

Original Article

Friends with Benefits: The Evolved Psychology of Same- and Opposite-Sex Friendship

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Abstract: During human evolution, men and women faced distinct adaptive problems, including pregnancy, hunting, childcare, and warfare. Due to these sex-linked adaptive problems, natural selection would have favored psychological mechanisms that oriented men and women toward forming friendships with individuals possessing characteristics valuable for solving these problems. The current study explored sex-differentiated friend preferences and the psychological design features of same- and opposite-sex friendship in two tasks. In Task 1, participants ($N = 121$) categorized their same-sex friends (SSFs) and opposite-sex friends (OSFs) according to the functions these friends serve in their lives. In Task 2, participants designed their ideal SSFs and OSFs using limited budgets that forced them to make trade-offs between the characteristics they desire in their friends. In Task 1, men, more than women, reported maintaining SSFs for functions related to athleticism and status enhancement and OSFs for mating opportunities. In Task 2, both sexes prioritized agreeableness and dependability in their ideal SSFs, but men prioritized physical attractiveness in their OSFs, whereas women prioritized economic resources and physical prowess. These findings suggest that friend preferences may have evolved to solve ancestrally sex-linked adaptive problems, and that opposite-sex friendship may directly or indirectly serve mating functions.

Keywords: friendship, evolutionary psychology, relationship preferences, budget allocation method, sex differences

Introduction

Friendships can be of enormous evolutionary significance: Friends can provide fitness-relevant benefits like the provisioning of resources, cooperation on critical tasks, assistance with childcare, and even mating opportunities. We thus expect natural selection to have shaped psychological mechanisms that motivate individuals to seek out friendships, in addition to those psychological mechanisms dedicated to other types of social relationship. To the extent that potential friends' characteristics render them differentially able to provision certain fitness-related benefits, evolved psychological mechanisms for friendship should also orient people to form friendships specifically with individuals who possess these benefit-promoting characteristics. In light of the relative gap in the evolutionary literature on friend preferences compared to mate preferences, the current paper examines friendship by predicting the friendship preferences of men and women based on the sex-linked adaptive problems they faced throughout human evolutionary history.

Friendship

The extant body of research on friendship is relatively limited but has elucidated some aspects of friend preferences. A broad generalization is that men and women both have assortative friend preferences – they tend to befriend individuals with characteristics similar to their own (McPherson, Smith-Lovin, and Cook, 2001; Vigil, 2007). However, men's and women's friendships differ in important ways. In general, women's friendships are more intimate in nature, whereas men's friendships serve more instrumental functions (Sprecher and Regan, 2002; Vigil, 2007). Men's friendships tend to be more activity-oriented, and men prefer friends who are athletic, have good financial prospects, and are socially well connected (Aukett, Ritchie, and Mill, 1988; Vigil, 2007). In contrast, women place a higher premium on friends demonstrating traits indicative of intimacy potential, such as kindness, compassion, and empathy (Sprecher, Sullivan, and Hatfield, 1994; Vigil, 2007; Williams, 1985).

Some research has attempted to explain these patterns of friendship at the proximate level by invoking the constructs of similarity and proximity (Linden-Andersen, Markiewicz, and Doyle, 2009; McPherson et al., 2001; Nahemow and Lawton, 1975; Selfhout, Denissen, Branje, and Meeus, 2009). Friends exhibit similarities across personality traits, values, interests, attitudes, and physical appearance (Berscheid, Dion, Walster, and Walster, 1971; Byrne, London, and Reeves, 1968; Singh and Ho, 2000), and many friendships are moderated by physical proximity (Back, Schmukle, and Egloff, 2008; Clark and Ayers, 1988; Nahemow and Lawton, 1975; Sias and Cahill, 1998). Other proximate-level theories have described friendships as a means of social exchange, whereby individuals weigh the costs and benefits associated with each friend and calibrate investment in those friendships accordingly (Befu, 1977; Emerson, 1976; Homans, 1958). A corollary of this idea is that social relationships thrive to the extent that the relationship partners are interdependent – a state in which both individuals feel, to some extent, that they share experiences as a collective unit rather than as two distinct entities (Agnew, Van

Lange, Rusbult, and Langston, 1998; Thibaut and Kelley, 1959).

Although previous research programs have identified some general correlates of friend preferences, the exclusive focus on proximate description and lack of distinction between opposite-sex and same-sex friendships have left important conceptual and theoretical limitations. As a consequence of not being derived from a powerful meta-theoretical framework, previous research has been limited to primarily a descriptive function; previous research has not generated a body of theoretically principled *a priori* predictions about the nature of human friendship. Investigating friendship preferences using such a meta-theoretical framework may (1) lead to novel findings that would not be predicted under alternative approaches, (2) provide explanations for previously unexplained findings, and (3) enable these findings to be interpreted and integrated under a single parsimonious framework. By predicting novel aspects of the psychology of friendship and offering explanations for existing findings based on the particular adaptive challenges men and women faced during human evolution, an evolutionary psychological approach may provide such a principled, theory-driven framework.

The proximate explanation that similarity drives friend preferences may be consistent with some previous findings, but there are strong evolutionary reasons to predict that patterns of friendship should not invariably revolve around similarity. Possessing friends with similar characteristics may have been recurrently associated with greater ease of communication, greater likelihood of sharing common goals, and greater levels of cooperation toward those objectives. However, in domains in which possessing friends with characteristics different from one's own was recurrently associated with greater fitness, natural selection would have favored psychological adaptations for preferring dissimilar friends. For example, because ancestral men were larger in size, had greater upper body strength, and were more physically aggressive than ancestral women (Buss and Schmitt, 1993), physically vulnerable women who sought opposite-sex friends (OSFs) with greater physical strength than themselves would have received better protection from aggressive male pursuers than women with OSFs of similar formidability as themselves. Thus, an evolutionary approach may predict preferences for friends with dissimilar characteristics in certain domains.

