



Altruism as a courtship display: Some effects of third-party generosity on audience perceptions

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Public generosity may be a means to convincingly advertise one's good character. This hypothesis suggests that altruistic individuals will be desirable as romantic partners. Few studies have tested this prediction, and these showed mixed results. Some studies have found that altruism is not particularly attractive; other studies showed that altruism is attractive by contrasting descriptions of 'nice guys' with 'jerks'. The present study sought to resolve this debate by having participants read a series of experimentally manipulated vignettes of persons with corresponding photographs, such that altruistic vignettes were compared with control descriptions that differed only in the presence or absence of small hints of altruistic tendencies. Altruists were more desirable for long-term relationships than neutral individuals. Women also preferred altruists for single dates whereas men had no such preference. These results are discussed with regard to the idea that people (males in particular) signal their good character via generosity.

Altruistic behaviour is costly behaviour that benefits others without immediate or obvious benefits to the altruist (Trivers, 1971), and its existence is of great interdisciplinary relevance. Some investigators have argued that generous and helpful behaviour is caused by empathic and/or altruistic motivations (see for example, Batson *et al.*, 1997; Cox, 2004; Sober & Wilson, 1998) and if so, we must ask why (developmentally and evolutionarily) humans possess inclinations that cause them to perform such costly behaviour. Evolutionary psychologists often focus on altruistic *behaviour* (i.e. generous behaviour regardless of the causal psychological mechanisms) and its consequences for oneself, in order to investigate how the *psychological*

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mechanisms which cause such behaviour (e.g. empathy) could have evolved or be learned.¹ In order for altruistic inclinations to be learned via socialization despite the costs of generous behaviour, there must be some counteracting social rewards for behaving generously, just as there must be some genetic benefit for the evolution of altruistic inclinations or the ability to learn generosity. By focusing on the benefits that generous individuals may receive, theories of reciprocity (direct reciprocity: Axelrod, 1984; Trivers, 1971; indirect reciprocity: Alexander, 1987) have done much to explain the existence of altruistic motives. However, there are many instances of human generosity that cannot be easily explained by reciprocity alone because they involve beneficence that is targeted specifically towards individuals who are unlikely to reciprocate (problematic for direct reciprocity), or towards groups when non-altruists cannot be excluded from benefiting (problematic for both types of reciprocity), and people do seem to have motives for generalized altruism (e.g. Fehr & Fischbacher, 2003; Sober & Wilson, 1998).

Recently, costly signaling theory (Spence, 1973; Zahavi & Zahavi, 1997) has been developed in economics and evolutionary biology as a formalization and extension of Veblen's (1899) ideas of conspicuous consumption, and has been used to explain public displays of generosity (e.g. provisioning for feasts: Boone, 1997; Smith & Bliege Bird, 2000). By giving benefits to others, an altruist can prove that he or she is of high enough quality or status to bear the costs of conferring those benefits, and/or that he or she cares for the welfare of others. Tesson (1995) suggested that human altruism is a courtship display that honestly signals an individual's ability and willingness to be a good parent, and Miller (2000) argued that altruism can act like a peacock's tail as a costly display of abilities and resources. Although people may strategically use generosity for mating purposes (e.g. Griskevicius *et al.*, 2007; Iredale, Van Vugt, & Dunbar, 2008), it need not be a conscious courtship signal, and often will not be: the proximate mechanisms that cause generosity (e.g. empathy) would be present in an individual because they serve the function of signaling one's quality and/or character (Miller, 2007). Generosity towards a potential mate is likely to be attractive because it honestly signals interest and concern for that potential mate: generous acts would not be worth the time and cost for someone who was not romantically interested, thus deterring people from misrepresenting their intentions (Bolle, 2001). Thus, generosity can function as a signal of good character that is believable because it is difficult and/or not worth it to fake. Generosity towards third parties might also be attractive for shorter relationships if it additionally signals abilities, resources, or good character; the time or energy costs of magnanimity can be high enough to make it not worth the effort for someone who did not honestly possess those qualities, and the cooperative sentiment experienced should reflect this tradeoff.

Whether generosity signals abilities/resources or good character, one would predict (e.g. Miller, 2007) that people should be able to notice altruism and should find relationships with altruists to be more appealing than relationships with non-altruists. If these costly signaling accounts of altruism are correct, then observers will associate with altruists because it is in their interest to do so, and not simply to reward them

¹ In this article, I am using the word "altruism" in the sense used by evolutionary psychologists, with a focus on the behaviour and its immediate effects (apparent cost to self and benefit to others) rather than on the specific underlying psychological mechanisms (e.g. empathy, Batson *et al.*, 1997; oneness with others, Cialdini, Brown, Lewis, Luce, & Neuburg, 1997; "warm glow", Andreoni, 1990; egoism, etc.). Those who disagree with this use should substitute their preferred term for behaviors that are immediately costly to self but beneficial to others.

(as might be predicted by reciprocity).² If altruism signals abilities (e.g. hunting or resource-gathering ability), and such abilities are considered attractive (see for example Faurie, Pontier, & Raymond, 2004) then it should affect perceived attractiveness and desirability for short- and long-term relationships. Altruism that signals character (but not abilities) should be an attractive quality in long-term partners (romantic or otherwise), but not necessarily in short-term romantic partners because of the lack of opportunity to benefit from a partner's good character, and so it is less likely to affect perceived attractiveness. Any such attraction will likely also exist for non-romantic contexts, but romantic contexts are particularly important for one's happiness and reproductive success.

