

RESEARCH ARTICLE

Cooperation as a Sexual Selection Trait: Insights from Gender-Specific Mate Preferences*

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Abstract

Cooperation is considered an essential component of natural selection due to its critical role in ensuring the survival of individuals and communities. However, whether cooperation is also a trait favored in the context of sexual selection remains an ongoing debate in evolutionary psychology. This study examined whether cooperative behavior increases individual attractiveness during the mate selection process. Participants were recruited through convenience sampling via Google Forms. In the first study, 199 participants were randomly assigned to one of three levels of cooperation. The results revealed that female participants preferred men who displayed cooperative behavior. In the second study, the effect of cooperation was evaluated together with the gender of the individuals involved. A total of 230 participants watched videos depicting different cooperation scenarios and evaluated the target person as a potential partner. The findings indicated that women found men who cooperated with both men and women more attractive, whereas men showed a preference only for women who cooperated with other women. In conclusion, cooperation is perceived differently by men and women within the framework of sexual selection, and particularly women regard cooperative behavior as a strong indicator of attractiveness.

Keywords: Cooperation, sexual selection theory, gender differences, altruism

Öz

İş birliği, bireylerin ve toplulukların hayatta kalmasını sağlamadaki kritik rolü nedeniyle doğal seçilimin vazgeçilmez bir unsuru olarak görülmektedir. Ancak iş birliğinin aynı zamanda cinsel seçim açısından da tercih edilen bir özellik olup olmadığı konusu, evrimsel psikolojide güncelliğini koruyan bir tartışma alanıdır. Bu çalışmada, iş birliğinin cinsel seçim sürecinde bireyin çekiciliğini artırıp artırmadığı araştırılmıştır. Katılımcılar, Google Forms aracılığıyla ulaşılan ulaşılabilirlik örnekleme yöntemiyle belirlenmiştir. Birinci çalışmada 199 katılımcı rastgele olarak üç farklı iş birliği düzeyinden birine atanmış ve sonuçlar, kadınların iş birliği sergileyen erkekleri daha çok tercih ettiğini göstermiştir. İkinci çalışmada ise iş birliğinin etkisi, iş birliği yapılan kişilerin cinsiyetiyle birlikte incelenmiştir. Bu kapsamda 230 katılımcı, iş birliği senaryolarını içeren videoları izleyerek hedef kişiyi potansiyel partner olarak değerlendirmiştir. Bulgular, kadınların hem erkeklerle hem de kadınlarla iş birliği yapan erkekleri daha çekici bulduğunu, erkeklerin ise yalnızca kadınlarla iş birliği yapan kadınları daha çok tercih ettiğini ortaya koymuştur. Sonuç olarak, iş birliğinin cinsel seçim bağlamında farklı cinsiyetlerde farklı biçimlerde değerlendirildiği ve özellikle kadınların iş birliği davranışını güçlü bir çekicilik unsuru olarak gördüğü anlaşılmaktadır.

Anahtar Kelimeler: İş birliği, cinsel seçim kuramı, cinsiyet farklılıkları, özgecilik.

* This study is based on the undergraduate thesis project of Fatma Akbulut, supervised by Ahmet Yasin Şenyurt.

Introduction

Altruistic behavior, in which an individual benefits others at their own expense, has been observed in various species. Primates, for instance, groom one another to maintain hygiene (Seyfarth & Cheney, 1984). In evolution, situations can arise in which an individual exhibits altruism, even if it is not reciprocal, to benefit members of the same species (Riolo et al., 2001). This type of behavior supports the continuation of the species and is passed down to future generations (Üzümçeker et al., 2019).

Therefore, altruistic cooperation is typically viewed as an outcome of natural selection (Sachs et al., 2004), and is explained through five fundamental principles: kin selection, direct reciprocity, indirect reciprocity, network reciprocity, and group selection (Nowak, 2006). Kin selection (Patten, 2010) suggests that cooperation has evolved because helping relatives can enhance the survival and reproduction of shared genes, even if it incurs personal costs. Direct reciprocity (Roberts, 2008) suggests that individuals are more inclined to cooperate when they anticipate reciprocal actions in the future, fostering a cycle of mutual support. Indirect reciprocity (Roberts, 2008) highlights that altruistic behavior can boost an individual's social status or reputation, thereby increasing the likelihood of receiving help from others in future interactions. Network reciprocity (Floría et al., 2009) explains how cooperation can flourish within structured populations or networks, where interactions are more common among close neighbors than among the entire population. Finally, group selection (Patten, 2010) proposes that cooperators can outcompete non-cooperators, leading to the proliferation of cooperative traits across groups and ultimately within the population.

First theorists to suggest that sexual selection, as well as natural selection, played a role in the evolution of cooperation were Zahavi (1975; Zahavi & Zahavi 1997) and Eshel and Sforza (1982). Zahavi suggested that cooperation is a handicap similar to the peacock's colorful feathers, but it provides an advantage in sexual selection due to the other traits it signals, such as strength and health. Eshel and Sforza (1982) mathematically demonstrated that the evolution of cooperative behavior is influenced not only by natural selection, but also

by the selection of cooperative individuals within natural environments. Pilot (2005) also demonstrated using computer simulations that even in the absence of reciprocation, cooperation can be evolutionarily stable if it signals traits such as the cooperators' physical condition and prestige.