The failure to distinguish between OSFs and SSFs in previous research also represents an oversimplification of friendship that leaves existing theories with conceptual and explanatory shortcomings. In ancestral conditions, members of different sexes would have been able to provision distinct benefits to SSFs and OSFs. For example, men could have assisted both their SSFs and OSFs in procuring meat (via hunting large game) and providing protection (via warfare, defense, and intragroup alliances), whereas women would not have been able to reliably provision these benefits to either their SSFs or OSFs (Tooby and DeVore, 1987). An evolutionary perspective thus contrasts with both social exchange theory and interdependence theory because it yields *a priori* predictions about friend preferences and differences between same-sex and opposite-sex friendship based on the distinct functions these relationships are hypothesized to have served in ancestral conditions. Ultimately, such a meta-theoretical framework is needed to predict findings in advance and account for the patterns and principles researchers are discovering in the psychology of human friendship.

Initial evolutionary psychological investigations into friend preferences have revealed important similarities and differences between men's and women's same- and opposite-sex friendship psychology. Bleske and Buss (2000) found that both men and women perceived having same-sex friends with whom they can seek mates and who are respected by their peers to be highly beneficial, and used these friends to attain these benefits. However, in opposite-sex friendships, men perceived the potential for sexual access as more beneficial than did women, whereas women perceived physical protection as more beneficial than did men. These findings have two important implications for achieving an understanding of the psychology of human friendship. First, the observed differences in men's and women's perceptions of the benefits of friendship suggest it may be fruitful to explore sex differences in friend preferences as a function of the different selection pressures that men and women faced during human evolutionary history. Second, men's and women's perceptions of the benefits of same-sex friendship differ from their perceptions of the benefits of opposite-sex friendship (e.g., the value men attribute to sexual access to their OSFs and women's valuation of their OSFs' ability to protect them), suggesting that research on human friendship should disambiguate friendship into the distinct relationships of same- and opposite-sex friendship. An understanding of the sex-linked adaptive problems men and women recurrently faced during human evolutionary history may provide an important starting point for investigating men's and women's psychology in the contexts of these friendships.

Same-Sex Friendship

Sex-linked adaptive problems

In ancestral environments, men recurrently faced adaptive problems related to hunting and warfare to a greater extent than did women (Silverman, Choi, and Peters, 2007; Tooby and DeVore, 1987), whereas women disproportionately faced adaptive problems related to gathering and childcare (Silverman and Choi, 2005). Consequently, men would have gained more than women from friends with hunting- and warfare-related skills, whereas women would have gained more from friends who offered knowledge and advice on gathering, pregnancy, nursing, or childcare. Natural selection would thus have favored preferences in men and women for friends who possessed traits and knowledge relevant to solving these sex-linked adaptive problems.

Throughout ancestral history, meat was procured primarily by men via large game hunting (Tooby and DeVore, 1987). Large game was risky to hunt and could rarely be successfully killed by one man alone (Milton, 1999; Tooby and DeVore, 1987), so ancestral men hunted collectively (Buss, 2004; Cosmides, 1989; Tooby and DeVore, 1987). Meat would have been shared among the men who partook in the hunt and their kin (Hill and Hurtado, 1996). In modern tribal societies such as the Aché and !Kung San, there are pronounced individual differences among men in attributes relevant to hunting, including physical size and strength, hunting skills, tendency to cooperate in collective action, and willingness to reciprocate (Hill and Hurtado, 1996; Lee, 1979). Ancestral men who failed to form friendships with men possessing these characteristics would have been outcompeted by other men who were more discriminating in their selection of friends. We

would thus expect modern day men's same-sex friendship psychology to exhibit evidence of evolved preferences for friends who can fulfill functions relevant to hunting and warfare.

On the other hand, we would expect the adaptive problem of gaining reliable childcare to have shaped women's same-sex friend preferences. In contemporary tribal societies that closely resemble ancestral conditions, women engage in "cooperative breeding"—the practice of providing protection, warmth, food, and other resources to the children of other women, both kin and non-kin (Hill and Hurtado, 2009; Hrdy, 2008, 2009a; Sear and Mace, 2008). Cooperative breeding is associated with enhanced maternal fertility, reduced infant and child mortality, and shorter interbirth intervals (Hrdy, 2008, 2009b; Kramer, 2005; Sear and Mace, 2008). This fitness-critical function is primarily fulfilled for women by other women (Sear and Mace, 2008). If ancestral women varied in their ability or inclination to engage in cooperative allomothering, women who had a preference for SSFs who were able and willing to provide these critical forms of support would have outcompeted their less discriminating counterparts. We would thus expect modern day women to possess evolved preferences for SSFs knowledgeable and skilled in the domains of infant care and childrearing. In sum, childrearing for women and hunting and warfare for men represent specific examples of sex-linked adaptive problems that would have provided impetus for the evolution of sex-differentiated design features of SSF preferences (Silverman and Choi, 2005; Silverman et al., 2007; Tooby and DeVore, 1987).

