $t(45) = -1.97$, $p = .056$). The simple slopes for the two-way interaction in the outgroup condition indicated that among women reporting low levels of vulnerability to sexual coercion (1 SD below the mean) conception risk was positively, but not significantly, related to willingness to say yes to the date request ($b = 16.87$, $\beta = .32$, $t(45) = 1.29$, $p = .203$). The reverse was true for women reporting high levels of vulnerability to sexual coercion (1 SD above the mean), that is, conception risk was negatively associated with willingness to say yes to the date request from an outgroup member, although the effect did not reach statistical significance ($b = -23.61$, $\beta = -.45$, $t(45) = -1.88$, $p = .067$). To test a pseudo-control group, these analyses were also conducted for women using hormonal contraceptives; the predicted interactions were not statistically significant. Overall, these findings support H3, suggesting that women are less willing to date outgroup men, but not ingroup men, when conception risk and perceived vulnerability to sexual coercion are both high.

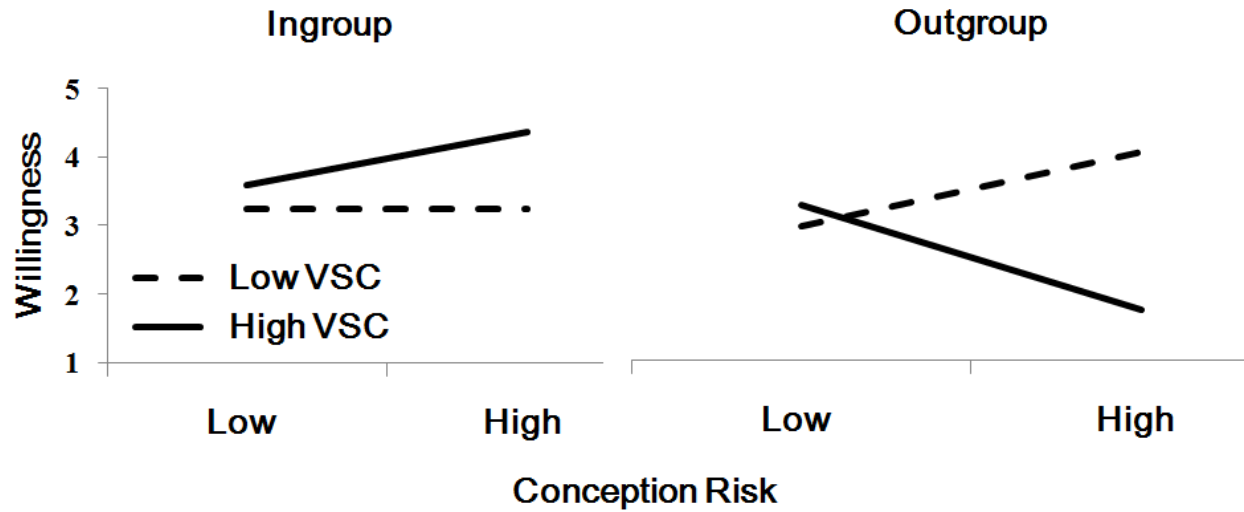


Figure 1. Willingness Response to Date Request by Group Condition, Conception Risk, and Vulnerability to Sexual Coercion (VSC).

Conception Risk and Target Formidability. The next two analyses examined whether women who perceive the outgroup as physically formidable exhibit a greater outgroup dating bias, particularly when conception risk is high. Perceptions of physical formidability were assessed both indirectly via the stereotype IAT, and directly via the follow-up questions (i.e. “To what extent did you find your chat partner dominant? aggressive?”). The multiple regression analyses were conducted using only female participants with complete data on all relevant variables, and whose menstrual cycle data met the criteria for the scoring of conception risk. The dependent variable was participants’ willingness to respond positively to the date request. The primary predictors included in the analyses were group condition (whether the date request came from an ingroup (0) or outgroup member (1)), centered conception risk, and centered evaluations of target physical formidability (stereotype IAT score or composite of dominant and aggressive follow-up evaluations). All two-way and three-way interactions among these variables were also

included. Participant suspicion and relationship status (0 = single, 1 = non-single) were entered as covariates.

