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Evidence of mating-motivated altruistic behaviour in time spent on a shared online task

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Abstract

Altruistic behaviour has been shown to be an important trait in human mate choice, and as such it is often displayed in situations where an individual believes they are in the presence of a potential partner (mating motivation). The current study looked to replicate this finding using an online charity task (www.freerice.com) where time spent is the cost that individuals incur. Here, heterosexual participants were presented with a shared task with hypothetical partners that were either the opposite or same sex, and asked to complete as much of the task as they wished. The results found that although participants did not spend more time on the shared task (in this case, answering questions on the Free Rice website to earn grains of rice for the World Food Programme) in the presence of opposite sex partners (i.e. mating motivation). However it was found that when opposite sex partners were played with first then participants did spend more time on the task than when same sex partners were played with first, and that the decrease in time spent was less when opposite sex partners were played with last. These findings offer partial support for mating motivation leading to increased altruistic behaviour, and also by showing that the above effects were present in men and women, that mutual mate choice is driving altruistic displays.

Keywords

Altruism, cooperation, mate choice, mating motivation, charity.

Introduction

Altruistic behaviour appears to go against the principles of natural selection (Darwin, 1859), which suggests that to survive and reproduce (increase fitness) an individual must out-compete those around them rather than help them. Therefore, to explain the evolution of altruistic behaviour, it must be assumed that altruism presents significant advantages to the donor such as through being genetically related to the benefactor (Hamilton, 1964) or from having the altruistic act reciprocated in the future (Trivers, 1971). More recently, attention has turned to how the benefits of being altruistic may come through indirect means, in particular how altruistic behaviours may be important in mate choice (see Bhogal et al., 2019 for a review). Here it is considered that by behaving altruistically, the altruist is signalling to potential partners a trait that is desirable. This may be due to altruistic behaviour signalling that the actor has good genetic quality that can be passed on to offspring (Miller, 2007) or that they have good qualities as a parent/partner that will be beneficial for the raising of any shared offspring (Farrelly, 2011, 2013).

As a means of providing evidence of the importance of altruism in mate choice, a number of studies have explored how individuals use altruistic behaviour when in suggested mating opportunities. For example, when in the presence of or being observed by potential partners, people increase their altruistic behaviour in economic games (Bhogal et al., 2016; Farrelly et al., 2007; Lucas & Koff, 2013; Tognetti et al., 2016), donations to charity or other recipients (Iredale et al., 2008; Tognetti et al., 2012), helping behaviour to others (Schwarz & Baßfeld, 2019), sharing non-financial commodities such as course credits (Bhogal et al., 2018) and reported pro-environmental behaviour (Farrelly & Bhogal, 2021).

The range of methods that have been utilised above to observe altruistic behaviour being motivated by mating opportunities is indicative of the broad conceptualisation of what altruism is in mate choice, and its underlying value (Bhogal et al., 2019). As such it is important to further explore how mating motivation affects various forms of altruistic behaviour, to provide further evidence of the broad appeal of an altruist in mate choice situations. One such possibility is to explore different forms

of costs such as time spent engaging in altruistic acts (Farrelly et al., 2015; Lange et al., 2018; Macrae & Johnston, 1998; Oates & Wilson, 2002; Scaffidi Abbate et al., 2013), which the current study examined.

Indeed, a number of recent studies have used the Free Rice game (www.freerice.com), a website where visitors can make donations to charity based on their time spent on the site, to test how social influences affect altruistic behaviour in this specific context. Farrelly and Bennett (2018) found that participants who experienced feelings of empathy spent more time on the Free Rice website, whereas Farmer and Farrelly (2021) found that men will spend more time on the website to outcompete other men when they believed they were observed by women. Therefore there is clear value to also now see how altruistic behaviour as measured by the Free Rice website is affected further by mating motivations.

As a result, the aim of the current study is to therefore conceptually replicate the findings of previous research in this area with time spent on the Free Rice website as the measure of altruistic behaviour. Similarly to Bhogal et al. (2018), this study will attempt to identify whether a mating motivation (in this case, the hypothetical presence of potential partners) will increase levels of sharing of non-financial commodities in both men and women. Therefore, based on these previous findings it is hypothesised here that heterosexual individuals will spend more time on an altruistic online task when interacting with members of the opposite sex (mating motivation) than with members of the same sex (no mating motivation) (Hypothesis 1). Furthermore as altruism is considered an important trait for mutual mate choice due to the need for bi-parental care of human offspring (Farrelly & King, 2019), there will be no difference in the size of this effect between male and female participants (Hypothesis 2).