According to the sexual selection theory, opting for more cooperative partners can result in immediate and long-term advantages. By selecting individuals who offer superior parental care, higher quality mates can be ensured. Additionally, offspring produced with these partners are more likely to be of higher quality and exhibit increased cooperative tendencies (Covas and Doutrelant, 2019).

In one study (Farrelly et al., 2007), participants played four different games on an online platform while viewing images of targets with high and low attractiveness. In the **Mutualism Game**, participants obtained better results by donating (cooperating) regardless of their partner's actions, which tests their understanding and motivation to act in economic interests without allowing for displays of altruism. In the **One-Shot Prisoner's Dilemma (PD) Game**, cooperation is rational for those with a sense of fairness and trust in their partner, although defection is a rational choice otherwise. The **Dictator Game** showed that giving can reflect a sense of fairness or generosity, while in the **Charity Dictator Game**, where donations were directed toward charity rather than the partner, altruistic signaling was emphasized. The results revealed that both male and female participants exhibited more cooperation with highly attractive targets and found cooperative men and women to be more attractive. Additionally, in the high-cooperation condition, men's attractiveness ratings for both low- and high-attractiveness women significantly increased by the end of the four games. Similarly, women's attractiveness ratings for low-attractiveness men also increased by the end of the games under high-cooperation conditions. However, attractiveness did not affect same-sex cooperation.

Phillips et al. (2008) used the Mate Preference for Altruistic Traits (MPAT) scale to measure the value of altruistic qualities in potential mates. Their research, which involved 1,118 participants

across three studies, found evidence of mate selection based on altruistic traits. This study presented two main findings, supporting the hypothesis that altruistic traits evolved through sexual selection. First, there was a significant correlation between the degree of MPAT and the "altruistic personality" of the chosen partner, suggesting that mate choice is influenced by altruism. Second, women's stronger preference for altruistic traits aligned with evolutionary predictions remained significant, even when controlling for participants' own altruistic tendencies and relationship duration. Overall, these findings support the idea that altruism may play a role in human mate selection, with women valuing altruistic traits more than men do. The study concluded that altruistic behavior could significantly influence human mating preferences, which is consistent with the theory of sexual selection.

In another study, there was evidence that sexual selection plays a significant role in shaping cooperative behavior among men in rural Senegal, with the presence of female observers enhancing males' willingness to cooperate. Conversely, women's cooperative behavior appears to be less influenced by the potential for sexual selection and broader social factors (Tognetti et al., 2012).

Gender differences in mate preference

As a result of natural and sexual selection processes, individuals may develop different mating strategies for long- and short-term mating. Men and women may develop similar or different strategies for this process. The fundamental reason for this is that both sexes invest differently in producing a single offspring (Buss & Schmitt, 2019). Different challenges may arise in short-term relationships with low commitment versus long-term relationships with heavy commitment, affecting preference shaping (e.g., compatibility issues). Therefore, the strategies developed differ regarding short- and long-term relationship preferences (Jonason and Buss 2012). The Sexual Strategies Theory (Buss, 1998) is an evolutionary explanation of how these differences occur. For instance, while a man seeks to ensure that he is the biological father of a child, a woman aims to secure the man's ability and willingness to invest in the child's upbringing.

This dynamic influences how women and men within a group evaluate each other. Women find men surrounded by other women more attractive, in line with the principles of the social learning theory. Conversely, men find women surrounded by other men less attractive.

In terms of mate preference, women tend to be more selective than men, particularly when evaluating character and status. Although cultural variations exist, certain traits such as a preference for a waist-to-hip ratio indicative of fertility are common across many cultures (Buss, 1989; Minervini & McAndrew, 2006). Women generally place greater emphasis on character traits than men (Buss & Barnes, 1986; Bressler et al., 2006; Whyte et al., 2021). For instance, Buss and Barnes (1986) found that women value personality traits such as kindness, understanding, honesty, and dependability, as well as status traits such as earning capacity and ambition, more than men do. Conversely, men prioritize physical appearance traits such as attractiveness and beauty more than women. Whyte (2021) corroborates these findings, noting that men focus on attractiveness, while women emphasize character traits, such as trust and emotional connection, and status variables, such as age and income.

In summary, although cooperation is evolutionarily transmitted, sexual selection also plays a role in its propagation. However, owing to gender differences in sexual selection, the impact of engaging in cooperation may vary between men and women. Building on sexual selection theory, this study aimed to investigate two research questions: (1) Does cooperation influence individual attractiveness in the context of sexual selection? (2) How do gender-specific preferences for cooperation manifest in mate selection? These questions guided our investigation into the role of cooperation as a sexual selection trait. This study explores the influence of cooperation on desirability in sexual selection through two studies. In the first study, cooperation was manipulated by using vignettes. In the second study, both cooperation and the gender of the individuals with whom the target cooperates are manipulated using videos.

The hypothesis of Study 1 is that (H1) the level of cooperation demonstrated by an individual affects their attractiveness to the opposite gender,

with cooperative behaviors expected to lead to higher attractiveness ratings, and that this effect will be gender-specific.