Although men and women may both have reason to desire altruistic partners, one might expect that women would be more sensitive to cues of altruism than men for a few reasons. In species where females have a greater minimal parental investment than males, male fitness increases more with each additional mate than does female fitness, such that males benefit less from being choosy about partners than do females (Bateman, 1948; Buss & Schmitt, 1993; Trivers, 1972). Although humans do show more mutual mate choice than many other mammals, women are often more choosy in their mating partners (Gaulin & McBurney, 2001), especially for short-term relationships (Kenrick, Groth, Trost, & Sadalla, 1993). Given that choosiness, men are more likely than women to signal abilities to attract mates (Miller, 2000). Both sexes are concerned with good character in many cultures (Buss *et al.*, 1990), but women are predicted to be more concerned with the good character of men in order to avoid abandonment or violent relationships, because these are more problematic for females than males due to differences in parental investment (Alcock, 1993; Daly & Wilson, 1988; Trivers, 1972). If altruism signals concern for others, and if this concern is predictive of later investment in the relationship and/or any offspring produced, then women may be more attracted to altruistic tendencies in mates than men are. However, sex differences in choosiness are typically diminished for serious committed relationships (Kenrick *et al.*, 1993) because such relationships require enough investment from both parties to remove both men and women from the mating pool (or least reduce their participation in it). Thus, any sex differences in preferences for altruism should be weaker for long-term relationships.

The above arguments suggest that altruism should be a desirable trait in dating partners, especially when women choose men. However, folk wisdom apparently argues otherwise, suggesting that 'nice guys finish last' and that they are less attractive than 'bad boys'. However, this is often an unfair comparison because 'nice guys' and 'bad boys' may differ on many dimensions other than niceness. Jensen-Campbell, Graziano, and West (1995) presented videos of males that varied in agreeableness and dominance, and found that women rated agreeable or prosocial men as being more attractive than disagreeable men, especially when the men acted dominantly instead of subordinately. Similarly, Mims, Hartnett, and Nay (1975) found that men were rated more positively after being observed acting nicely than after acting obnoxiously, and Farrelly, Lazarus, and Roberts (2007) found that people were rated more attractive if they had allegedly cooperated rather than defected in a Prisoner's Dilemma game.³

² With reciprocity, one needs to explain why observers will reward altruists – this is the problem of “second-order cooperation”. With costly signaling, observers respond in a way that is beneficial to the altruist (e.g. mate or ally with them) because it is their interest to do so (e.g. because the altruist is of high quality or good character).

³ By having participants re-rate faces before and after the addition of character information, the increased attractiveness of cooperators is likely caused by demand characteristics, an issue discussed in Barclay & Lalumière (2006) who found a similar effect while investigating memory for cheaters and cooperators.

These studies do not show that women are attracted to men who behave altruistically towards other people (third-party altruism), nor do they conclusively show that a 'nice guy' is more desirable than a neutral guy. Instead, they show that 'nice guys' are preferred to 'jerks'. In order to show that third-party altruism is desirable, a study needs to provide a relatively neutral condition to see whether altruism can raise an individual's desirability. The absence of a neutral control when contrasting 'nice guys' with 'jerks' (or cooperators with defectors) confounds the interpretation of women valuing niceness or altruism with women disliking jerks. Women might actually prefer neutral men to either 'nice guys' or 'jerks', just as Burger and Cosby (1999) found that both dominant and submissive men are less attractive than men who display neither trait. In fact, Urbaniak and Kilmann (2003) found that women rated a particular man more favorably when he was portrayed as being 'nice' rather than a 'jerk', but there was little difference between the 'nice' and the 'neutral' guy. However, they apparently only used a single vignette in each category (nice, neutral, and jerk), so the effects may not generalize to other instances or other men.

The use of single vignettes was also a problem in a study by Kelly and Dunbar (2001). Using fictive descriptions of men, they found that altruism was not particularly attractive to women unless it was paired with bravery (e.g. helping elderly vs. saving lives as a fireman), but altruism did seem to have some impact such that altruists were more desirable than non-altruists for long-term relationships but not short-term relationships. However, Kelly and Dunbar varied three factors (altruism, bravery, and professional/volunteer engagement in such acts), and used one fictive description for each combination of those factors. For example, the sole fictive description describing a man whose job involved risky altruistic acts was completely different from that of the man whose job involved risky non-altruistic acts. We cannot generalize much from these results of comparisons of single descriptions that differ in factors other than the supposedly focal factors.