Methods

Participants

A power analysis was conducted (Faul et al., 2009), and to achieve 90% power and detect a medium effect size (.4) in line with Bhogal et al. (2018) a minimum of 54 participants per sex were

required. Following the removal of data that was falsely or incorrectly reported, 146 (68 males, 78 females) heterosexual participants took part, who were recruited via either opportunity sampling on social media (e.g., www.surveycircle.com), using e-survey creator (www.surveyhero.com). This study was approved by the university ethics committee.

Materials and Procedure

In this study, the www.freerice.com website game was used. This game consists of answering word analogies in a quiz-like format. For each question answered correctly the player raises funds for the World Food Programme (WFP), represented as grains of rice which increase in increments of ten (i.e., for each question answered correctly, ten grains of rice were donated). The final amount of rice a player earns generates an equivalent financial contribution to the WFP through private sponsors. Therefore, by spending time playing the Free Rice game, participants directly support the charitable work done by the WFP. As mentioned above, this site has previously been used in similar research (Farrelly & Bennett, 2018, Farmer & Farrelly, 2021).

After participants were first presented with details about the game, they were then told that they would hypothetically play two ‘rounds’ of the Free Rice game with different partners, and that in each round they would need to jointly collect 600 grains of rice (i.e. answer 60 questions). Participants were then introduced to their hypothetical ‘partners’ for each round, which were represented by usernames on the screen only. As with Farmer and Farrelly (2021), the usernames contained gender-specific names within them to clearly signal to participants whether the partner was either male or female.

Participants were told that that they could contribute as little or as much as they wished towards the total of 600 grains of rice in each round, with the implication that the remainder would be contributed by their partner. Each participant played one round with a same sex partner, and another with an opposite sex partner. To account for possible order effects, the order in which each participant played with same sex or opposite sex partners was randomised. Furthermore, in total there were

twenty-four usernames generated by the authors (12 male and 12 female), and participants were randomly allocated to two of these.

In each round, after being presented with a partner participants left the study website to access the Free Rice game, and asked to return to the study website when they had collected as much rice as they wished. Upon their return, participants were asked to enter their score and also provide a pseudonym that they wished to represent them in their group (as was the case with their ‘partner’). After this participants were thanked for their contribution and participation in the task before being debriefed and completing the study.

Results

Data for this research is available on the Open Science Framework (https://osf.io/qm6kj/?view_only=487d8be52a3e40f187ca2723e3818a15). A 2 x 2 x 2 mixed measure ANOVA was conducted with partner sex (same, opposite) as a within-subjects independent variable, and participant sex (male, female) and order in which partners were presented (same-opposite, opposite-same) as between-subjects independent variables, and amount of rice gained as the dependent variable. There was found to be no significant main effect of partner sex on amount of rice gained, $F_{(1,142)} = 1.62, p = .21, \omega^2 = .001$, nor for participant sex, $F_{(1,142)} = 1.18, p = .28, \omega^2 = .001$, or order, $F_{(1,142)} = 1.5, p = .22, \omega^2 = .003$, nor was there a significant interaction between partner sex and participant sex, $F_{(1,142)} = .32, p = .96, \omega^2 < .001$.

There was, however, a significant interaction between partner sex and order, $F_{(1,142)} = 19.11, p < .001, \omega^2 = .031$, see table 1 below. Subsequent pairwise comparisons revealed that significantly more rice was gained with opposite sex partners than same sex partners when opposite sex partners were presented first, $t_{142} = 4.11, p_{Holm} < .001$, but there was no such difference when same sex partners were presented first, $t_{142} = 2.13, p_{Holm} = .014$. It was also revealed that whereas amount of rice gained with same sex partners significantly decreased from when they were presented first as opposed to presented second, $t_{142} = 3.62, p_{Holm} = .002$, there was no such decrease over time for the amount of rice gained with opposite sex partners, $t_{142} = 1.04, p_{Holm} < .6$.