Method of Study 1

This study was conducted using a 3 (cooperation: altruism alone, altruism with cooperation, altruism without cooperation) $\times$ 2 (gender of participant: female, male) between-subject design. Participants were presented with three different vignettes: the first described the target helping a friend individually; the second indicated that the target's help involved cooperation; and the third stated that the target helped without engaging in cooperation (see Appendix A). Male participants read a vignette featuring a woman, while female participants read a vignette featuring a man. The gender difference in the target was achieved by manipulating the names of the targets in the vignettes.

Participants

A total of 199 participants were included in the study, with 100 females and 99 males ($M_{age} = 27.2$, $SD = 6.45$, %95CI [26.3-28.1]). Participants were reached using a convenient sampling method using Google Forms. There were no significant differences in average age across the research conditions ($F(2, 293) = .669$, $p > .05$). Each condition had a minimum of 32 participants and a maximum of 34.

Measurements

After the participants read the vignettes, they responded to 11 questions (i.e., ... could be attractive, ... might be beautiful/handsome, ... could be considered for a long-term relationship, ... could be a good partner) on an 11-point Likert Scale (0: Strongly disagree, 10: Strongly agree). These questions were chosen by examining both the international (Buss & Barnes, 1986) and culture-specific literature (Gündoğdu Aktürk, 2010) to measure mate preference.

Analysis

The data were analyzed using JAMOVİ with a 3 $\times$ 2 between-subject MANOVA.

Results

Regarding the "good partner" variable, the MANOVA results revealed no significant main effects for gender ($F(1, 193) = .82$, $p > .05$) or cooperation ($F(2, 193) = .25$, $p > .05$). However, there was a significant interaction effect between gender and cooperation ($F(2, 193) = 6.66$, $p = .046$) (see Figure 1). Male participants rated the "good partner" variable the highest ($M = 5.56$, $SD = 1.19$, %95 CI [5.15, 5.97]) for female targets described as not cooperating. In contrast, female participants rated the non-cooperating male target the lowest ($M = 5.03$, $SD = 1.38$, %95 CI [4.54, 5.52]) (Figure 1).

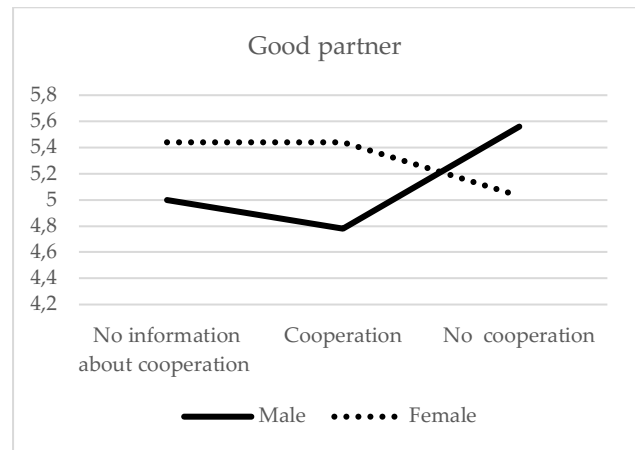


Figure 1. Means for evaluating the target as a good partner. Male and female in the graph represent the gender of the participants.

For the "considering as a potential spouse" variable, neither gender ($F(1, 193) = .52$, $p > .05$) nor cooperation ($F(2, 193) = .90$, $p > .05$) had a significant main effect. However, the interaction between gender and cooperation was significant ($F(2, 193) = 3.68$, $p < .05$) (see Figure 2). Male participants indicated that they found non-cooperating female targets to be more suitable as partners, with a mean rating of 5.26 ($SD = 1.52$, %95 CI [4.82, 5.71]). By contrast, female participants rated non-cooperating male targets as the least suitable, with a mean rating of 4.42, $SD = 1.25$, %95 CI [3.67, 4.66] (Figure 2).

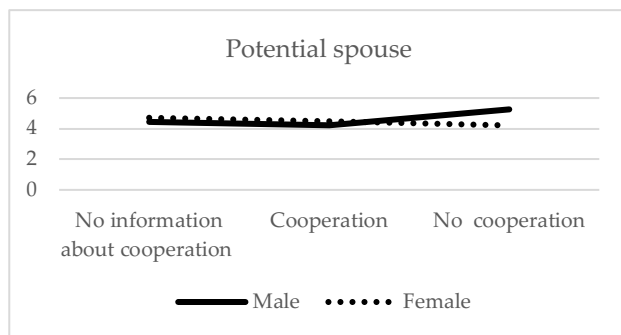


Figure 2. Means for evaluating the target as a potential spouse. Male and female in the graph represent the gender of the participants.

In terms of the "evaluating beautiful/handsome" variable, the MANOVA results revealed no significant main effects of gender ($F(1, 193) = .28, p > .05$) or cooperation ($F(2, 193) = .53, p > .05$). However, a significant interaction effect between gender and cooperation was observed, $F(2, 193) = 3.08, p < .05$ (see Figure 3). Male participants rated non-cooperative female targets as the most attractive, with a mean rating of 5.21, $SD = 1.34$, %95CI [4.74, 5.67]. In contrast, female participants rated non-cooperating male targets as the least handsome, with a mean rating of 4.30 ($SD = 1.49$, %95 CI [3.77, 4.30]) (Figure 3).