Mate preferences as sex-linked selection pressures

Sex differences in mate preferences would also have created selection pressures for differences in men's and women's SSF preferences. Both sexes faced the adaptive problem of acquiring a mate, a problem that same-sex friends can help solve (Ackerman and Kenrick, 2009; Bleske and Buss, 2000). Mate preferences differ between the sexes (Buss and Schmitt, 1993) and the characteristics valued in mates by members of one sex drive competition between members of the other sex on those characteristics (Buss, 1988; Trivers, 1972). Natural selection would thus have favored SSF preferences that oriented individuals to seek out SSFs with attributes that were both desirable to members of the opposite-sex and which either could have been directly transferred, or from which an individual could have reaped "trickle-down" effects. For example, women value economic resources in a potential mate more than men do, so men should have a stronger preference than women for friends with economic resources (Vigil, 2007). Such friends could have conferred fitness benefits either directly by sharing resources or indirectly via positive externalities (Tooby and Cosmides, 1996). For example, because men with economic resources would have been desirable as mates and had access to a larger pool of potential mates, men who befriended these men could themselves have gained access to a larger pool of potential mates. On the other hand, because men place a greater premium on the physical attractiveness of long-term mates (Buss, 1989; Buss and Schmitt, 1993; Li, Bailey, Kenrick, and Linsenmeier, 2002), women may have derived greater fitness-benefits from friends who were physically attractive and thus helped them gain access to a larger pool of male suitors, or directly helped them enhance their physical attractiveness. In sum, adaptive problems faced by men and women alike, sex-linked adaptive problems, and sex differences in mate preferences would have created selection pressures for multiple design

features of men's and women's SSF preferences:

Prediction 1: Both men and women will value a willingness to reciprocate and a past history of reciprocation in SSFs. Acts and characteristics related to these traits include honesty, agreeableness, and having a reputation for being a reliable reciprocator.

Prediction 2: Men, more than women, will value abilities relevant to hunting and warfare in SSFs. Acts and characteristics indicative of these abilities include athleticism, physical prowess, bravery, leadership ability, hunting-related skills and knowledge facilitating successful combat.

Prediction 3: Men, more than women, will value SSFs who possess resources.

Prediction 4: Women, more than men, will value abilities relevant to childcare in SSFs. Relevant attributes and traits include childcare skills and conscientiousness.

Prediction 5: Women, more than men, will value physical attractiveness in SSFs, including knowledge about physical appearance enhancement.

Opposite-Sex Friendship

There are strong evolutionary theoretical reasons to expect the psychology of opposite-sex friendship to differ from that of same-sex friendship. First, because of sexual dimorphism and sex differences in ancestral resource control, friends of only one sex may have been able to reliably offer certain benefits, such as physical protection from formidable male aggressors or provisioning of meat from large game. Second, OSFs – but not SSFs – could also have been potential mates. The parallel content between the characteristics men and women desire in mates (Buss and Schmitt, 1993) and the reported benefits of opposite-sex friendships (Bleske and Buss, 2000) suggests that the psychological mechanisms underpinning opposite-sex friendship may be closely tied to human mating psychology or may overlap with mating adaptations.

If OSFs can serve as 'back-up mates' (Duntley, 2007), provide "mate insurance" (Buss, 1994), or be transformed into mating opportunities, humans' OSF preferences should resemble mate preferences. As a consequence of facing common adaptive problems, both men and women prize characteristics such as kindness and generosity in mates, but as a consequence of sex-linked adaptive problems, the sexes differ in the extent to which they prioritize other characteristics such as physical attractiveness and resource acquisition potential (Buss and Schmitt, 1993). If individuals prefer OSFs with characteristics similar to those they desire in mates, we would expect women to have a stronger preference for OSFs who exhibit resource acquisition potential and are capable of providing physical protection (Buss and Schmitt, 1993). On the other hand, we would expect men to have a stronger preference for OSFs who are physically attractive and skilled and knowledgeable at caring for children. If a central function of opposite-sex friendship is mating, the friend preferences outlined in predictions 1-5 should be more evident in SSF than OSF contexts, and OSF preferences should exhibit distinct design features:

Prediction 6: Women, more than men, will desire OSFs with traits associated with reliably provisioning resources, such as agreeableness, generosity, and dependability.

Prediction 7: Women, more than men, will desire traits in OSFs related to hunting and providing protection, such as strength and athleticism.

Prediction 8: Women, more than men, will desire OSFs with characteristics associated with control of economic resources. These include earning potential, having a wealthy family, and being savvy with such resources.

Prediction 9: Men, more than women, will desire traits related to childrearing and family care in OSFs.

Prediction 10: Men, more than women, will desire OSFs with traits associated with fertility and reproductive value, such as physical attractiveness.

Current Study

In the current study, we examined the distinct design features of men's and women's SSF and OSF preferences. We employed two tasks that imposed constraints on these preferences to assess how they manifest themselves under conditions consistent with the real world. The limitations of one's own "friend value" or desirability on the friend market, as well as the restrictions imposed by the eligible friend pool, likely make it impossible to obtain ideal friends. Because individuals are unlikely to be able to find and form friendships with individuals who have all of the characteristics they desire in a friend, in the real world individuals must prioritize certain characteristics and consequently sacrifice other characteristics of lower priority.

In the first task, participants categorized their actual SSFs and OSFs according to the specific functions these friends serve in their lives. Having participants describe their real friends enables the exploration of the actual choices men and women make when forced to select among the naturally occurring, available distributions of friend traits. The second task convergently explored how men and women prioritize the characteristics they desire in friends when constraints consistent with real-world conditions are imposed. Participants allocated limited budgets of "friend dollars" to different categories of characteristics to design their ideal SSFs and OSFs given the specified budgetary constraints. This budget allocation method offers two advantages over simple valuation tasks in which individuals rate the desirability of single traits in isolation. Because participants must allocate constrained, fixed budgets to multiple desired characteristics simultaneously, the budget allocation method forces participants to make trade-offs for those characteristics of greatest priority (Li et al., 2002)—each dollar allocated to one trait is a dollar taken away from another. The second advantage of a budget allocation method involving multiple budgets is that it enables the assessment of non-linear patterns of expenditure. Individuals allocate large initial portions of their budget to necessities until the required level of the necessity is reached, at which point expenditure asymptotes (Li et al., 2002). Conversely, individuals only allocate their resources to luxuries once demands for necessities are satisfied. A multiple-budget allocation task is the only extant method for assessing these quadratic patterns of expenditure, which may reveal nuanced design features of men's and women's SSF and OSF preferences.