Table 1.

Amount of rice gained ($\pm 95\%$ C.I.) by participants with opposite sex and same sex partners for different orders.

Order	Partner sex	Mean	95% Confidence Interval	
			Lower	Upper
Opposite-sex partner first	Same	265.362	218.765	311.960
	Opposite	373.394	316.847	429.942
Same-sex partner first	Same	389.476	340.226	438.726
	Opposite	330.194	270.427	389.961

Discussion

Generally speaking, there was partial support for the hypotheses. In terms of hypothesis 1, although there was no overall evidence of mating motivation leading to increased altruistic behaviour in the online task, there was when the order in which participants were paired with different partners was also considered. When paired with opposite sex partners first (i.e., when mating motivated), participants did display greater altruistic behaviour in the form of the amount of rice gained, and this cannot be explained as an order effect as there was no similar effect for same sex partners when these were presented first. Additionally, there was no decrease in altruistic behaviour towards opposite sex partners from being presented first to second, but there was a significant decrease in altruistic behaviour across time towards same sex partners.

Additionally, as these observed significant effects of mating motivations on altruistic behaviour did not vary between male and female participants there is support for hypothesis 2. By examining both male and female behaviour this study has contributed to the body of evidence that altruism is under mutual mate choice, as both sexes appear to behave more altruistically in the presence of potential mates. This is commensurate with other findings that show, that when both male and female behaviours

are measured, altruism is a valued mate choice trait by both men and women (Bhagal et al., 2019) and strongly suggests that future research on this topic should take this into account.

How should we best interpret these findings? It is important to consider the relevance of the currency used to create the cost in this example of altruistic behaviour, that of time spent. It is clear from the order effects observed above that behaviour in the Free Rice game was a realistic cost, as general motivation to behave altruistically without further motivations (in this case, mating) diminished over time, possibly due to factors such as boredom and fatigue. However, when the mating motivation was present as well then participants were still behaving altruistically over time, which supports the view that altruistic behaviour can act as a valued trait in mate choice. However, it is important to note that altruism towards opposite sex partners was only greater than towards same sex partners when opposite sex partners were presented first (although that was not the case for the opposite, with altruism towards same sex partners when these were presented first). Also, when directly comparing how participants behaved with partners presented first, there was no difference between same sex and opposite sex partners.

Therefore as mentioned above, although there is some evidence of mating motivation affecting participants' altruistic behaviour, this is not consistently present across the whole course of their participation and engagement in the Free Rice game. It does however show the continuing validity of using methods that assess the costs of behaving altruistically in terms of time such as the Free Rice game in research on prosociality. Furthermore the results suggests the means by which mating motivation affects altruistic behaviour is nuanced and influenced by a number of factors that are worthy of future investigation.

References

- Bhogal, M. S., Bartlett, J. E., & Farrelly, D. (2018). The influence of mate choice motivation on non-financial altruism. *Current Psychology*, 38, 959–964. <https://doi.org/10.1007/s12144-018-0070-x>.
- Bhogal, M. S., Farrelly, D., & Galbraith, N. (2019). The role of prosocial behaviors in mate choice: A critical review of the literature. *Current Psychology*, 38, 1062–1075. <https://doi.org/10.1007/s12144-019-00308-8>.
- Bhogal, M. S., Galbraith, N., & Manktelow, K. (2016). Sexual Selection and the Evolution of Altruism: Males are more altruistic and cooperative towards attractive females. *Letters on Evolutionary Behavioral Science*, 7, 10–13. <https://doi.org/10.5178/lebs.2016.42>.
- Darwin, C. (1859). *On the origin of species*. Murray.
- Farmer, S., & Farrelly, D. (2023). Men increase time spent on a charitable task when in the presence of women and other men: Evidence of competitive altruism in online mating scenarios. *Current Psychology*, 42, 9047–9052. <https://doi.org/10.1007/s12144-021-02173-w>.
- Farrelly, D. (2011). Cooperation as a signal of genetic or phenotypic quality in female mate choice? Evidence from preferences across the menstrual cycle. *British Journal of Psychology*, 102, 406–430. <https://doi.org/10.1348/000712610X532896>.
- Farrelly, D. (2013). Altruism as an indicator of good parenting quality in long-term relationships: Further investigations using the mate preferences towards altruistic traits scale. *Journal of Social Psychology*, 153, 395-398. <https://doi.org/10.1080/00224545.2013.768595>.
- Farrelly, D., & Bennett, M. (2018). Empathy leads to increased online charitable behaviour when time is the currency. *Journal of Community and Applied Social Psychology*, 28, 42–46.
- Farrelly, D., & Bhogal, M. S. (2021). The value of pro-environmental behaviour in mate choice. *Personality and Individual Differences*, 179, 110964. <https://doi.org/10.1016/j.paid.2021.110964>.
- Farrelly, D., & King, L. (2019). Mutual mate choice drives the desirability of altruism in relationships. *Current Psychology*, 38, 977–981. <https://doi.org/10.1007/s12144-019-00194-0>.