A recent study in this journal (Phillips *et al.*, 2008) independently predicted that people will seek generous mates and sought to test this hypothesis by creating a scale purporting to measure individual differences in preference for altruism in mates (MPAT). Women scored relatively higher than men on this scale, but absolute preferences for or against altruism were not assessed because of a lack of a comparison group (including the scale mid-point). Questions on the scale were selected for their ability to discriminate among individuals, not for their neutrality or for the absolute level of attraction/aversion to altruism; this makes the scale useful for comparing among individuals or sexes, but it is unclear how to interpret absolute numerical scores on such a scale and whether a given score represents attraction or aversion to altruism. Thus, relative scores (including relative to the scale mid-point) do not provide evidence for an absolute attraction or aversion to altruism. It is interesting that female scores were associated with the self-reported altruism of their mates, but this only occurred within pairs who had been together for a long time ($> 1 SD$ beyond the mean relationship length), such that scores on the MPAT could be caused by pairing with an altruistic partner rather than vice versa (and do not demonstrate a *preference* but instead show that variation along the attraction/aversion continuum is related to one's partners' behaviour). Altogether, Phillips and colleagues (2008) did not actually demonstrate whether males and females prefer altruistic partners to more neutral partners and/or whether altruism increases people's desirability as mates, such that this question is still unresolved. Nevertheless, Phillips and colleagues identified an important theoretical question, and their hypothesis is very much in line with that of the present study.

The present study examined men's and women's attraction to opposite-sex photographs that were accompanied by descriptions that varied in the level of altruism described. Ratings of attractiveness for altruists were compared to the attractiveness of the same description without mention of altruism. This was done for eight different descriptions, each with an altruistic version and its own neutral control version, so that the findings would be more generalizable than in previous studies. The descriptions also varied the level of commitment sought by the people in the descriptions (the target), because people may prefer different traits in short-term partners than long-term partners (e.g. Gangestad & Simpson, 2000). To generalize the results further, two characteristically different sets of stimuli were created with four pictures and descriptions each, and these two sets were viewed by different sets of participants.

Methods

Participants

A total of 70 female (mean age = $20.1 \pm SD 2.1$ years) and 75 male (mean age = $19.7 \pm SD 2.0$ years) undergraduates viewed the first set of stimuli, and 80 men (mean age = $19.18 \pm SD 1.02$) and 80 women (mean age = $19.15 \pm SD 1.29$) viewed the second set. Participants were recruited from an undergraduate psychology course at McMaster University as part of their course requirements.

Stimuli

First set of stimuli: Self-reported altruism

The first set of stimuli used simulated dating advertisements to cue participants towards a mate selection mindset, using self-reported altruism amidst other phrases selected from actual on-line dating services. Each simulated advertisement had a control version, and an 'altruistic version' that differed only in the minor addition ($\sim 10\%$ of total words) of a short descriptive phrase implying altruistic tendencies (e.g. '. . . and I enjoy helping people') and a hobby that also implied altruism (e.g. volunteering at a food bank) - such a hobby would carry some time cost which would make it not worth it for someone who had no concern for others, and claiming such a hobby would not be mere 'cheap talk' if potential mates could actually verify such statements. Based on a pilot study, four of these ads were selected, with two ads 'seeking' short-term relationships and two ads 'seeking' long-term relationships, each with an altruistic and control version. By merely lacking the mention of altruism, the control versions were comparatively neutral relative to the altruistic versions (no vignette is 100% 'neutral', but some can be more neutral than others). Pictures were downloaded in 2001 from an Internet site where pictures are rated for attractiveness (www.amihotornot.com). Upper body photographs of university-age men and women were selected if they had attractiveness ratings equal to the median for their sex (men: 8.3; women: 8.0; based on 60 pictures each). Four pictures for each sex were used, and these were counterbalanced across the four ads (and two versions of each ad), with the order of presentation randomized.

Second set of stimuli: Other-reported altruism

The second set of stimuli used simulated e-mail messages that contained third-party descriptions of people, each with pictures and an altruistic and control (comparatively

neutral) version as in the first stimulus set, except that pictures were head-shoulders instead of whole upper body. This second stimulus set tried to equalize the skills and ability levels displayed in the altruistic and control versions rather than simply adding altruistic wording as was done in the first stimulus set. For example, the control version of one description mentioned that the target played guitar in a local establishment, whereas the altruistic version said that the target played guitar at a children's hospital. This was done so that altruism could only signal good character and not abilities or interests, whereas the latter two could conceivably have been signaled in the first stimulus set. Each description also varied in the length of relationship sought by the target, which was manipulated by changing a single phrase ('but he/she [wants to/doesn't want to] settle down at this point') within the description, rather than using completely different descriptions for targets seeking long- and short-term relationships as in the first stimulus set. Four descriptions were chosen based on pilot testing. Participants were asked to imagine that a friend had sent descriptions and pictures of people that the participants could have blind dates with, and were asked to rate them on various dimensions.

Procedure

Each participant received a package containing the four ads from one of the two stimulus sets: two short-term-seeking ads (one altruist and the other a neutral control) and two long-term-seeking ads (also one altruist and one neutral person). Thus, each participant saw a neutral person and an altruist each seeking a short-term relationship, and a neutral person and an altruist each seeking a long-term relationship. The same ads were used for both sexes with appropriate names and pronouns changed, but each participant only saw pictures of the opposite sex. Pictures were paired with descriptions in a counterbalanced fashion. Participants rated each picture with respect to their willingness to associate with the person for various romantic and non-romantic partnerships; i.e. to have a date, a long-term relationship, or a one-night stand with, to work with the target, to be a platonic friend, and to lend money to the target. Participants rated each target on physical and sexual attractiveness and many personality traits (used as fillers). All ratings were completed for each target before continuing to the next vignette. To minimize picture effects, scores on each dependent variable were standardized according to the mean and standard deviation for each picture on that dependent variable.