Results of the analysis that included the stereotype IAT as the indicator of target physical formidability revealed a marginal main effect of relationship status ($b = -.62$, $\beta = -.17$, $t(119) = -1.92$, $p = .057$) and a main effect of suspicion ($b = -.27$, $\beta = -.24$, $t(119) = -2.64$, $p = .009$). However, the predicted three-way interaction between condition, conception risk, and target formidability was small in size and not statistically significant ($b = -15.63$, $\beta = -.13$, $t(119) = -.72$, $p = .475$). Similarly, results of the analysis that included the follow-up evaluations of target dominance and aggressiveness also showed no significant evidence of the predicted three-way interaction, ($b = -3.60$, $\beta = -.11$, $t(118) = -.72$, $p = .472$). However, there was a moderately sized main effect of dominance/aggressiveness ($b = -.45$, $\beta = -.46$, $t(118) = -4.00$, $p < .001$) such that women who perceived the target as more dominant and aggressive were less willing to say yes to the date request. Overall, these results do not support H4; there is no evidence that women exhibit increased dating bias against outgroup men perceived as physically formidable (assessed directly or indirectly) when conception risk is high.

Discussion

The purpose of Study 2 was to evaluate gender differences in responses to intergroup dating requests, with a particular emphasis on understanding the motivations that underlie intergroup dating bias among women. Results provided support for two of the four hypotheses (H1 and H3). Across conditions men were more likely to respond positively to the date requests than were women (H1). However, neither men nor women's willingness to respond positively to the date request differed significantly by group condition (H2). In other words, participants were equally likely to respond positively to a date request when it came from an ingroup member as

when it came from an outgroup member. Yet, women's willingness to say yes to date requests from outgroup members was moderated by an interaction of conception risk and vulnerability to sexual coercion (H3). More specifically, women in the fertile window of their menstrual cycle who also appraised themselves as being particularly vulnerable to sexual coercion were least likely to accept date requests from outgroup members. As expected, there was no significant effect of conception risk or vulnerability to sexual coercion in the ingroup condition. This pattern of findings suggests that women who perceive themselves as most vulnerable to reproductive threats are more likely to avoid outgroup men (i.e. reject their mating advances) when threats to reproductive choice would be most costly. On the other hand, no evidence was found to suggest that fertile women are more likely to avoid outgroup men perceived as physically formidable (H4). This was true regardless of whether physical formidability of the target was assessed directly or indirectly.

GENERAL DISCUSSION

Much theorizing in social psychology regarding intergroup bias has made the assumption that the motivations underlying intergroup bias are the same for both men and women (e.g. Tajfel & Turner, 1979). Yet, an evolutionary approach suggests that men and women's underlying motivations for intergroup bias may diverge in some instances. These differences arise as a result of stark asymmetries in the obligatory levels of parental investment required of males and females. The large investment on the part of females results in a reproductive strategy in which fitness is maximized by the selection of high quality mates. As a result, females likely evolved adaptive mechanisms for protecting reproductive choice. Given the link between intergroup conflict and sexual coercion, one mechanism for protecting reproductive choice may have been increased wariness of outgroup men, particularly when threats to reproductive choice

would be most costly, such as during the fertile window of the menstrual cycle. From this perspective, women's intergroup bias may be, at least in part, motivated by the unconscious goal of protecting reproductive choice. This contrasts sharply with the social dominance motivations thought to underlie men's intergroup bias (Navarrete, McDonald, Molina, & Sidanius, 2010).

Given the geographic distribution of different racial groups throughout human evolutionary history, this perspective also suggests that a mechanism for protecting reproductive choice via the avoidance of outgroup men should not be constrained to groups defined along racial lines. Rather, because groups were historically demarcated by features such as dialect, style of dress, and coalitional badges or markings, simple cues to group membership should be sufficient to activate the psychological mechanisms that evince intergroup bias.