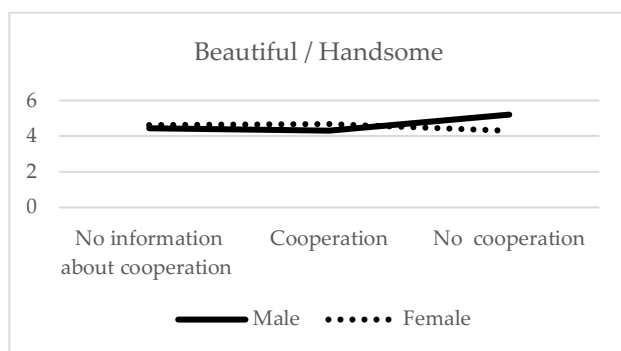


Figure 3. Means for evaluating the target as beautiful or handsome. Male and female in the graph represent the gender of the participants.

No significant interaction effects between cooperation and gender were found for the other dependent variables. There were two main interaction effects of gender. Male participants evaluated the targets as more suitable partners than females did ($F(1,193) = 4.84, p = .029$). In addition, males evaluated the targets as more sufficient than females did, $F(1,193) = 3.97, p = .048$.

Discussion of Study 1 and Introduction of Study 2

The results show that men perceive women who do not cooperate as more attractive, as better candidates for a partner, and as more suitable as good partners. This result contradicts that of previous research (Farrelly et al., 2007). Keeping in mind that Farrelly and colleagues worked on altruism, our study included cooperative altruistic behavior. In contrast, women rated non-cooperating males the lowest among all these variables. This result is consistent with those reported in the literature (Farrelly et al. 2007; Phillips et al. 2008). These results partially supported H1. Cooperation increased the mate value of men for women on the other hand decreased mate value of women for men.

According to both Parental Investment Theory and Sexual Strategies Theory (Buss & Schmitt, 1993), men and women face different challenges in mate selection and preferences for short- and long-term relationships, which leads them to use different strategies. One of these differences arises when the target person is in groups with members of the same sex compared with groups with members of the opposite sex (Hill & Buss, 2008). Men aim to avoid competition to ensure the continuation of their lineage, which is why they find women surrounded by other men to be less attractive. By contrast, women value a man's status and resources, and they generally find women surrounded by men more attractive. From this perspective, it can be inferred that men might view a woman's lack of cooperation as a reduction in competition, despite not knowing with whom she is cooperating. On the other hand, women may interpret a man's lack of cooperation as a sign of lacking social capital or an indication that he might also be uncooperative as a spouse.

To test these assumptions, it is necessary to measure participants' evaluations of target individuals in conditions where targets either cooperate or do not cooperate with members of the opposite gender and same gender. If men prefer women who do not cooperate with men more than women who do not cooperate with women, this preference cannot be attributed to a lack of cooperation but

can be attributed to competition (H2). We also expected women to prefer men who cooperate with same-gender individuals and those of the opposite gender (H3). This is because such cooperation would indicate that the man is likely to offer future cooperation, possess the necessary social capital, or be attractive to other women. Additionally, we did not include the 'altruism with no cooperation' condition in the second study because we found no significant differences between the 'altruism with individual working' and 'altruism with cooperation' conditions for either gender.

Methods of Study 2

Study 2 employed a $2 \times 2 \times 2$ design to dissect the impact of cooperation and gender dynamics on sexual selection. This design aimed to isolate the effects of cooperation (present or absent), gender composition of the cooperation group (same or opposite gender), and gender of the participants. By structuring the conditions in this manner, we sought to understand how these variables interact to influence the perceptions of mate suitability.

The data has been supplied as a supplementary file and additionally uploaded to Mendeley Data.

Participants

A total of 230 participants were included in the study, including 116 females and 114 males ($M_{age} = 24.5$, $SD = 5.60$, %95CI [23.8-25.3]). Participants were reached using a convenient sampling method using Google Forms. There were no significant differences in average age across research conditions ($F(1, 222) = .73$, $p > .05$).

Manipulation materials

For this study, a total of 16 videos, each approximately 30 seconds long, were produced, with two videos for each of the eight conditions (See Appendix B for sample videos). The 16 videos featured 3 male and 3 female collaborators.

For male participants, the first video (opposite-gender, no cooperation condition) showed a female collaborator seated between two male collaborators, where all three performed the envelope-

folding task without interacting with each other (opposite-gender, no cooperation condition) in the classroom setting. In the second video (opposite-gender, cooperation condition), the same female collaborator was seated between two male collaborators, but this time she cooperated with the men while performing the task. In the third video (same-gender, no cooperation condition), the female collaborator was seated between two female collaborators and all three completed the envelope-folding task without any interaction. The fourth video (same-gender, cooperation condition) featured the same female collaborator seated between two female collaborators, but here she cooperated with other women during the task.