Results

Effects of altruism on dating desirability

Figure 1 presents the effects of altruism on the desirability of targets, and Table 1 breaks down this information by relationship type. Participants were more willing to have long-term relationships with altruistic targets than with neutral targets ($F_{1,303} = 7.89$, $p = .005$), and males and females did not differ in their preferences for altruistic over neutral targets ($F_{1,303} = 1.77$, $p = .19$). There were significant sex differences for the effects of altruism on preferences for dates and one-night stands ($F_{s_{1,304}} = 6.76$ and 5.70 , $p_s = .010$ and $.018$, respectively) such that women significantly preferred dates with altruistic targets ($F_{1,151} = 7.19$, $p = .008$) and had a non-significant preference for one-night stands with altruistic targets ($F_{1,152} = 1.68$, $p = .20$) whereas men had no

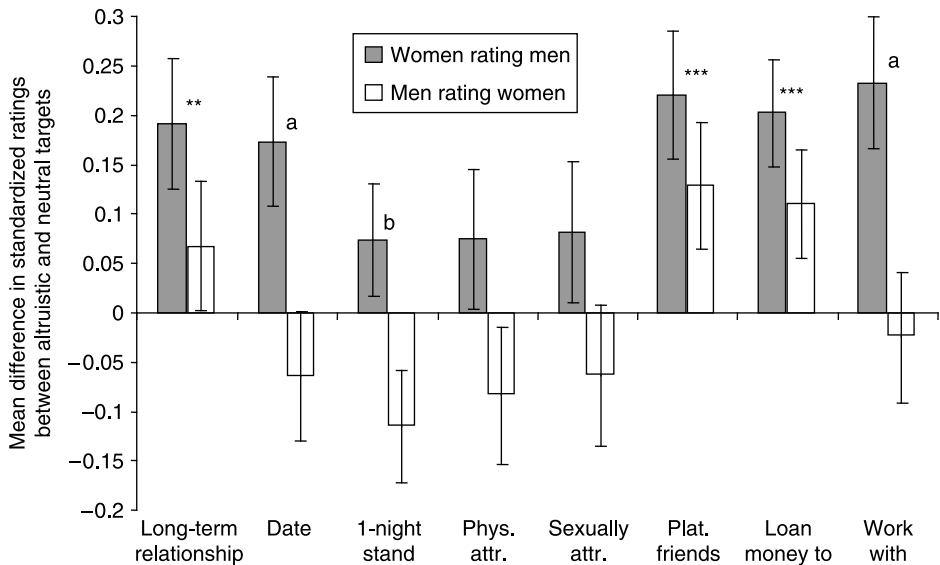


Figure 1. The effects of altruism on women's ratings of male targets (grey bars) and men's ratings of female targets (white bars). Ratings were standardized according to the mean and standard deviation of each picture on each variable. Main effect at $*p < .05$, $**p < .01$, $***p < .005$; a, sex difference at $p < .05$ ($p < .05$ in females, n.s. in males); b, sex difference at $p < .05$ (n.s. in females, $p < .05$ in males).

significant preference for dates ($F < 1$) and a significant preference against altruistic targets for one-night stands ($F_{1,152} = 4.42$, $p = .037$). Thus, it appears that altruism is desirable to both sexes for long-term relationships, but for short-term relationships it has a positive effect on men's desirability to women and possibly even a negative effect on women's desirability to men if the relationship is short enough (possibly because men expect less success at short-term relationships with 'good girls'). Altruism did not affect physical or sexual attractiveness (both F s < 1) and did not interact significantly with participant sex on either variable ($F_{1,305} = 2.59$ and $F_{1,303} = 2.10$, p s = .11 and .15, respectively), although the sex differences are in the same direction. The preferences for altruism did not differ between stimulus sets for any variable (all F s < 1), nor were there any significant interactions between altruism and other independent variables.

Comparing across relationship types, altruism had different effects across long-term relationships, dates, and one-night stands ($F_{2,606} = 5.56$, $p = .004$), with a greater positive effect of altruism on preferences for long-term relationships than for dates (planned contrast $F_{1,303} = 4.31$, $p = .039$) and a marginally more positive effect on preferences for dates than for one-night stands (planned contrast $F_{1,303} = 2.87$, $p = .091$). Women displayed a greater total preference for altruism in these three types of romantic relationships than did men ($F_{1,303} = 6.41$, $p = .012$). The effects on different relationship types did not differ across stimulus sets, nor were there significant interactions with stimulus set or participant gender (all F s < 1).

