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The Influence of Mate Choice Motivation on Non-Financial Altruism

Manpal Singh Bhogal*¹

James E Bartlett^{2,3}

Daniel Farrelly⁴

¹ Department of Psychology, Institute of Human Sciences, Faculty of Education, Health and Wellbeing, City Campus, University of Wolverhampton, Wolverhampton, WV1 1LY, UK

² Brain, Belief, and Behaviour Lab, Coventry University, Priory Street, Coventry, CV1 5FB, UK

³ School of Psychology, Law, & Social Science, Arden University, Coventry, CV3 4FJ, UK

⁴ School of Psychology, University of Worcester, St John's Campus, Henwick Grove, Worcester, WR2 6AJ, UK

* corresponding author (m.s.b2@wlv.ac.uk)

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Abstract

Several studies have found that individuals are more altruistic towards potential mates than others, suggesting altruistic behavior may be a mating signal. Much of the literature focuses on financial altruism using economic games, however altruism can also comprise of non-financial acts, which this experiment examined in an attempt to replicate and refine previous findings. A study was conducted with 199 participants, who viewed both high attractive and low attractive opposite-sex images and were asked how likely they would be to altruistically share their research credits with the person in the image, whilst controlling for self-rated attractiveness. The findings suggest that both men and women were more altruistic towards pictures of high attractive than low attractive potential mating partners (Cohen's $d = 0.37$). This study therefore partially replicates previous research examining the role of mate choice effects when exploring non-financial altruism.

Keywords: altruism; sexual selection theory; mate choice; prosocial behavior; attractiveness

The Influence of Mate Choice Motivation on Non-Financial Altruism

Altruistic behavior is defined as an act that is beneficial to a receiver, but costly to the altruist (Trivers, 1971), and theorists have applied sexual selection theory (Darwin, 1871) to help understand why it exists. Research has provided strong evidence that people find altruism to be a desired trait in potential romantic partners (e.g. Barclay, 2010; Bhogal, Galbraith & Manktelow, in press; Farrelly, 2013; Farrelly, Clemson & Guthrie, 2016; Phillips, Barnard, Ferguson & Reader, 2008). However, whereas most studies have explored self-reported perceptions of desirability, fewer have examined actual altruistic behavior in mate choice settings. Those that have, have found that individuals display more altruistic behaviors in the presence of potential mating partners (Bhogal, Galbraith & Manktelow, 2016a; Farrelly, Lazarus & Roberts, 2007; Iredale, van Vugt & Dunbar, 2008; Jensen, 2013), and in line with parental investment theory (Trivers, 1972), these displays are stronger in men than women. For example, the synergistic effect of physical attractiveness and different traits of prosociality (heroism and altruism) has been demonstrated in the literature, showing women are attracted to physically attractive men who display prosocial behavior compared to those who do not (Margana, Bhogal, Bartlett, & Farrelly, 2019). This is because as men invest less in reproduction, they have greater variability in reproductive success compared to women and exert more effort into male-male competition (Bateman, 1948). Furthermore, as women invest more in parental care, there are greater requirements that they carefully select partners of higher quality, leading to competition among men.

These findings further emphasize the role of prosocial behavior in mate choice, particularly for women. However, in some studies it has been shown that men also typically

display prosocial behavior towards potential mates, as women too are attracted to acts of prosociality, suggesting prosociality has evolved via mutual mate choice (Miller, 2000; 2007). Therefore, to further our understanding of how individuals use altruistic behaviors in mate choice and whether it is due to female or mutual mate choice, this study attempts to replicate the above findings, as replication is rapidly becoming an important factor in the behavioral sciences (Earp & Trafimow, 2015).

Most research conducted in this area has involved public displays of altruism involving financial resources (Iredale, van Vugt & Dunbar, 2008; van Vugt & Iredale, 2013), and/or altruistic behaviors in experimental economic games such as the ultimatum, dictator, and prisoner's dilemma games using financial sources (Bhagal, Galbraith & Manktelow, 2016b, 2017; Farrelly et al., 2007; Saad & Gill, 2001). However, several authors argue that researchers should explore altruistic behavior using a variety of measurements and experimental frameworks, suggesting much of the literature exploring the evolution of altruism using economic games (particularly those which only utilize financial endowments) in conditions of low ecological validity can only explain financial altruism, not alternate forms of altruism which we see in everyday life (Farrelly & Bennett, 2018; Farrelly, Moan & White, 2015). As a result, this conceptual replication study explores whether men and women use altruistic behavior with potential romantic partners that is based on costs relevant to their lives that relate to time rather than finances available. In other words, do the findings of previous researchers exploring mate choice and altruistic behavior replicate when the costs are non-financial yet still relevant to individuals' lives?