The budget allocation method also enables the testing of design features of OSF preferences that previous evolutionary psychological research on friendship did not directly address. Bleske and Buss (2000) found sex differences in the reported benefits of having OSFs possessing specific attributes. However, as Buss (2004) points out, there is a

fundamental distinction between benefits and functions. To assert that men and women have evolved preferences for specific traits in OSFs, it must be demonstrated that men and women not only reap these benefits from OSFs, but that they specifically desire OSFs who can provide those benefits, and preferentially select such OSFs when they have the ability and opportunity to do so.

Materials and Methods

Participants

Participants were 63 male and 58 female students (mean age = 20.8 years, $SD = 3.8$ years) enrolled in an introductory psychology course at a large public university in the Southwestern United States. One hundred fourteen participants reported being heterosexual, six reported being homosexual, and one did not report sexual orientation. Because our hypotheses pertained to a heterosexual model, only data from heterosexual participants were retained. Participants completed the study on a secure server hosted by the Psychology Department at the university and received partial course credit for their participation.

Questionnaire and procedure

Actual friend selection. A questionnaire instructed participants to list their friends and the functions each of these friends served for the participants in their lives. Below the instructions were sections for participants to list up to eight friends. Each section consisted of six blank text fields for participants to enter the friend's functions, and a question asking the sex of that friend.

Budget allocation task. Six adaptively relevant domains were created using an act nomination procedure (Buss and Craik, 1983). Six undergraduate research assistants blind to the hypotheses of the current study listed as many traits, attributes, and skills as they could that would have been associated with being able to successfully solve adaptive problems recurrently faced during human evolutionary history. This procedure resulted in a total of 62 characteristics. The research assistants then categorized these characteristics according to the broader domains of adaptive problems the characteristics helped solve. The research assistants reached consensus on six distinct categories into which the 62 attributes fell: Family Care, Physical Prowess, Physical Attractiveness, Personality, Economic Resource Status (ERS), and Social Intelligence. A person high in Family Care is adept at solving problems related to child rearing and food gathering; a person high in Physical Prowess is a good fighter, is able to provide physical protection, and has strong hunting skills; a person high in Physical Attractiveness possesses characteristics associated with being attractive to members of the opposite sex; a person high in Personality is altruistic, agreeable, and cooperative; a person high in ERS possesses resources, as well as the ability and social connections to acquire future resources; and a person high in Social Intelligence is skilled with people and able to gain access to important social information.

The 62 attributes, organized by domain, were presented to participants before they began the budget allocation task (see Appendix A). Participants were given three sequentially increasing budgets of "friend dollars" (\$15, \$25, and \$35). The instructions

explained that each dollar allocated to a specific domain for a friend was associated with a decile (10 percentile) increase in that domain for that friend relative to the friend's same-sex peers. For example, a male participant who allocated \$7 to an OSF's Physical Attractiveness would obtain a female friend who was more attractive than 70% of her same-sex peers, and an additional dollar spent on her Physical Attractiveness would increase her standing in this domain by an additional decile, making her more attractive than 80% of her peers. Participants were presented with a blank text field for each domain and typed the desired number of friend dollars for each domain into these fields. Expenditure within one budget was independent from, and did not carry over to, expenditure on other budgets.

Results

Analysis of the actual friend selection data focused on the functions of participants' friends. Two researchers blind to the sex of the participant and friend categorized the functions according to broader domains of adaptive problems solved (e.g., the functions of "networking" and "influence" were categorized as belonging to the "Status Striving" domain; see Appendix B for the full list). When there was disagreement between the researchers about the categorization of the functions, the researchers discussed these differences and reached consensus for all categorizations. Chi-square analyses were conducted on the frequency counts for each domain, organized by participant sex and friendship type (i.e., same-sex vs. opposite-sex friendship).

2 x 3 ANOVAs with trend analyses were conducted on the budget allocation data for same- and opposite-sex friends. Participant sex was a between-subject factor, and budget level (\$15, \$25, \$35) was a within-subject factor. Results at each budget level are reported in brackets.

Results provided support for 7 of the 10 hypothesized evolved design features of men's and women's SSF and OSF preferences.

Personality

Friend functions. Friend function data did not support Prediction 1, that men and women would value characteristics in SSFs indicative of being a reliable reciprocator, or Prediction 6, that women, more than men, would desire OSFs with characteristics associated with reliably sharing resources, such as generosity, agreeableness, and dependability.

Budget allocation. The budget allocation data supported Prediction 1. Across budgets, both men ($M = 6.64$, $SD = 1.66$) and women ($M = 6.40$, $SD = 1.79$) allocated a greater proportion of their SSF budgets to Personality, a domain of characteristics associated with being agreeable, cooperative, and altruistic, than to any other domain (Figure 1; all Bonferroni-corrected pairwise comparisons: $p < .001$, [\$15: $p < .001$, \$25: $p < .05$, \$35, $p < .001$])

The budget allocation data also supported Prediction 6. Women spent more on Personality than on any other quality in OSFs (all pairwise comparisons: $p < .001$, [\$15: $p < .05$, \$25: $p < .001$, \$35: $p < .001$]). Women also treated Personality in OSFs as a necessity,

exhibiting a significantly negative quadratic trend of expenditure across budget conditions, ANOVA: $F(1,46) = 9.25, p < .01, \eta_p^2 = .17$. The mean proportion of the total budget dedicated to Personality by women was highest in the most constrained condition, but then decreased as the budget increased to \$25 and saw an even steeper decrease in the highest (\$35) budget condition. This is precisely the pattern we would expect to obtain if women were treating Personality in OSFs as a necessity. However, men, relative to women, treated the Personality of OSFs as a luxury, $F(1,94) = 6.73, p = .01, \eta_p^2 = .07$, and spent as much on the Physical Attractiveness of their OSFs as on their Personality (Physical Attractiveness-Personality pairwise comparison: $p = .997$; all other pairwise comparisons: $p < .001$ [\$15: Physical Attractiveness-Personality $p = .08$, all other pairwise comparisons $p < .001$, \$25: Physical Attractiveness-Personality $p = .174$, all others $p < .001$, \$35: Physical Attractiveness-Personality $p = .123$, all others $p < .001$).