Effects of altruism on other relationships

Men and women were both more willing to have platonic friendships and loan money to altruistic targets than to neutral targets ($F_{s1,304} = 15.03$ and 16.87 , respectively, both

Table 1. Participants' standardized mean ratings (and standard errors) of target men and women on the target's desirability and attractiveness. Ratings represent standard deviations from the sex-specific mean for each photograph on each variable (totals may deviate from 0 due to rounding)

	Target seeking short-term		Target seeking long-term	
	Neutral	Altruist	Neutral	Altruist
Long-term relationship				
Male Target	-0.39(0.07)	-0.15(0.08)	0.20(0.08)	0.34(0.08)
Female target	-0.20(0.07)	-0.13(0.08)	0.13(0.08)	0.20(0.08)
Date				
Male target	-0.27(0.07)	-0.02(0.08)	0.10(0.08)	0.20(0.08)
Female target	-0.01(0.07)	-0.13(0.08)	0.07(0.08)	0.07(0.08)
One-night stand				
Male target	-0.01(0.08)	0.14(0.09)	-0.06(0.08)	-0.07(0.08)
Female target	0.24(0.09)	0.11(0.08)	-0.12(0.09)	-0.22(0.08)
Platonic friendship				
Male target	-0.30(0.08)	-0.02(0.08)	0.08(0.08)	0.25(0.08)
Female target	-0.10(0.08)	0.06(0.08)	-0.03(0.08)	0.07(0.08)
Work partnership				
Male target	-0.35(0.08)	0.02(0.08)	0.10(0.08)	0.21(0.08)
Female target	-0.08(0.08)	-0.07(0.08)	0.10(0.08)	0.04(0.08)
Loan Money				
Male target	-0.36(0.07)	-0.08(0.08)	0.16(0.08)	0.29(0.08)
Female target	-0.23(0.07)	-0.12(0.08)	0.12(0.08)	0.24(0.08)
Physical attractiveness				
Male target	-0.01(0.08)	0.04(0.08)	-0.06(0.08)	0.04(0.08)
Female target	0.06(0.08)	-0.02(0.08)	0.03(0.08)	-0.07(0.09)
Sexual attractiveness				
Male target	-0.07(0.08)	0.05(0.08)	-0.01(0.08)	0.05(0.09)
Female target	0.08(0.08)	-0.01(0.08)	-0.02(0.08)	-0.05(0.09)

p s < .001) and there were no sex differences on these variables ($F_{S_{1,304}} = 1.03$ and 1.44 , p s = .31 and .23, respectively). There was a significantly positive main effect of altruism on targets' desirability for working partnerships ($F_{1,304} = 3.38$, $p = .026$), but it was qualified by a significant sex difference ($F_{1,304} = 7.66$, $p = .006$) such that women preferred working with altruistic men ($F_{1,151} = 13.83$, $p < .001$) whereas men had no significant preference ($F < 1$).

Effects of relationship type sought

Long-term-seeking targets were more desirable than short-term-seeking targets for long-term relationships, dates, platonic friendships, working partnerships, and loans (all F s > 15, all p s < .001). Men and women both significantly preferred long-term-seeking partners for long-term relationships (both F s > 20, both p s < .001), but women's preference was stronger than men's preference ($F_{1,305} = 4.70$, $p = .031$). Women and men also differed significantly in their preferences for platonic friendships ($F_{1,304} = 10.94$, $p = .001$): women significantly preferred long-term-seeking targets ($F_{1,304} = 26.00$, $p < .001$) whereas men had no preference ($F < 1$). There were no

significant sex differences in preferences for dates, working partnerships, or loans ($F_{s_{1,304}} = 2.89, 2.86, \text{ and } 1.28, p_s = .090, .092, \text{ and } .26, \text{ respectively}$). The type of relationship sought had stronger effects on participants' ratings in the first stimulus set than the second on almost all of the above variables (all $F_s > 8$, all $p_s < .01$, except date: $F = 1.67, p = .20$), most likely because the manipulation of relationship type sought was more subtle in the second set such that the short-term seeking targets were less likely to be interpreted as sleazy.

As contrasted with the other variables, participants preferred short-term-seeking targets over long-term-seeking targets for one-night stands ($F_{1,304} = 32.17, p < .001$): this preference was significant for both male and female participants ($F_{s_{1,152}} = 32.03 \text{ and } 5.11, \text{ respectively, both } p_s < .05$) but was stronger among male participants ($F_{1,304} = 6.62, p = .011$), probably because it is more difficult for males than for females to have one-night stands with targets who prefer long-term relationships. There were no effects of the type of relationship sought on target physical or sexual attractiveness nor any sex differences or effects of stimulus set (all $F_s < 2$, all $p_s > .15$).

Discussion

These results show that altruism increased men and women's desirability for long-term relationships, despite the cues of altruism being relatively minor ($\sim 10\%$ of total words). Furthermore, altruism increased men's (but not women's) desirability for single dates. This suggests that altruism can serve as a courtship display, particularly by males. This also supports the hypothesis that women are more concerned with good character in mates than men are (because abandonment is more problematic for females than for males due to differences in parental investment), but that sex differences in these preferences will be diminished for longer and more committed relationships (Kenrick *et al.*, 2003). These positive effects of altruism on targets' dating desirability were not simply due to contrasting 'nice guys' (and girls) versus 'jerks', because each altruistic description was paired with a relatively neutral version rather than a negative version. Thus, this work expands and improves upon other studies on attractiveness (e.g. Farrelly *et al.*, 2007; Jensen-Campbell *et al.*, 1995; Kelly & Dunbar, 2001; Phillips *et al.*, 2008; Urbaniak & Kilmann, 2003) by using multiple descriptions with proper controls to demonstrate positive effects of multiple types of altruism on attractiveness. It also dovetails nicely with recent work demonstrating that people display more of some types of generosity when faced with attractive members of the opposite sex (Griskevicius *et al.*, 2007; Iredale *et al.*, 2008): the present work shows the effectiveness of such strategies - by signaling ability and/or willingness to confer benefits upon others, a person can demonstrate his/her mate value, which could lead to higher reproductive success than a similar person who didn't signal. By showing reputational benefits accruing to altruists, this study also supports recent work showing that (at least some) humans are good at noticing instances of altruism (Brown & Moore, 2000), and will tend to reward or trust generous people more than stingy people (Barclay, 2004; Milinski, Semman, & Krambeck, 2002; Wedekind & Milinski, 2000).