The target person was the same for all four videos. To control for the attractiveness of the target, four additional videos were created, where one of the women from the first four videos was the target, and the target woman from the initial videos was one of the collaborators. Male participants were randomly assigned to one of the conditions and displayed a video. The same process was applied to female participants using male targets, and one of the eight videos was shown to them.

The envelope-folding task was chosen for its simplicity and the clear opportunity it presents for cooperative versus non-cooperative behavior in a controlled setting.

Measurements And Procedure

After the participants watched the video, they were instructed to rate 12 sentences about the target, which was described as "the person in the middle." The sentences were rated on a 7 Likert scale, and the answers were evaluated as the dependent variable in this study. Some of the sentences were "The person performing the task is attractive to me.", "The person performing the task would be a good partner for me," "I would consider a long-term relationship with the person performing the task.", "The person performing the task could be a good parent."

Participants first completed a consent form. They then read the instructions which includes "watch a video and focus on the behavior of the central figure in the video," followed by watching

the video itself. Finally, they completed a demographic information form.

Analysis

A MANOVA was conducted to examine the main and interaction effects of three independent variables—participant gender, presence of collaboration, and whether the collaborator was of the same or opposite gender—on the dependent variables.

Results

The MANOVA results are presented in Table 1. A significant three-way interaction effect (participant gender, cooperation, and gender of cooperators) was found for the perception of the target as a good partner, $F(1,222) = 6.76, p = .01$. Men believed that women who cooperated with other women would be their best partners ($M = 6.00, SD = 1.39, 95\% CI [5.49, 6.51]$), whereas women considered men who cooperated with women to be better partners ($M = 5.45, SD = 1.75, 95\% CI [4.81, 6.09]$). Men gave the lowest ratings to women who did not cooperate with other women ($M = 5.16, SD = 1.53, 95\% CI [4.60, 5.72]$) and women gave the lowest ratings to men who did not cooperate with women ($M = 4.19, SD = 1.97, 95\% CI [3.30, 5.09]$).

long-term relationship, men gave the highest ratings to women who cooperated with the same gender ($M = 6.06, SD = 1.41, 95\% CI [5.55, 6.58]$), and women who did not cooperate with the opposite gender ($M = 6.13, SD = 1.18, 95\% CI [5.70, 6.56]$). On the other hand, women gave the highest ratings to men who cooperated with women ($M = 5.39, SD = 1.69, 95\% CI [4.77, 6.01]$). Men gave the lowest ratings to women who cooperated with men ($M = 5.38, SD = 1.53, 95\% CI [4.68, 6.08]$) and women who did not cooperate with women ($M = 5.29, SD = 1.49, 95\% CI [4.74, 5.84]$). Women gave the lowest ratings to men who did not cooperate with women ($M = 4.29, SD = 2.33, 95\% CI [3.23, 5.34]$) and to those who did not cooperate with men ($M = 4.28, SD = 2.07, 95\% CI [3.42-5.14]$).

The three-way interaction significantly affected consideration of the target for entering a relationship, $F(1, 222) = 6.14, p = .014$. In response to the question, 'Would you consider having a relationship with the target person?', men gave the highest ratings to women who did not cooperate with men in the group ($M = 6.00, SD = 1.26, 95\% CI [5.54, 6.46]$) and to women who cooperated with other women in the group ($M = 5.97, SD = 1.45, 95\% CI [5.44, 6.50]$). Women gave the highest ratings to men who cooperated with the opposite gender ($M = 5.32, SD = 1.78, 95\% CI [4.67, 5.97]$).

Table 1. MANOVA results

Dependent Variables	Gender F (p)	Cooperation with F (p)	Cooperation F (p)	Gender * Cooperation with F (p)	Gender * Cooperation F (p)	Cooperation with * Cooperation F (p)	Gender * Cooperation with * Cooperation F (p)
Attractive	25.82 (<.001)	1.72 (.19)	11.18 (<.001)	0.39 (.53)	3.84 (.05)	0.01 (.92)	2.29 (.13)
Short-term	14.40 (<.001)	0.72 (.40)	5.37 (.021)	0.27 (.60)	1.82 (.18)	0.67 (.40)	3.00 (.084)
Partner	16.29 (<.001)	1.37 (.24)	4.62 (.033)	0.27 (.60)	1.67 (.20)	0.41 (.52)	6.76 (.01)
Beautiful/handsome	27.56 (<.001)	0.01 (.92)	3.93 (.033)	0.18 (.67)	4.41 (.037)	1.71 (.19)	2.91 (.089)
Marriage	18.88 (<.001)	1.79 (.18)	1.98 (.161)	0.02 (.89)	0.36 (.55)	0.71 (.40)	3.11 (.078)
Long term	19.18 (<.001)	1.27 (.26)	3.17 (.076)	0.12 (.73)	2.57 (.11)	1.27 (.26)	5.05 (.026)
Suitable for Parenting	11.54 (.001)	0.69 (.41)	0.23 (.64)	0.32 (.57)	0.81 (.37)	0.51 (.48)	0.32 (.57)
Relationship	25.54 (<.001)	1.84 (.18)	3.15 (.077)	0.31 (.58)	1.46 (.23)	0.08 (.78)	6.14 (.014)
Sufficient partner	21.83 (<.001)	1.43 (.23)	2.26 (.134)	0.02 (.90)	1.34 (.25)	1.25 (.27)	2.77 (.098)
Good parent	14.03 (<.001)	1.29 (.26)	0.05 (.83)	1.43 (.23)	1.50 (.22)	0.66 (.42)	0.53 (.47)
Sufficient	26.73 (<.001)	0.97 (.33)	1.22 (.27)	0.60 (.44)	1.17 (.28)	1.11 (.29)	3.26 (.072)
Good spouse	18.60 (<.001)	1.11 (.30)	1.58 (.21)	0.07 (.79)	0.24 (.63)	0.30 (.58)	3.61 (.059)

Note: p values smaller than .1 were not rounded.