- Farrelly, D., Lazarus, J., & Roberts, G. (2007). Altruists attract. *Evolutionary Psychology*, 5, 313–329. <https://doi.org/10.1177/147470490700500205>.
- Farrelly, D., Moan, E., White, K., & Young, S. (2015). Evidence of an Alternative Currency for Altruism in Laboratory-Based Experiments. *Europe's Journal of Psychology*, 11, 100–111. doi:10.5964/ejop.v11i1.855.
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41, 1149–1160. doi:10.3758/BRM.41.4.1149.
- Hamilton, W. D. (1964). The genetic evolution of social behaviour. I & II. *Journal of Theoretical Biology*, 7, 1–52. [https://doi.org/10.1016/0022-5193\(64\)90038-4](https://doi.org/10.1016/0022-5193(64)90038-4)
- Iredale, W., Van Vugt, M., & Dunbar, R. (2008). Showing Off in Humans: Male Generosity as a Mating Signal. *Evolutionary Psychology*, 6, 386–392. <https://doi.org/10.1177/147470490800600302>
- Lange, F., Steinke, A., & Dewitte, S. (2018). The Pro-Environmental Behavior Task: A laboratory measure of actual pro-environmental behavior. *Journal of Environmental Psychology*, 56, 46–54. <https://doi.org/10.1016/j.jenvp.2018.02.007>.
- Lucas, M., & Koff, E. (2013). How conception risk affects competition and cooperation with attractive women and men. *Evolution and Human Behavior*, 34, 16–22. <https://doi.org/10.1016/j.evolhumbehav.2012.08.001>.
- Macrae, C. N., & Johnston, L. (1998). Help, I need somebody: Automatic action and inaction. *Social Cognition*, 16, 400–417. <https://doi.org/10.1521/soco.1998.16.4.400>.
- Miller, G. F. (2007). Sexual Selection for Moral Virtues. *The Quarterly Review of Biology*, 82, 97–125. <https://doi.org/10.1086/517857>.
- Oates, K., & Wilson, M. (2002). Nominal kinship cues facilitate altruism. *Proceedings. Biological Sciences / The Royal Society*, 269, 105–109. <https://doi.org/10.1098/rspb.2001.1875>.
- Scaffidi Abbate, C., Ruggieri, S., & Boca, S. (2013). Automatic Influences of Priming on Prosocial Behavior. *Europe's Journal of Psychology*, 9, 479–492. <https://doi.org/10.5964/ejop.v9i3.603>.

- Schwarz, S., & Baßfeld, L. (2019). Do men help only beautiful women in social networks? *Current Psychology*, 38, 965–976. <https://doi.org/10.1007/s12144-018-0086-2>.
- Tognetti, A., Berticat, C., Raymond, M., & Faurie, C. (2012). Sexual selection of human cooperative behaviour: An experimental study in rural Senegal. *PloS One*, 7, e44403–e44403. [10.1038/srep29819](https://doi.org/10.1038/srep29819)
- Tognetti, A., Dubois, D., Faurie, C., & Willinger, M. (2016). Men increase contributions to a public good when under sexual competition. *Scientific Reports*, 6, 29819. <https://doi.org/10.1038/srep29819>
- Trivers, R. (1971). The evolution of reciprocal altruism. *Quarterly Review of Biology*, 46, 35–57. <https://doi.org/10.1086/406755>.