Women preferred altruistic targets for long-term relationships and dates and even had a non-significant but positive preference for altruists for one-night stands. These findings seem to contradict the popular wisdom that women do not want to date 'nice guys', but this discrepancy is resolved if 'nice guys' tend to be less physically attractive on average such that they actually are less desirable overall. Takahashi, Yamagishi,

Tanida, Kiyonari, and Kanazawa (2006) argued that unattractive men may unconsciously invest more into relationships to compensate for their lower attractiveness (see also Buss & Greiling, 1999; Gangestad & Simpson, 2000), and indeed they found a negative correlation between men's attractiveness and their cooperation in experimental social dilemmas. Similarly, unattractive men could make the best of a bad situation by using public generosity or compassion to attract mates if they lack other attractive qualities such as athleticism, courage, or physical attractiveness (which are possessed by stereotypical 'bad boys'). Males with other attractive qualities might not signal via altruism if signaling those other qualities pays off better per unit of effort, such that the *opportunity* costs of altruistic signaling are only worth it for someone with fewer ways to attract mates and who genuinely will be generous in the future. Thus, even if altruistic acts can increase the desirability of any male, they might tend to be performed more often by less attractive men with fewer desirable traits, thereby creating the popular assumption that women do not prefer altruistic men. One might expect brave and athletic altruists to be the most desirable males, and Farthing (2005) indeed found that both sexes (but especially women) preferred heroic physical risk-takers to non-risk-takers. This might explain some contemporary women's apparent fascination with firemen (or at least firemen calendars), because firemen are expected to take physical risks in order to rescue others.

If altruism increases one's dating desirability, then this can help account for the existence of altruistic displays in certain contexts (e.g. Griskevicius *et al.*, 2007; Miller, 2007); sexual selection could favour displays of generosity, just as it may favor other displays such as creativity (Griskevicius, Cialdini, & Kenrick, 2006; Miller, 2000). Public generosity is a way to signal good character to potential mates and other cooperative partners, and the time and resource costs could deter those without good character. Of course, these displays do not only function in mating contexts - and the present data suggest that the benefits of an altruistic reputation occur in other contexts as well - but mating contexts are expected to be particularly important to people given their obvious effects on happiness and reproductive success. If those who display generosity tend to receive more (or better quality) partnerships than they would have if they had not made such displays, then this gives them an incentive for generous displays. If this also occurred in ancestral environments, then sexual selection could have selected for psychological mechanisms that increased the likelihood of performing generous acts. It is important to note that this is complementary to, and not mutually exclusive with, a socialization account for the presence of altruism: one would expect evolved decision rules to be sensitive to social and environmental input in order to produce behaviours that are locally adaptive (Crawford & Anderson, 1989). In this case, social rewards would increase or decrease the likelihood that any given person signals character via generosity, and attention from the opposite sex is a powerful reward, especially for males.

All types of altruism can honestly signal concern for others (or at least more concern than someone who incurs as much cost on a non-altruistic signal), but only *some* altruistic acts can also signal abilities or resources - acts which are impossible or not worth the cost of altruism for those who do not honestly possess the abilities or resources being signaled (e.g. large donations to charity are not worth the reputational benefit for those who have little money to spare). When it does signal ability/quality, people should prefer altruism for long- *and* short-term relationships - there are potential genetic benefits for choosing those of high mate quality for short-term relationships, and unlike with other putative indicators of quality (e.g. symmetry,

masculinity, see for example Little, Burt, Penton-Voak, & Perrett, 2001), there are fewer tradeoffs associated with pairing with altruistic signalers for long-term relationships because altruism can also signal good character.

This study did not explicitly distinguish among signals of ability, of mate quality (Smith & Bliege Bird, 2000), or of willingness to be a good partner for marriage, parenthood or work (Sosis, 2000; Tessman, 1995), but the results are more supportive of altruism signaling character because participants preferred altruistic targets for long-term romantic and platonic relationships but there was little evidence indicating a preference for short-term relationships (except women's preferences for dates, which can conceivably lead to longer relationships). This is at least in part because the second stimulus set was specifically designed such that altruism could not signal abilities because those were controlled for; nevertheless, the effects of altruism did not significantly interact with the stimulus set, indicating that the general everyday types of altruism used in the study affect desirability for long-term but less so for short-term relationships, as would be expected if they were signals of character rather than of resources or abilities. Still, it is possible that other types of altruism not tested in this experiment, such as public donations or provision of bonanzas or hunted game (Boone, 1997; Smith & Bliege Bird, 2000), could signal the abilities and/or resources necessary to acquire such resources. Further studies should investigate these different types of altruism more explicitly.