To do so, this study makes use of a potential cost in terms of time and effort that is commonly found in undergraduate psychology courses; that of research participation. In contrast

to previous literature, we aimed to use a resource which was relevant and pertinent to the sample involved in this study, i.e. undergraduate psychology students. Many of these courses require students to engage in research in order to collect credits, often so that they themselves can benefit in terms of being able to use such a pool in the future (as was the case here). This study therefore sought to assess if individuals would be altruistically motivated to use these credits to display to potential mating partners. To elicit such mating motivations, we used facial images of opposite sex individuals, of both high and low attractiveness (with the former predicted to elicit higher mating motivations than the latter). Facial images have been used in previous literature exploring evolutionary hypotheses (e.g. Solnick & Schweitzer, 1999). For example, Roney (2003) found that when men were primed with attractive opposite-sex images, they reported higher material wealth, social status, and self-ratings of extraversion, further showing how facial images can be used to prime participants into a mating mindset. A further rationale for using facial images in evolutionary research is that people respond to genetic markers when evaluating a potential mate (Thornhill & Gangestad, 1999). In addition, facial images allow stimuli to be kept consistent in an experimental procedure (Solnick & Schweitzer, 1999).

Furthermore, it is known that self-rated attractiveness influences how we perceive others on domains such as the perceived attractiveness of others (see Bhogal et al., 2016b; Stirrat et al., 2011). Those who consider themselves as unattractive may be more altruistic towards prospective partners to maximize success in attracting and retaining a mate (Hill & Reeve, 2004). For example, Shinoda and Yamagishi (2014) found that when playing the prisoner's dilemma (with photographs), less attractive men were more cooperative compared to attractive men, as less attractive men are argued to secure long-term reproductive success by displaying altruistic

behavior through resource sharing. As a result, the effect of self-rated attractiveness was controlled for here by including it as a covariate in our analyses.

An additional theoretical perspective relies on the attractiveness halo effect. Decades of research has concluded that attractive people are treated more favourably across a wide range of domains and contexts than less attractive people (see Dion et al., 1972). There are many positive outcomes tied to being physically attractive. For example, attractive people are thought to be more intelligent, kinder, healthier, and socially competent than unattractive people (Langlois et al., 2000). These findings show how physical attractiveness can influence behaviour and life outcomes. Therefore, it is important to explore the role of physical attractiveness in altruistic behaviour.

As a result of the aforementioned literature, the primary aim of our study was to further explore the role of altruistic behavior in mate choice. To do this, we aimed to explore whether, consistent with previous literature, people display altruism towards potential mating partners through the use of a non-financial cost which is relevant to the sample being investigated, i.e. undergraduate research credits. Although much of the literature has typically involved hypothetical and 'live' economic games, these have been argued to be artificial (Baumard, 2016), thus negating the need to include alternative measures in research exploring the role of altruism in mate choice.

We hypothesized the following:

H1: Individuals would be more likely to donate more of their research credits to high attractive rather than low attractive potential partners of the opposite sex.

H2: The above effect would be higher in men than women, due to differences in parental investment

Method

Participants and Design

One hundred, ninety-nine, heterosexual undergraduate Psychology students took part from a UK university, recruited as part of a research methods module (44 males, 155 females, mean age = 20 years old, $SD = 3.56$). Allocations were recorded anonymously.

We adopted a 2 (between-groups factor, sex: male and female) x 2 (within-group factor, attractiveness: high and low) mixed design. The dependent variable was non-financial altruism measured via an allocation exercise with framing effects (whereby participants were informed that a new rule now permitted them to share their accumulated research credits with the person in the image) where they were asked how likely they would be to share their credits, at a cost to themselves (measured via a Likert scale from 1 = very unlikely to 5 = very likely).

Materials and procedure:

The experiment was conducted in computer labs, using the software OpenSesame (Version 2.9.7, Mathôt, Schreij & Theeuwes, 2012), which is an open source software program used to create psychological experiments. After providing informed consent and entering demographic details, participants viewed a series of randomly assorted, opposite-sex facial images (men viewed 10 images of women, and women viewed 10 images of men). Ten male images (5 high attractive/5 low attractive) and 10 female images (5 high attractive/5 low attractive) were selected from facial databases where images have previously been assorted into attractive and unattractive categories (Database: *Original Computer Generated Faces*, see Said

& Todorov, 2011; Todorov, Dotsch, Porter, Oosterhof & Falvello, 2013; Todorov & Oosterhof, 2011). Images were grey-scaled to control for ethnicity.