Physical prowess

Friend functions. The friend function data supported Prediction 2, that men, more than women, would value characteristics in SSFs associated with hunting and fighting ability. Men maintained same-sex friendships for “Physical Formidability Enhancement,” which consisted of functions such as “lift [weights] together” and “play sports,” more frequently than did women, Chi-square: $\chi^2(1) = 7.86, p < .01 (N = 93)$.

The friend function data also supported Prediction 7, that women, more than men, would desire traits in OSFs associated with strength and the ability to provide physical protection. Women were significantly more likely than men to maintain opposite-sex friendships for “Protection,” $\chi^2(3) = 9.32, p = .03 (N = 62)$.

Budget allocation. The budget allocation data supported Prediction 7, but not Prediction 2. Women allocated significantly more ($M = 3.71, SD = 1.35$) than men ($M = 2.07, SD = 1.12$) to the Physical Prowess of their OSFs, $F(1,84) = 31.92, p < .001, \eta_p^2 = .28$ [\$15: $t(86) = -5.07, p < .001$, \$25: $t(88) = -5.32, p < .001$, \$35: $t(92) = -5.90, p < .001$].

Economic resources

Friend functions. The actual friend function data supported Prediction 3, that men would place a greater premium than women on their SSFs’ access to economic resources. Men were more likely than women to maintain same-sex friendships for “Acquisition of Economic Resources,” with specific functions such as “business endeavors,” $\chi^2(1) = 7.86, p < .01 (N = 93)$, and for “Status Striving” (Buss, 1995), which included functions like gaining “influence,” “respect,” and “network connections,” $\chi^2(1) = 13.57, p < .001 (N = 93)$. Prediction 8, that women would have a greater preference than men for OSFs with access to economic resources, was not supported by the friend function data.

Budget allocation. The budget allocation data supported Prediction 8, but not Prediction 3. Women ($M = 3.40, SD = 1.29$) allocated significantly more than men ($M = 2.91, SD = 1.39$) to the ERS of OSFs, $F(1,86) = 33.47, p < .01, \eta_p^2 = .08$ [\$15: $t(86) = -2.79, p < .01$, \$25: $t(91) = -1.99, p = .05$, \$35: $t(94) = -1.82, p = .07$].