The present study used simulated dating advertisements and blind date recommendations to measure mate preferences. One strong feature is this study's use of multiple vignettes to increase the generalizability of the results to different types of altruism. However, vignette studies are inherently limited by the hypothetical nature of participants' decisions. Several researchers have done content analyses of real lonely hearts advertisements to investigate mating strategies and preferences (e.g. Oda, 2001; Thiessen, Young, & Burroughs, 1993; Wiederman, 1993). Unfortunately, very few real advertisements explicitly mention altruistic tendencies or request them: it is often difficult in ads to mention such information in short ads without it sounding forced, which would undermine its effectiveness as a costly-to-fake signal of character (people would be skeptical of blatant mentions); the experimental vignettes required careful preparation with much 'filler' material to avoid this problem. This makes it infeasible to measure preferences for altruism by analyzing the content of existing ads. Strassberg and Holty (2003) created experimental personal advertisements and measured the hit rates of different types of ads; future studies could use a similar procedure to test whether the current findings generalize to real-life mating contexts and further examine whether altruism increases a person's desirability.

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References

- Alcock, J. (1993). *Animal behavior: An evolutionary approach*. Sunderland, MA: Sinauer Association.
- Alexander, R. D. (1987). *The biology of moral systems*. New York: Aldine de Gruyter.

- Andreoni, J. (1990). Impure altruism and donations to public goods: A theory of warm-glow giving. *The Economic Journal*, *100*, 464–477.
- Axelrod, R. (1984). *The evolution of cooperation*. New York: Basic Books.
- Barclay, P. (2004). Trustworthiness and competitive altruism can also solve the ‘tragedy of the commons’. *Evolution and Human Behavior*, *25*, 209–220.
- Barclay, P., & Lalumière, M. L. (2006). Do people differentially remember cheaters? *Human Nature*, *17*, 98–113.
- Bateman, A. J. (1948). Intra-sexual selection in *Drosophila*. *Heredity*, *2*, 349–368.
- Batson, C. D., Sager, K., Garst, E., Kang, M., Rubchinsky, K., & Dawson, K. (1997). Is empathy-induced helping due to self-other merging? *Journal of Personality and Social Psychology*, *73*, 495–509.
- Bolle, F. (2001). Why to buy your darling flowers: On cooperation and exploitation. *Theory and Decision*, *50*, 1–28.
- Boone, J. L. (1997). The evolution of magnanimity: When is it better to give than to receive? *Human Nature*, *9*, 1–21.
- Brown, W. M., & Moore, C. (2000). Is prospective altruist-detection an evolved solution to the adaptive problem of subtle cheating in cooperative ventures? Supportive evidence using the Wason selective task. *Evolution and Human Behavior*, *21*, 25–37.
- Burger, J. M., & Cosby, M. (1999). Do women prefer dominant men? The case of the missing control condition. *Journal of Research in Personality*, *33*, 358–368.
- Buss, D. M., Abbot, M., Angleitner, A., Asherian, A., Biaggio, A., Blanco-Villasenor, A., *et al.* (1990). International preferences in selecting mates. *Journal of Cross-Cultural Psychology*, *21*, 5–47.
- Buss, D. M., & Greiling, H. (1999). Adaptive individual differences. *Journal of Personality*, *67*, 209–243.
- Buss, D. M., & Schmitt, D. P. (1993). Sexual Strategies Theory: An evolutionary perspective on human mating. *Psychological Review*, *100*, 204–232.
- Cialdini, R. B., Brown, S. L., Lewis, B. P., Luce, C., & Neuburg, S. L. (1997). Reinterpreting the empathy–altruism relationship: When one into one equals oneness. *Journal of Personality and Social Psychology*, *73*, 481–494.
- Cox, J. C. (2004). How to identify trust and reciprocity. *Games & Economic Behavior*, *46*, 260–281.
- Crawford, C. B., & Anderson, J. L. (1989). Sociobiology and environmentalist discipline? *American Psychologist*, *44*, 1449–1459.
- Daly, M., & Wilson, M. (1988). *Homicide*. New York: Aldine de Gruyter.
- Farrelly, D., Lazarus, J., & Roberts, G. (2007). Altruists attract. *Evolutionary Psychology*, *5*(2), 313–329.
- Farthing, G. W. (2005). Attitudes toward heroic and nonheroic physical risk takers as mates and friends. *Evolution and Human Behavior*, *26*, 171–185.
- Faurie, C., Pontier, D., & Raymond, M. (2004). Student athletes claim to have more sexual partners than other students. *Evolution and Human Behavior*, *25*, 1–8.
- Fehr, E., & Fischbacher, U. (2003). The nature of human altruism. *Nature*, *425*, 785–791.
- Gangestad, S. W., & Simpson, J. A. (2000). The evolution of human mating: Trade-offs and strategic pluralism. *Behavioral and Brain Sciences*, *23*, 573–644.
- Gaulin, S. J. C., & McBurney, D. H. (2001). *Psychology: An evolutionary approach*. Upper Saddle River, NJ: Prentice Hall.
- Griskevicius, V., Cialdini, R. B., & Kenrick, D. T. (2006). Peacocks, Picasso, and parental investment: The effects of romantic motives on creativity. *Journal of Personality and Social Psychology*, *91*(1), 63–76.
- Griskevicius, V., Tybur, J. M., Sundie, J. M., Cialdini, R. B., Miller, G. F., & Kenrick, D. T. (2007). Blatant benevolence and conspicuous consumption: When romantic motives elicit strategic costly signals. *Journal of Personality and Social Psychology*, *93*(1), 85–102.
- Iredale, W., Van Vugt, M., & Dunbar, R. (2008). Showing off in humans: Male generosity as a mating signal. *Evolutionary Psychology*, *6*(3), 386–392.