The interaction effect on considering the target for a long-term relationship was significant, $F(1,222) = 5.05, p = .026$. In response to the question on the target person's suitability for a

Men gave the lowest ratings to women who did not cooperate with other women ($M = 5.25, SD = 1.62, 95\% CI [4.83, 5.67]$). Women gave the lowest

ratings to men who did not cooperate with women ($M = 4.05$, $SD = 2.33$, 95% CI [2.99, 5.11]).

The three-way interaction effects of participant gender, collaboration style, and cooperators' gender on considering the target for a short-term relationship ($F(1,222) = 3.00$, $p = .084$), consider for marriage ($F(1,222) = 3.11$, $p = .078$), sufficient partner ($F(1,222) = 2.77$, $p = .098$), sufficient ($F(1,222) = 3.26$, $p = .072$), evaluation of the target as beautiful or handsome ($F(1,222) = 2.91$, $p = .089$) and considered a good spouse ($F(1,222) = 3.61$, $p = .059$) were only marginally significant. As shown in Figure 4, consistent with the results given in the paragraphs above, men gave the highest ratings when women cooperated with other women or when women did not cooperate with men.

On the other hand, women gave the highest ratings to the target when men cooperated with other women. For example, in response to the question, 'Would you consider marrying the target person?', men gave the highest ratings to women who did not cooperate with men ($M = 6.16$, $SD = 1.19$, 95% CI [5.73, 6.60]) and women who cooperated with

women ($M = 6.10$, $SD = 1.33$, 95% CI [5.61–6.58]). On the other hand, women gave the highest ratings to men who cooperated with women ($M = 5.35$, $SD = 1.85$, 95% CI [4.67–6.03]. For the marriage consideration question, men gave the lowest ratings to women who did not cooperate with women ($M = 5.43$, $SD = 1.60$, 95% CI [3.81–5.02]), while women gave the lowest ratings to men who did not cooperate with men ($M = 4.60$, $SD = 1.91$, 95% CI [3.81–5.39]) and those who did not cooperate with women ($M = 4.67$, $SD = 2.22$, 95% CI [3.66–5.66]).

In terms of the perception of the target as beautiful or handsome, men rated women who cooperated with the same gender as the most attractive ($M = 5.61$, $SD = 1.65$, 95% CI [4.97, 6.25]). Women, on the other hand, rated men who cooperated with the opposite gender as the most handsome ($M = 4.52$, $SD = 1.81$, 95% CI [3.85, 5.18]). The conditions under which men gave the lowest attractiveness ratings were women who cooperated with men ($M = 4.71$, $SD = 1.65$, 95% CI [3.96, 5.46]). Women rated men who did not cooperate with either men ($M = 3.44$, $SD = 1.89$, 95% CI [2.66, 4.22]) or women ($M =$



Figure 4. Means for significant and partially significant interaction effects. Sg: same-gender cooperation (male targets cooperate with males, female targets cooperate with females); Og: opposite gender (male targets cooperate with females; female target)

3.43, $SD = 2.11$, 95% CI [2.47, 4.39]) as least handsome.

The interaction effect on the perception of the target as beautiful or handsome was also significant, $F(1,251) = 4.32$, $p = .039$. Men rated women who cooperated with the same gender as the most attractive ($M = 5.61$, $SD = 1.65$, 95% CI [4.97, 6.25]). Women, on the other hand, rated men who cooperated with the opposite gender as the most handsome ($M = 4.52$, $SD = 1.81$, 95% CI [3.85, 5.18]). The conditions under which men gave the lowest attractiveness ratings were women who did not cooperate with women ($M = 4.70$, $SD = 1.71$, 95% CI [4.26, 5.14]) and women who cooperated with men ($M = 4.71$, $SD = 1.65$, 95% CI [3.96, 5.46]). Women rated men who did not cooperate with either men ($M = 3.44$, $SD = 1.89$, 95% CI [2.66, 4.22]) or women ($M = 3.43$, $SD = 2.11$, 95% CI [2.47, 4.39]) as least handsome.

The interaction effects of independent variables on perceived attractiveness of the target ($F(1,222) = 2.29$, $p = .13$), seeing the target as a suitable parent ($F(1,222) = 0.32$, $p = .57$) and evaluating it as a possible good parent ($F(1,222) = 0.53$, $p = .47$) were not significant.