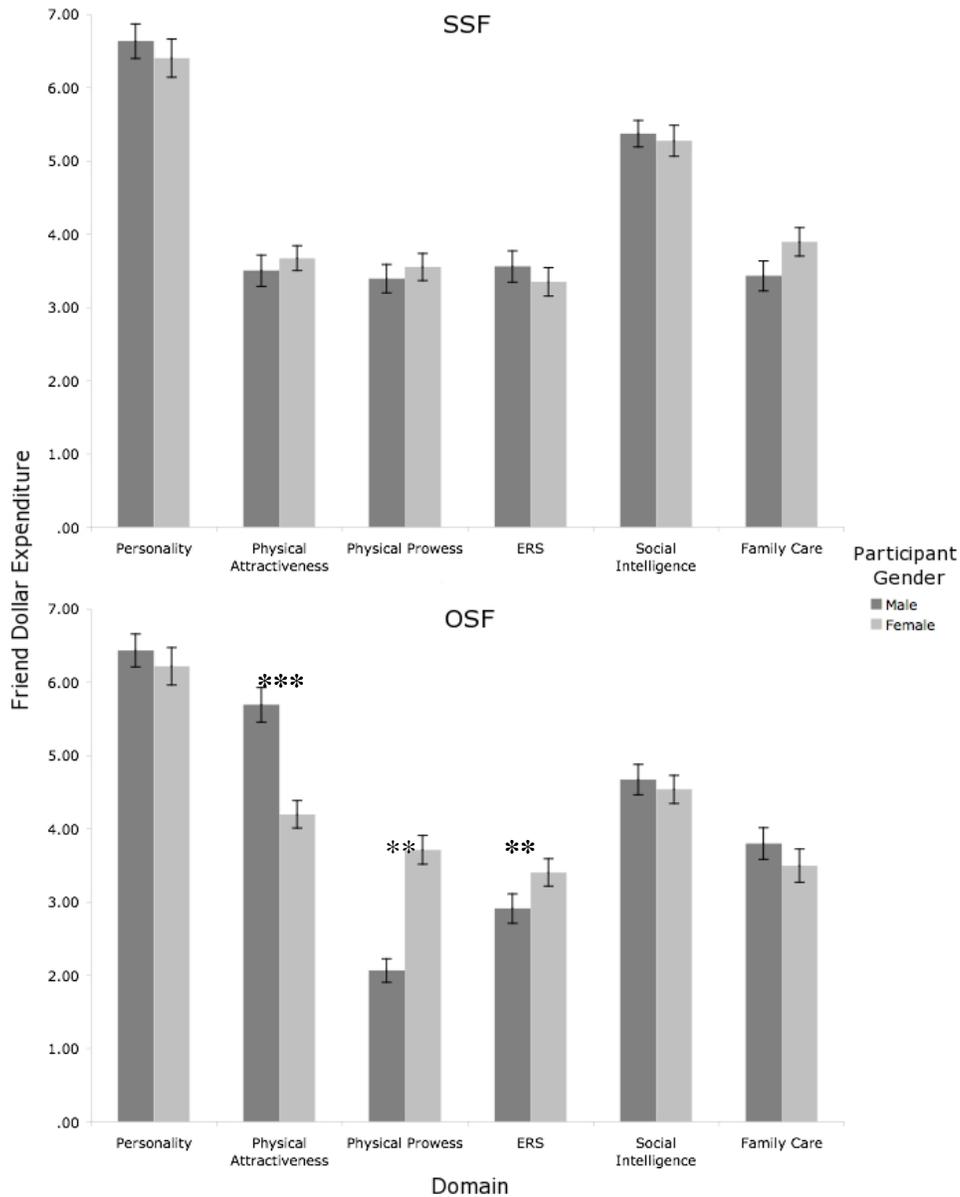
Physical attractiveness

Friend functions. The friend function data did not support Prediction 5, that women

would place greater value than men on their SSFs' physical attractiveness, or Prediction 10, that men would place greater value than women on the physical attractiveness of their OSFs.

Budget allocation. The budget allocation data supported Prediction 10, but not Prediction 5. Men ($M = 5.69$, $SD = 1.66$) allocated significantly more than women ($M = 4.20$, $SD = 1.28$) to the physical attractiveness of their OSFs, $F(1,93) = 23.28$, $p < .001$, $\eta_p^2 = .20$ [\$15: $t(93) = 4.41$, $p < .01$, \$25: $t(93) = 4.97$, $p < .001$, \$35, $t(95) = 4.78$, $p < .001$].

Figure 1. Male and female participants' mean friend dollar expenditure on same-sex friends (SSF) and opposite-sex friends (OSF) by domain



Note: Bars represent $M + (SE)$. ** $p < .01$; *** $p < .001$.

Family care

Neither friend function nor budget allocation data supported Prediction 4, that women, more than men, would value SSFs with characteristics associated with childcare abilities. The findings also did not support Prediction 9, that men, more than women, would desire OSFs with traits relevant to childrearing.

Discussion

Broadly, the current findings suggest that men's and women's SSFs preferences differ according to sex-linked adaptive problems recurrently faced during human evolution. Friend selection in male-male dyads—even in modern conditions—revolved around characteristics that would have facilitated hunting and warfare in ancestral environments. Men also placed greater value than women on characteristics in their SSFs relevant to gaining access to resources and elevating their social status. In ancestral environments, a preference for friends who could help oneself acquire resources and ascend the status hierarchy would have conferred greater fitness benefits to men than to women, because social status and resources would have been more powerful determinants of men's mate value than women's (Buss and Schmitt, 1993). On the other hand, men and women alike recurrently faced the adaptive problem of identifying and forming social relationships with cooperative individuals. In accordance with this shared selection pressure, both men and women valued and prioritized agreeableness, altruism, and dependability in their SSFs.

The functions and preferences of opposite-sex friendship exhibited pronounced differences from those of same-sex friendship; for both men and women, OSF preferences and selection exhibited patterns consistent with mate preferences. Men prioritized the physical attractiveness of their OSFs and, relative to women, treated the personality of their OSFs as a luxury. Women, on the other hand, maintained opposite-sex friendships for physical protection and prioritized their male friends' ability to provide protection and economic resources. These patterns of results from both the actual friend selection and budget allocation data provide convergent evidence of a close parallel between OSF preferences and mate preferences. Although OSF preferences differed from SSF preferences in ways that suggest mating functions of opposite-sex friendship, it is unclear whether OSFs represent potential short-term or long-term mates. Women place a greater premium on qualities related to physical prowess in short-term than long-term mates (Buss and Schmitt, 1993). On the other hand, women prioritize men's access to economic resources more in long-term than short-term mates (Li and Kenrick, 2006). The parallels between OSF preferences and both short-term and long-term mate preferences suggest that OSFs may represent potential short-term mates as well as potential long-term mates. Future research should explore the contexts in which short-term mating, long-term mating, and platonic relationship mechanisms are activated in opposite-sex friendships, and how these mechanisms influence OSF preferences and selection.

The proposal that OSF preferences are the output of mating adaptations is just one of several potential explanations for the high degree of overlap between OSF and mate preferences. Another possibility is that having OSFs who are desirable as mates may increase one's mating opportunities with individuals of the opposite sex other than the

OSF. Attractive women tend to befriend other attractive women (Bleske-Rechek and Lighthall, 2010). Thus, a man who befriends a beautiful woman may gain access to mating opportunities by way of his OSF introducing him to her SSFs. Another possible function of forming friendships with desirable members of the opposite sex is that having desirable OSFs may enhance others' perceptions of one's mate value. Mate copying—a member of one sex experiencing attraction to a member of the opposite sex because that individual has a mate—is a well-documented phenomenon in diverse species of fish, birds, mammals, and, as preliminary evidence suggests, humans (Dugatkin and Godin, 1992; Hill and Buss, 2008; Place, Todd, Penke, and Asendorpf, 2010; Waynforth, 2007; White and Galef, 2000). Possessing a mate indicates that an individual has passed the quality-control standards set up by members of the opposite sex and is thus likely to be worthy of consideration as a mate. There is some evidence that mate copying is strongest when the potential interloper observes that the opposite-sex individual's mate is of high quality (Waynforth, 2007). Having a desirable OSF, like having a desirable mate, may increase perceptions of one's value to members of the opposite sex as a potential mate, friend, or both. These proposed explanations for the parallel content between OSF preferences and mate preferences are not necessarily mutually exclusive; all of these possible functions of OSFs may have contributed to the evolution of the psychological mechanisms underpinning opposite-sex friendship. Testing these novel hypotheses and determining the relative importance of opposite-sex friendship's different functions awaits future research.