Strengths and Limitations

The line of reasoning outlined above suggests that the fitness advantage that results from increased intergroup bias among women is the opportunity to select a high quality mate. This includes the genetic quality of one's mate as well as their likelihood of investing in one's shared offspring. A slightly different perspective suggests that outgroup men are avoided not because they have historically posed a greater threat of sexual coercion (and therefore thwart women's reproductive choice), but because outgroup men are perceived by women to be, and may actually have been, less capable or less willing investors in offspring. The research conducted to date does not definitively distinguish between these two possibilities, and the two are not mutually exclusive. Indeed, the issue is difficult to disentangle, given that perceptions of outgroup men as unwilling to invest in intergroup offspring could serve as a proximal mechanism for avoiding outgroup men in the service of protecting reproductive choice. Clearly this is still an open question in need of further examination.

Previous research has demonstrated that women evince increased bias against outgroup men (defined along racial lines as well as within a minimal group context) when threats to reproductive choice would be most costly. This includes when conception risk is elevated and when women appraise themselves as being particularly vulnerable to sexual coercion or evaluate the outgroup targets to be physically formidable. However, this research has relied primarily on indirect measures of intergroup bias, such as implicit association tests. There are strengths to this approach, namely that it reduces socially desirable responding because IAT responses are more difficult to consciously control. Yet, the assumption of this work has been that an increase in bias against the outgroup will translate into fearful avoidance of outgroup males. The current work attempted to test this assumption by examining intergroup bias in dating decisions, a context in which mechanisms for protecting reproductive choice should be particularly important.

To assess dating decisions naturalistically, while still in the controlled setting of a laboratory, a revised version of the paradigm used by Clark and Hatfield (1989) was employed in which participants were propositioned for a date via Skype chat by a research confederate that they were led to believe was another participant. There are many strengths to this design relative to the original design as well as the vignette studies that conceptually replicated the original study (e.g. Conley, 2010). For example, although the current procedure is less naturalistic than the original paradigm, it provides the opportunity for greater experimental control and is safer (and less potentially embarrassing) for participants and confederates alike. Unlike vignette studies that ask participants what they think they would do in a particular situation, this methodology permits assessment of real behavioral outcomes, and because the dating request still occurs in the laboratory it is possible to assess individual differences in the participants. With this new paradigm it is also possible to save the conversations between the participant and

the research confederate so that they can be evaluated by independent coders who can be made blind to the gender of the participant. It is also easier to manipulate aspects of the design, such as the attractiveness of the requestor and, importantly for the current project, whether they are a member of an ingroup or an outgroup.

Gender Differences in Responses to Date Request

Using this revised paradigm, four hypotheses were tested in Study 2. The first concerned whether men would be more willing to say yes to the date request than females. Although a request for a date may be viewed as a long term mating opportunity, because the request occurred very quickly in the course of the conversation, and can be presumed to have been offered on the basis of attraction alone, it is likely perceived as a more short-term mating request by participants. Given this, it should not be surprising that men were more willing to respond positively to the request than women, as men tend to be more open to short-term mating opportunities than women (Buss & Schmitt, 1993).

Gender Differences in Intergroup Dating Preferences

The second hypothesis predicted that women would show a stronger within group dating preference than men. This was expected given that the reason women are hypothesized to avoid outgroup men does not apply to men. In other words, outgroup women do not pose a threat to men's reproductive choice, largely because of asymmetries in size and strength, but also because women do not benefit from increased access to mating opportunities to the same extent as men. Although previous research has found evidence of a within-race dating preference among women (Fisman et al., 2006; Sprecher et al., 1994), the findings from Study 2 do not support this hypothesis. There was no evidence of a within group dating preference among women or men, or generalized negativity toward the outgroup (see footnote 4).