Each image was accompanied by the following scenario:

You have gained most of your research credits for the academic year, however the person in this image has not. A new rule now permits you to share some of your credits with this person, but you will lose the exact number of credits you offer. How likely are you to offer some of your credits to this person?

After viewing all 10 images, participants were asked to rate their own attractiveness on a 1 (very unattractive) to 5 (very attractive) Likert scale (consistent with Bhogal et al. 2016b, 2017). In addition, participants were presented with a financial altruism scenario for all 10 images and asked if they won £50 on a scratch card, how much of it would they donate to the person on the screen. However, this data is not reported here as we concentrated on non-financial altruism. Finally, participants rated each image on attractiveness (1 = very unattractive to 5 = very attractive), which was implemented as a manipulation check. A paired samples t-test was conducted to measure mean differences between attractive (mean = 2.60, SD = .94) and unattractive images (mean = 1.84, SD = .75), $t(198) = 14.74$, $p < .001$, Cohen's $d = 1.05$, 95% CI = [0.87, 1.22], thus suggesting participants could reliably identify the images as either attractive or unattractive. All analyses were performed using a combination of JASP (JASP team, 2018) and R (R Core Team, 2016). Normality of residuals was assessed using Q-Q plots which showed the assumption should be upheld. Summary data and analysis files are openly available

on the Open Science Framework (OSF; Project CFZYB). Note the raw data is not openly available due to data sharing not being stipulated in the participant's consent forms.

Results

Mean altruism was computed by calculating the mean (likelihood of offering research credits) across all 5 high attractive images, and 5 low attractive images. Descriptive statistics are presented in Table 1.

[Insert Table 1]

A two-way ANCOVA was conducted with sex as a between-subject factor, attractiveness as a within-subject factor, and self-reported attractiveness as a covariate. The mean likelihood to donate research credits for attractive and unattractive images was used as a DV. Following the recommendation of Baguley (2012), self-reported attractiveness was centered before being entered as a covariate. For the ANCOVA, Omega-squared (ω^2) was reported instead of eta-squared (η^2) as it provides a less biased estimate of the proportion of variance explained by the independent variables (Lakens, 2013).

The ANCOVA showed that the covariate self-reported attractiveness was related to the likelihood of donating research credits, $F(1, 196) = 4.13, p = .043, \omega^2 = .015$. After controlling for self-reported attractiveness, there was a main effect of image attractiveness, $F(1, 196) = 19.43, p < .001, \omega^2 = .008$. Consistent with H1, participants were more likely to donate their research credits (a 0.21 point increase on our 5 point scale) towards potential mates of high attractive than low attractiveness (Cohen's $d = 0.37, 95\% \text{ CI} = [0.22, 0.51]$). However, the main effect of the participants' sex was not significant, $F(1, 196) = 2.07, p = .152, \omega^2 = .005$,

inconsistent with H2. Furthermore, there was a non-significant interaction between facial attractiveness and sex, $F(1, 196) = 0.06, p = .803, \omega^2 < .001$. If the covariate is removed from the analyses, the pattern of results does not change.

Discussion

The primary aim of this study was to attempt to replicate previous research into the role of altruism in mate choice, and to explore whether men and women displayed altruistic behavior towards high attractive compared to low attractive potential partners. This was supported, as the participants reported that they would be more likely to donate their research credits to potential mates of high attractiveness rather than low attractiveness. The effect size for this difference is consistent with a large meta-analysis aiming to quantitatively describe different effects in social psychology (Richard, Bond & Stokes-Zoota, 2003). One of their sub-samples was helping behavior which included a range of prosocial behaviors across 824 studies. The meta-analytic effect size was equivalent to a Cohen's d of 0.37 which is the same point estimate as our study. This shows that our high-powered study demonstrated a realistic sized effect of potential partner attractiveness on altruistic behavior in a novel application of non-financial resources, thereby offering a valuable contribution to the current research area. Self-reported attractiveness was included as a covariate as it is known to influence altruistic behavior (e.g. Hill & Reeve, 2004; Shinoda & Yamagishi 2014). After adjusting for this as a covariate, participants were more altruistic towards attractive faces.