The results of this study are also consistent with an alternative account of human OSF psychology. If opposite-sex friendships are a feature of evolutionarily novel environments, then selection could not have fashioned OSF-specific psychological adaptations during human evolution. Instead, the close parallel between OSF preferences and mate preferences may be due to the combined output of mating psychology and same-sex friendship psychology in a novel context in which members of the opposite-sex are both potential mates and friends. The results here are thus consistent with the possibility that ancestral environments yielded mating adaptations and SSF adaptations, and OSF preferences are the byproduct of the combined action of these adaptations. The evidence presented here does not discriminate between byproduct and adaptation hypotheses, and so disentangling these possible explanations requires future research. In particular, the byproduct hypothesis would predict that various contextual and individual difference variables would lead to the differential activation of SSF versus mating mechanisms in determining OSF preferences. For example, mated individuals, compared to unmated individuals, may be less likely to have mating mechanisms activated in the context of opposite-sex friendship because of the potential costs of extra-pair mating, such as retaliatory affairs or mate defection (Lewis, Easton, Goetz, and Buss, 2012). On the other hand, among mated individuals, those who are dissatisfied with their current relationship may be more likely to treat OSFs as potential mates. Attention to the individual- and context-dependent costs and benefits of treating OSFs like mates may enable researchers to formulate a framework for predicting shifts in the activation of SSF and mating mechanisms in producing manifest OSF preferences. Future research should carefully consider these ideas to disentangle the adaptation and byproduct hypotheses.

Two possible contentions to our interpretation of the current study's findings are

that OSF preferences may be due to (1) the sexes differing in their abilities in specific domains as a result of experience or socialization (e.g., women have more experience with childcare than men), or (2) social stereotypes about the roles women and men ought to play in society. These possible proximate explanations do not represent competing alternatives to the position that OSF preferences are a consequence of humans' evolved psychology.

First, societal phenomena such as sex differences in abilities in particular domains may represent a possible proximate explanation for the observed pattern of OSF preferences, but this explanation is incomplete if it is not integrated with an ultimate explanation of the pattern. Moreover, these proximate phenomena themselves require explanation (Confer et al., 2010). For example, women may have more experience with childcare than men, but why does every human culture systematically afford women more experience and practice with childcare than men? An empirical generalization regarding one sex's on-average superiority at a given task because of socialization holds no explanatory power beyond the proximate level – what is needed is an explanation of why friendship preferences are patterned in the particular way that they are across specific domains of adaptive problems. Because women recurrently faced adaptive problems associated with childcare to a greater extent than did men, natural selection would have selected for stronger childcare abilities in women than in men. Desiring childcare abilities in women would thus have been associated with greater fitness-benefits during human evolution than desiring these qualities in men – consequently, selection would have favored a stronger preference for seeking childcare abilities in female than male friends.

Second, stereotypes about men's and women's roles in society may be one of the many categories of proximate inputs into the information-processing mechanisms that determine OSF preferences. However, this would be perfectly consistent with our position, which provides a framework for understanding the ultimate explanations underlying OSF psychology and does not exclude social stereotypes as one of the proximate inputs. Such an “alternative” socialization explanation is not truly an alternative. Rather, it is one piece of the proximate explanation that must be combined with an ultimate, evolutionary explanation in order to move toward a more complete understanding of human OSF psychology (Tinbergen, 1963; Confer et al., 2010).

Although the findings supported many of the hypothesized design features of men's and women's same- and opposite-sex friendship psychology, they did not support the prediction that women would desire SSFs high in physical attractiveness. One possible explanation for this is that although SSFs can assist in mate acquisition (Ackerman and Kenrick, 2009), they can also be competitors for mates. Having highly attractive friends may introduce costs that exceed the benefits of friendship with these individuals. Previous research provides circumstantial evidence for this: in female friendship dyads, the friend lower in physical attractiveness perceives greater rivalry in the friendship than does the more attractive friend (Bleske-Rechek and Lighthall, 2010). Future research is needed to explore the influence of the costs of having physically attractive friends on friend preferences.

Data also did not support the hypothesis that women would prioritize family care and childrearing skills in their SSFs. One possible explanation for this lies in the duration required to accomplish the tasks in which ancestral women collectively engaged with their

SSFs: collective childrearing would often have lasted years. This would have created selection pressures for psychological mechanisms in women to create enduring, dependable friendships and to place greatest priority on a friend's dependability, even if this meant decreasing the weight attached to specialized skills. The high degree of emotional closeness in female friendships (Ackerman, Kenrick, and Schaller, 2007) may be a key psychological design feature of female same-sex friendships. The vulnerability associated with mutual self-disclosure (Pearce, Wright, Sharp, and Slama, 1974) and sharing personal feelings and problems (Fasteau, 1974) may serve to increase the costs associated with dissolution of the friendship. This voluntary sharing of private information, which increases the costs of relationship severance, may be an honest, costly signal of commitment that promotes "deep engagement" (Tooby and Cosmides, 1996) among female friends and the formation of reliable, enduring friendships. Future research is required to explore this idea in further theoretical and empirical depth.