Regarding the main effects, the gender of the participants significantly affected all dependent variables, with males giving higher scores than females across all dependent variables. However, the effects of cooperation with either the same gender or the opposite gender were not significant. The effect of cooperation was only significant for certain dimensions: short-term relationships, partner suitability, attractiveness, long-term relationships, and desire to start a relationship. In these areas, participants showed a higher preference for targets who cooperated. No significant two-way interactions were observed.

Discussion of Study 2

The findings suggest that when it comes to mate preference, men exhibit a lower preference for women who cooperate with other men and those who do not cooperate with women. This finding supports hypothesis 2. On the other hand, women generally showed a lower preference for men who did not cooperate with other women or men, which supports Hypothesis 3. These findings are

consistent with the Sexual Strategies Theory (Buss & Schmitt, 1993; Buss, 1998), which posits that men and women focus on different aspects of relationships, leading them to develop distinct mating strategies. For most dependent variables, women who cooperated with men received the lowest ratings. This could be explained by competition. Men may perceive women to cooperate with other men as a threat. Conversely, men also rated women who do not cooperate with other women lower, with the highest ratings typically given to either women who cooperate with other women or those who do not cooperate with men. In summary, from a male perspective, a woman's cooperation with other women may be viewed as beneficial for sexual selection, whereas cooperation with men may be seen as a threat.

Women seem to prioritize whether men engage in cooperation. Women gave the highest scores to men who cooperated with other women. Moreover, for most of the dependent variables, female participants gave higher scores to those who cooperated (regardless of whether the cooperation was with women or men) than those who did not cooperate. These results are consistent with studies showing that women pay attention to characteristics such as kindness and understanding. Considering that mate selection is predominantly performed by women (Symons, 1979), these results indicate that cooperation can be transmitted through sexual selection.

It is also valuable to compare these results with those of research on group presence. Studies have shown that men find women less attractive when they are accompanied by two other men, while women find men more attractive when they are accompanied by two other women (Hill & Buss, 2008). Similar findings have been reported in humans and other animal species (White, 2004). Researchers have interpreted these results to reflect men's avoidance of sperm competition and women's use of social learning to identify suitable mates. Our findings are consistent with this perspective. Men may anticipate higher competition from women who cooperate with other men, whereas they may expect lower competition from women who do not cooperate with men. Conversely, women, being more character-focused (Whyte et

al., 2021), seem to primarily assess men's ability to cooperate.

General Discussion

This study explored the role of cooperation in sexual selection by examining whether cooperation influences mate preferences, in line with the assumptions of Sexual Strategies Theory. The findings from the two studies revealed that there are significant differences between men and women in their tendency to prefer cooperation as a mate preference trait. Specifically, women were more inclined to prefer men who demonstrated cooperative behavior, particularly with both genders, whereas men showed a preference for women who cooperated with men, but not with other women.

This study has several limitations. First, it was conducted within a single cultural context and relied on convenience sampling via Google Forms, which limits the representativeness of the findings. Future research should examine whether similar patterns emerge across different cultural and age groups.

Second, the use of vignettes and short video clips was useful for controlling specific factors but may not fully capture genuine cooperative behavior. The content and length of the videos could also have influenced participants' perceptions. Replication studies with more varied and ecologically valid stimuli are needed to confirm the robustness of the effects.

Third, the influence of gender norms should be noted. Men's greater attraction to women cooperating with other women may reflect jealousy or competition dynamics, while women's generally positive evaluations of cooperation might be linked to the social appeal of the "helpful man" stereotype. These mechanisms were not examined in detail here.

Finally, the study focused on attractiveness in initial impressions. It remains unclear how cooperation is evaluated in long-term mate choice, where it may play a more critical role compared to short-term preferences. Moreover, collaboration is not only shaped by the presence or gender of partners. For example, Lynn and colleagues (2024) demon-

strated that environmental conditions such as resource scarcity, abundance, and population density also influence how cooperation is evaluated—factors not considered in the present research.

To advance this line of research, future work should include cross-cultural comparisons, investigate preferences within the context of real interpersonal interactions, and take into account participants' expectations regarding short- versus long-term relationships.

In summary, these findings contribute to our understanding of how cooperation may function as a sexually selected trait, with potential implications for Sexual Strategies Theory. However, further research is necessary to validate these results in different cultural contexts and ensure the reliability and validity of the manipulations used in this study.

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Informed Consent: *All participants provided informed consent prior to participation.*

Data Availability: *The dataset supporting the findings of this study has been uploaded to Mendeley Data and is available as a supplementary file.*