Our findings are consistent with previous literature finding that people are more altruistic towards attractive potential partners when playing economic games (e.g. Farrelly et al., 2007; Solnick & Schweitzer, 1999). However, the findings are inconsistent with recent research finding

a strong effect of sex on altruism, that men are more altruistic in mate choice scenarios than women (e.g. Iredale et al., 2008; Bhogal et al., 2016a). However, other studies have also found that women also display altruistic behaviors to potential partners (Farrelly et al., 2007) and that men also consider altruistic traits important in partners (Farrelly, 2013). This suggests, as do the findings here, that altruistic behavior is important in both men's and women's mate choice, possibly due to its benefits in long term relationships as a signal of the potential to be a good partner and parent to shared offspring (Farrelly, 2011; 2013), which may be the result of mutual sexual selection (Miller, 2000, 2007). As men and women both engage in bi-parental care, mutual sexual selection suggests that both sexes value traits such as altruism and engage in altruistic ventures to signal phenotypic quality. In support, parental investment theory suggests that more equal parental investment leads to mutual sexual selection, whereby sexually selected traits are displayed by both sexes (Miller, 2007). As a result, these findings do partially support sexual selection via mutual mate choice as an explanation for altruistic behavior towards non-kin. Finally, our findings also provide support for the attractiveness halo effect, whereby attractive people are treated more favourably than unattractive people.

Future research could build on the findings in this paper by exploring the sexual selection hypothesis as an explanation for altruistic behavior using more non-financial resources, as opposed to focusing primarily on financial resource using economic games. Furthermore, the novelty of our study is that we make novel use of a resource which has not been explored in the literature and is not an obvious cost in relation to altruistic behavior. As mentioned previously, by limiting experimental procedures to financial resources, previous research has often bypassed much of the alternative forms of altruism which are evident in everyday life. Therefore, by using a non-financial resource such as research credits, we were able to provide evidence that humans

do not just use financial resources to signal positive mating characteristics, and instead can utilize novel forms of altruistic displays when they are available in their immediate environment. Furthermore, we build on previous literature where researchers have attempted to explore mate choice motivation using a variety of experimental measures (see Farrelly & Bennett, 2018; Farrelly et al. 2015). Here, we show that the findings of previous researchers who have explored mate choice and financial altruism can be partially replicated using alternate, non-financial measures.

Although there are notable strengths of this study, there are also some limitations to consider. We provided participants with a hypothetical resource (research credits) which may have reduced the value of signaling altruism for mating purposes, as there was no *real* consequence of being altruistic. However similar hypothetical scenarios have been used in previous studies whose findings this study attempted to replicate (e.g. Bhogal et al. 2016a; Farrelly et al., 2007) and overall the pattern of findings here suggests participants treated the imaginary scenarios as if they were real. Furthermore, we did not give participants the chance to earn their stake. Previous research suggests that those who have a chance to earn their endowment are more selfish than those who do not, as they have a right over the stake (Cherry, Frykblom & Shogren, 2002; although, this has been challenged, see Bhogal et al., 2016b). Future research could also account for relationship status when exploring altruistic behavior towards potential romantic partners. For example, research suggests that single men and women are more likely to engage in casual, short-term sexual encounters compared to those in committed relationships (Prokop & Fedor, 2013; Prokop & Pekarik, 2016). Finally, this study did not consider the effect of attractiveness on altruistic behaviors towards other individuals who were not potential partners (i.e. members of the same sex), which limits the scope of this replication

attempt. This offers a potential avenue for future research and would provide further evidence of the relative influences of sexual selection and the halo effect in explaining altruistic behavior here.

In sum, this study provides support via conceptual replication that people report being more altruistic towards potential mating partners in a design that deviated from the traditional economic game that use financial resources, by using real world non-financial resources. Furthermore, our high-powered study demonstrated an effect size consistent with a meta-analytically derived estimate of studies investigating prosocial behaviors. Therefore, future research should consider non-financial resources, and alternative paradigms when exploring the sexual selection hypothesis as an explanation for altruistic behavior. For example, Farrelly and Bennett (2018) measured helping behavior using a task involving a real-world charity (free rice game). In this task, participants completed questions, and the more questions they answered correctly, the more rice was donated to the charity involved. Future research should use such real-life tasks as outlined above to fully explore the role of altruistic behavior in mate choice.

Compliance with Ethical Standards

On behalf of all authors, the corresponding author states that there is no conflict of interest. This research involved collecting data from human participants. Informed consent was taken from all participants who took part in this study. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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Table 1. Descriptive statistics by attractiveness and sex.

Target	Participants' Sex	Mean	SD	N
High attractive	Men	2.50	1.05	44
	Women	2.28	.95	155
Low attractive	Men	2.27	.92	44
	Women	2.08	.97	155