- Jensen-Campbell, L. A., Graziano, W. G., & West, S. G. (1995). Dominance, prosocial orientation, and female preferences: Do nice guys really finish last? *Journal of Personality and Social Psychology*, *68*, 427–440.
- Kelly, S., & Dunbar, R. I. M. (2001). Who dares, wins: Heroism versus altruism in women's mate choice. *Human Nature*, *12*, 89–105.
- Kenrick, D. T., Groth, G. E., Trost, M. R., & Sadalla, E. K. (1993). Integrating evolutionary and social exchange perspectives on relationships: Effects of gender, self-appraisal, and involvement level on mate-selection criteria. *Journal of Personality and Social Psychology*, *64*, 951–969.
- Little, A. C., Burt, D. M., Penton-Voak, I. S., & Perrett, D. I. (2001). Self-perceived attractiveness influences human female preferences for sexual dimorphism and symmetry in male faces. *Proceedings of the Royal Society of London B*, *268*, 39–44.
- Milinski, M., Semman, D., & Krambeck, H. J. (2002). Reputation helps solve the “tragedy of the commons”. *Nature*, *415*, 424–426.
- Miller, G. F. (2000). *The mating mind: How sexual selection shaped the evolution of human nature*. New York: Doubleday.
- Miller, G. F. (2007). Sexual selection for moral virtues. *Quarterly Review of Biology*, *82*(2), 97–125.
- Mims, P. R., Hartnett, J. J., & Nay, W. R. (1975). Interpersonal attraction and help volunteering as a function of physical attractiveness. *The Journal of Psychology*, *89*, 125–131.
- Oda, R. (2001). Sexually dimorphic mate preference in Japan. *Human Nature*, *12*, 191–206.
- Phillips, T., Barnard, C., Ferguson, E., & Reader, T. (2008). Do humans prefer altruistic mates? Testing a link between sexual selection and altruism towards non-relatives. *British Journal of Psychology*, *99*, 555–572.
- Smith, E. A., & Bliege Bird, R. L. (2000). Turtle hunting and tombstone opening: Public generosity as costly signaling. *Evolution and Human Behavior*, *21*, 245–261.
- Sober, E., & Wilson, D. S. (1998). *Unto others: The evolution and psychology of unselfish behavior*. Cambridge, MA: Harvard University Press.
- Sosis, R. (2000). Costly signaling and torch fishing on Ifaluk atoll. *Evolution and Human Behavior*, *21*, 223–244.
- Spence, M. (1973). Job market signaling. *The Quarterly Journal of Economics*, *87*, 355–374.
- Strassberg, D. S., & Holty, S. H. (2003). An experimental study of women's internet personal ads. *Archives of Sexual Behavior*, *32*, 253–260.
- Takahashi, C., Yamagishi, T., Tanida, S., Kiyonari, T., & Kanazawa, S. (2006). Attractiveness and cooperation in social exchange. *Evolutionary Psychology*, *4*, 315–329.
- Tessman, I. (1995). Human altruism as a courtship display. *Oikos*, *74*, 157–158.
- Thiessen, D., Young, R. K., & Burroughs, R. (1993). Lonely hearts advertisements reflect sexually dimorphic mating strategies. *Ethology and Sociobiology*, *14*, 209–229.
- Trivers, R. L. (1971). The evolution of reciprocal altruism. *Quarterly Review of Biology*, *46*, 35–57.
- Trivers, R. L. (1972). Parental investment and sexual selection. In B. Campbell (Ed.), *Sexual Selection and the Descent of Man: The Darwinian Pivot* (pp. 136–179). Chicago, IL: Aldine.
- Urbaniak, G. C., & Kilmann, P. R. (2003). Physical attractiveness and the “Nice Guy Paradox”: Do nice guys really finish last? *Sex Roles*, *49*, 413–426.
- Veblen, T. (1899). *The theory of the leisure class*. New York, NY: Macmillan.
- Wedekind, C., & Milinski, M. (2000). Cooperation through image scoring in humans. *Science*, *288*, 850–882.
- Wiederman, M. (1993). Evolved gender differences in mate preferences: Evidence from personal advertisements. *Ethology and Sociobiology*, *14*, 331–352.
- Zahavi, A., & Zahavi, A. (1997). *The handicap principle: A missing piece of Darwin's puzzle*. New York: Oxford University Press.