One explanation for this may be that some women, under particular circumstances, exhibit an outgroup dating *preference*, which would diminish any main effect of group condition on dating responses. Such a preference may arise from the genetic advantages of mating conferred to offspring when an individual mates with someone with a distinct genetic profile (Roberts & Little, 2008; Wedekind, Seebeck, Bettens, Paepke, 1995). The increase in genetic heterogeneity can confer increased resistance to parasitism and disease as well as a reduced likelihood of expressing recessive genetic disorders (Hamilton, Axelrod, & Tanese, 1990). In the current data there is some evidence of this, as there is a positive (non-significant) relationship between conception risk and willingness to say yes to the date request for women in the outgroup condition, specifically among those women who report low levels of vulnerability to sexual coercion. A similar finding was reported in previous research (McDonald et al., 2011), in which conception risk was negatively associated with bias against the outgroup among women who did not associate the outgroup with physical formidability. Similarly, recent research has found evidence that women's physical attraction to photographs of men with ambiguous racial features, but who are labeled as an outgroup member, increases with conception risk, but that this increase in attraction does not occur when the same faces are labeled as ingroup members (Salvatore, 2012). Taking these findings together suggests that there may be mechanisms in place to actually increase women's preference for outgroup men, but that the operation of such mechanisms may depend on the self-appraised vulnerability of the individual and the perceived formidability of the outgroup target.

Predictors of Women's Intergroup Dating Preferences

Conception Risk and Vulnerability to Sexual Coercion. The third hypothesis predicted that women would exhibit less willingness to say yes to date requests from outgroup members

when conception risk was high and when they appraised themselves as being vulnerable to sexual coercion. The findings from Study 2 support this hypothesis and conceptually replicate results from previous research (Navarrete et al., 2009). Results indicated a negative association between conception risk and willingness to say yes to the date request in the outgroup condition, but, as predicted, only among women scoring high on vulnerability to sexual coercion. No interaction was found in the ingroup condition. This provides evidence that the bias exhibited by women against outgroup men as a function of conception risk and vulnerability to sexual coercion may translate into actual behavioral decisions about dating. More generally, the results provide additional evidence that women may be equipped with psychological mechanisms for evincing bias against outgroup men in the service of protecting reproductive choice, under the circumstances in which threats to reproductive choice would have been most costly for reproductive fitness. Furthermore, the presence of this effect in a minimal group context is consistent with the notion that this mechanism arose at a time in our evolutionary history in which groups were defined along coalitional rather than racial lines.

Conception Risk and Target Formidability. The fourth hypothesis predicted that women would be less willing to respond positively to the date requests when conception risk was high and they perceived the outgroup target to be physically formidable, given that formidable men would be most capable of effectively constraining and controlling a woman's reproductive choice. Perception of physical formidability of the outgroup was assessed both indirectly, via the stereotype IAT, and directly, via follow-up evaluations of the participants' chat partner as dominant and aggressive. The hypothesis was not supported, regardless of how formidability was assessed.

Previous research documenting the role of physical formidability in predicting women's intergroup bias used the stereotype IAT to predict intergroup bias as measured by an evaluative IAT (McDonald et al., 2011). Typically, indirect measures are better predictors of other indirect measures (Fazio & Olson, 2003). In the current study the dependent variable was willingness to say yes to a date request, which could arguably be classified as a direct measure given that it is a conscious behavioral decision. As such, the mismatch between the levels of the different measures may contribute to the null finding. Yet, if this is the case, one would expect the direct assessment of dominance and aggressiveness to predict willingness to say yes to the date request, but it does not.

This may lead one to question what the stereotype IAT measures. Importantly, IATs rely on difference scores, which can present a challenge in interpreting an individual's score. For example, in the case of the stereotype IAT, a high score could reflect either a strong association between the outgroup and the concept physical or a strong association between the ingroup and the concept mental. As such, in previous research the findings could be described as a preference for intelligent ingroup members that increases with conception risk. Yet research examining how women's ingroup dating preferences change across the menstrual cycle does not typically find effects for intelligence (Gangestad, Garver-Apgar, Simpson, & Cousins, 2007; Gangestad, Thornhill, & Garver-Apgar, 2010; Prokosch, Coss, Scheib, & Blosiz, 2008), and in the current study there was no evidence of a significant interaction when participants' evaluation of their chat partner's intelligence replaced the assessment of physical formidability. Thus, this alternative explanation seems unlikely.