One limitation of the current study is that it used consciously articulated reports, which may not offer accurate information about individuals' actual cognitive processes (Nisbett and Wilson, 1977). In an effort to avoid the limitations of self-reported preferences, which may not always correspond to actual social partner choices (e.g., Todd, Penke, Fasolo, and Lenton, 2007), the current study inferred participants' preferences by measuring outcomes from two distinct methodologies. The data collected via the budget allocation task ideally should reflect the output of individuals' preferences under constrained conditions, which were designed to be consistent with real-world conditions. However, at least one potential cause for the inaccuracies of self-reported preferences may be their hypothetical nature: Self-reported preferences measure what participants think they *would* prefer. Given that the budget allocation task assessed hypothetical rather than actual friends, it too may suffer from this limitation. The friend function data, however, pertained to actual friends—*after* friend selection. Because inferring individuals' preferences based on friends actually chosen does not depend on individuals' conscious awareness of their preferences, the friend functions method ideally circumvents the problem that individuals may not be consciously aware of their actual friend preferences. Nonetheless, one potential limitation of the friend function data is that individuals may not be aware of the benefits and functions their friends serve in their lives. However, any consciously articulated reports may be limited to the information of which individuals are aware. Actual social partner choices are also compromises between one's desirability as a partner and available potential partners. Thus, actual choices may not always be directly indicative of evolved design in preferences (Buss and Schmitt, 1993). Because all methods of assessing friend preferences have unique limitations, it is important that future studies continue to employ multiple, alternative methodologies to test for convergent evidence of the current study's findings.

The current study focused primarily on preferences for friends who could help solve specific adaptive problems. Future research should further explore the adaptive problems that friends *cause* and the psychological mechanisms that have evolved to solve these problems. One adaptive problem caused by friendship arises from the very nature of aiding others: In order to provide a friend with a benefit, one often has to incur costs. For example, if women seek out male friends for protection and resources, these men may incur the costs

of injury and resource investment to maintain the friendship. Other adaptive problems caused by friendship may result from strategic interference (Buss, 1989, 1994)—when one person pursues a strategy that interferes with another person’s strategy. For example, the presence of female friends pursuing a short-term mating strategy may interfere with other women’s goal of securing committed, long-term mates, because those women seeking short-term mates could attract men who might otherwise be willing to provide long-term commitment (Pedersen, 1991). Other adaptive problems that friends may directly cause include divulging reputation-damaging information, restricting sexual access, and being sexually coercive. Future research is needed to explore how the adaptive problems caused by friends influence friendship preferences, and how individual differences, such as mate value and preferred mating strategy, moderate these preferences.

The current research makes several contributions to the scientific literature on social partner preferences. First, by investigating friend preferences from an evolutionary perspective, the current study (a) enhances understanding of friend preferences beyond the proximate level into their functional causes, (b) incorporates a diverse set of previous findings within a single, parsimonious meta-theoretical framework, and (c) sheds light on previously undiscovered facets of friendship preferences. Second, the current research begins to fill the gap in research on psychological adaptations for social partner preferences outside of mateships. This paper represents a modest step toward a deeper understanding of these social partner preferences, and puts forth several novel hypotheses in hopes that these may represent fruitful avenues of research in this uncharted territory of human psychology.

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Appendix A – Attributes Used in Budget Allocation Task, Organized by Domain

Physical Attractiveness: Strength, weight, height, stylishness of appearance, face, skin tone, teeth, knowing what is attractive, knowing how to exercise effectively.

Physical Prowess: Sprinting speed, knowledge about animals, tool-making ability, ability to sneak up on people and surprise them, awareness of surroundings, sense of cardinal directions (N,S,E,W), balance, athletic stamina, ability to throw heavy objects, fighting ability.

Social Intelligence: Ability to get people to do what they want them to, ability to help people with their problems, charisma, ability to make others laugh, social influence, knowledge of others secrets, sense of humor, knowledge of whom to trust, ability to keep you in the loop.

Family Care: Cleaning ability and efficiency, cooking skills, child care, ability to carry things without breaking them, awareness of dangerous animals in the area, knowledge of how to eat healthily, knows how to pick out good fruit and vegetables at the grocery store, ability to get somewhere they have been to only once.

Personality: Thoughtfulness, encouragement of others to succeed, consideration of other people’s feelings, niceness, generosity, dependability, reliability, trustworthiness, team player, empathy.

Economic Resource Status: I.Q., job, wealth of friends, wealthy family, wealthy lifestyle, problem-solving ability, educational background, work ethic, career goals, skill with money, skill at multitasking, clear path to a high-paying job, family influence and connections, not letting failure get in the way of their goals.

Appendix B – Categorization of Friend Functions From Actual Friend Selection Data

<i>Function Domain</i>	<i>Specific functions</i>
Status Striving	Network connections, gain power, influence respect, networking, regular social connections, getting to meet people, knows many people
Emotional Support	Share secrets, discuss things that bother me, guidance, moral support, providing safe haven, knows how to help, gives advice from experience, advice, helps me forget about problems, talk about personal stuff, supportive in decisions, support, provide point of view, knows what I need, can depend on them, insight on decisions, crutch, confidant, listens, can run to them when things go bad, confide in and trust outside of family, offer help, let me vent, moral compass, always there, understands me

The evolutionary psychology of friendship

Humor	Tells jokes, laughter, inside jokes, makes jokes a lot, play jokes on/with, sense of humor, easy to joke around with, funny, laugh at similar things
Physical Formidability Enhancement	Spotting, Lift together, go to tournaments with, play sports with, play with, exercise with
Protection	Protects, weeds out potential mates
Playing Games	Play video games with, games
Giving Ideas	Gives ideas, brainstorm, expose to new/fresh ideas, inspiring, creative
Partying	Drinking, party life, go to clubs with, share drinks, act wild, able to find parties
Acquisition of Economic Resources	Lend money, business endeavors, has money, helps monetarily, has money to do things, can buy things
Academic Help	Study together, offer tips, explain exam material, compare grades, compare homework, relieve school stress, work productively, go to school together, work on projects, takes thorough notes, makes flash cards, attends class, understands material,
Romantic Access	Tease me, tempt me, flirt, sex
Advice on the Opposite Sex	Talk about problems women understand better, talk about relationships, help me understand women, talk about things you can't with men
Fashion/Appearance Advice	Help with grooming and dressing, fashion advice, is stylish, knows what is attractive
Religious Guidance	Spiritual helper, prayer partner