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References

- Bressler, E. R., Martin, R. A., & Balshine, S. (2006). Production and appreciation of humor as sexually selected traits. *Evolution and Human Behavior*, 27(2), 121-130. <https://doi.org/10.1016/j.evolhumbehav.2005.09.001>
- Buss, D. M. & Barnes, M. (1986). Preferences in human mate selection. *Journal of Personality and Social Psychology*, 50(3), 559-570.
- Buss, D. M., & Schmitt, D. P. (1993). Sexual Strategies Theory: An evolutionary perspective on human mating. *Psychological Review*, 100(2), 204-232. <https://doi.org/10.1037/0033-295X.100.2.204>
- Buss, D. M. (1989). Sex differences in human mate preferences: Evolutionary hypotheses tested in 37 cultures. *Behavioral and Brain Sciences*, 12, 1-49.
- Buss, D. M. (1998). Sexual Strategies Theory: Historical Origins and Current Status. *The Journal of Sex Research*, 35 (1), 19-31. Downloaded from: <http://links.jstor.org/sici?sici=0022-4499%281998%2935%3A1%3C19%3ASSTHOA%3E2.0.CO%3B2-B>
- Covas, R., & Doutrelant, C. (2019). Testing the Sexual and Social Benefits of Cooperation in Animals. *Trends in Ecology & Evolution*, 34(2), 112-120. <https://doi.org/10.1016/j.tree.2018.11.006>
- Eshel, I., & Cavalli-Sforza, L. L. (1982). Assortment of encounters and evolution of cooperativeness. *Proceedings of the National Academy of Sciences*, 79:1331-1335.
- Farrelly, D., Lazarus, J., & Roberts, G. (2007). Altruists Attract. *Evolutionary Psychology*, 5(2). <https://doi.org/10.1177/147470490700500205>
- Floría, L. M., Gracia-Lázaro, C., Gómez-Gardeñes, J., & Moreno, Y. (2009). Social network reciprocity as a phase transition in evolutionary cooperation. *Physical Review E*, 79(2), 26106. <https://doi.org/10.1103/PhysRevE.79.026106>
- Gündoğdu Aktürk, E. (2010). Attachment figure transference, caregiving styles and marital satisfaction in arranged and love marriages. [Master of Science, Middle East Technical University]. Downloaded from <https://open.metu.edu.tr/handle/11511/19867>
- Jonason, P. K., & Buss, D. M. (2012). Avoiding entangling commitments: Tactics for implementing a short-term mating strategy. *Personality and Individual Differences*, 52(5), 606-610.
- Minervini, B. P. ve McAndrew, F. T. (2006). The mating strategies and mate preferences of mail order brides. *Cross-Cultural Research*, 40(2), 111-129.
- Nowak M. A. (2006). Five rules for the evolution of cooperation. *Science (New York, N.Y.)*, 314(5805), 1560-1563. <https://doi.org/10.1126/science.1133755>
- Patten, M. M. (2010). Levels of Selection, in Encyclopedia of Animal Behavior(Eds. Michael D. Breed, Janice Moore). Academic Press, 272-276. <https://doi.org/10.1016/B978-0-08-045337-8.00112-1>.
- Phillips, T., Barnard, C., Ferguson, E., & Reader, T. (2008). Do humans prefer altruistic mates? Testing a link between sexual selection and altruism toward non-relatives. *British Journal of Psychology*, 99(4), 555-572. doi:10.1348/000712608x298467
- Pilot, M. (2005). Altruism as an advertisement – a model of the evolution of cooperation based on Zahavi's handicap principle. *Ethology Ecology & Evolution*, 17(3), 217-231. <https://doi.org/10.1080/08927014.2005.9522593>
- Roberts G. (2008). Evolution of direct and indirect reciprocity. *Proceedings. Biological Sciences*, 275(1631), 173-179. <https://doi.org/10.1098/rspb.2007.1134>
- Riolo, R., Cohen, M. & Axelrod, R. (2001). Evolution of cooperation without reciprocity. *Nature*, 414, 441-443 (2001). <https://doi.org/10.1038/35106555>
- Sachs, J. L., Mueller, U. G., Wilcox, T. P., & Bull, J. J. (2004). The evolution of cooperation. *The Quarterly Review of Biology*, 79(2), 136-160.
- Tan, L., Li, N. & Tan, K. (2024). Cash, crowds, and cooperation: The effects of population density and resource scarcity on cooperation in the dictator game. *Evolution and Human Behavior*, 45. DOI: 10.1016/j.evolhumbehav.2024.04.009.

- Tognetti, A., Berticat, C., Raymond, M., & Faurie, C. (2012). Sexual Selection of Human Cooperative Behaviour: An Experimental Study in Rural Senegal. *PLoS ONE*, 7(9), <https://doi.org/10.1371/journal.pone.0044403>
- Seyfarth, R. M., & Cheney, D. L. (1984). Grooming, alliances and reciprocal altruism in vervet monkeys. *Nature*, 308(5959), 541–543. <https://doi.org/10.1038/308541a0>
- Symons, D. (1979). *The evolution of human sexuality*. New York: Oxford University Press.
- Üzümçeker, E., Gezgin, G. N., & Akfırat, S. (2019). Sosyal ve evrimsel psikolojide insan özgeciliği bilmececi [The puzzle of human altruism in social and evolutionary psychology]. *Yaşam Becerileri Psikoloji Dergisi*, 3(5), 93–110.
- Whyte, S., Brooks, R. C., Chan, H. F., & Torgler, B. (2021). Sex differences in sexual attraction for aesthetics, resources, and personality across age. *PloS one*, 16(5), e0250151. <https://doi.org/10.1371/journal.pone.0250151>
- Zahavi, A. (1975). Mate selection – a selection for a handicap. *Journal of Theoretical Biology*, 53, 205–214.
- Zahavi, A. & Zahavi, A. (1997). *The Handicap Principle: a Missing Piece of Darwin's Puzzle*. Oxford University Press, New York.