Although it is possible that the null finding for this hypothesis is a Type-II error (i.e., failure to find evidence of effects that actually exist), it may also be necessary to rethink the

prediction. Physical formidability is considered relevant because physically formidable men are more capable of overpowering and constraining women, and therefore represent a greater threat to their reproductive choice. However, given the asymmetries in size and strength between men and women, the issue of whether a man is *capable* of overpowering a woman may often be irrelevant, as most men would have such capabilities. Being physically formidable may be a more important factor *following* acts of coercion, as the aggressor may become the target of attacks by the male family members of the female victim.

From this perspective, physically formidable men may be more *likely* to engage in sexually coercive mating tactics because they are better equipped to deter the potentially lethal costs associated with such a mating strategy. Research has documented that physical strength in men is associated with a greater proneness to anger and a history of fighting (Sell, Tooby, & Cosmides, 2009), but no research to-date has assessed whether physical strength predicts an increased likelihood of engaging in sexually coercive mating strategies. Previously, evolutionary researchers hypothesized that low-quality males may be more likely to pursue such mating strategies, but the evidence for this hypothesis has been mixed (Thornhill & Palmer, 2000). This may be because low-quality males lack the physical resources needed to offset the costs of such a risky strategy. If physically formidable men are not more likely to engage in sexually coercive mating tactics, then the prediction that physically formidable men pose a greater threat to women's reproductive choice may require revision.

The prediction that conception risk should be negatively associated with the physical formidability of the outgroup target is also at odds with an abundance of research in evolutionary psychology which has documented that women's preferences for masculine and dominant men increases with conception risk (reviewed in Gangestad et al., 2007). However, the important

caveat to this research is that it has primarily been conducted with ingroup male targets. It may be that formidability signals dominance and good genetic quality in ingroup males, but a threat to reproductive choice in outgroup males. More research examining mating preferences in an intergroup context is needed to address this question.

Conclusions

This research builds on a growing body of literature providing evidence for a suite of psychological adaptations in women to protect reproductive choice. In particular, demonstrating here that women who appraise themselves as vulnerable to sexual coercion are more likely to reject dating requests from outgroup men, who may have historically posed a greater threat of sexual coercion, when they are in the fertile window of their menstrual cycle, a time when threats to reproductive choice would be most costly. Importantly, this research provides the first evidence of a behavioral consequence of this psychological mechanism, namely, the avoidance of outgroup males. Furthermore, the research finds evidence of this mechanism in a minimal group context, providing some preliminary evidence that the mechanism may have evolved at a time in our evolutionary history in which groups were defined along coalitional rather than racial lines.

FOOTNOTES

FOOTNOTES

- ¹ For this and all subsequent t-tests with unequal variances, estimates of Cohen's *d* are calculated using the larger of the two standard deviations.
- ² These participants were dropped because they cited a large age difference as their reason for saying no to the request. The decision to drop these participants was made prior to conducting analyses. The two individuals were the oldest in the sample, ages 35 and 46.
- ³ Participants selected all racial and ethnic groups that applied; as a result, totaling the numbers from each group results in a number larger than the actual number of participants.
- ⁴ There was no evidence of outgroup bias, for men or women, on the other available indicators of bias. That is, men and women did not evaluate outgroup members significantly more negatively in the follow-up items assessing their chat partner's likability, intelligence, attractiveness, morality, disgustingness, dominance, or aggressiveness. There was also no evidence of a significant bias against outgroup members on the stereotype IAT.
- ⁵ Neither suspicion nor relationship status produced a significant 4-way interaction with the other variables.

APPENDIX

Table 1A

Physical and Mental Category Stimuli for Stereotype IAT in Study 2

Physical	Mental
Athletic	Math
Strong	Brainy
Basketball	Aptitude
Run	Library
Agile	Scientist
Jump	Idea
Dance	Learn
Rhythm	Thinking
Muscular	Bookish
Football	Reading

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