ethology international journal of behavioural biology

RESEARCH PAPER

Eye Images Increase Charitable Donations: Evidence From an Opportunistic Field Experiment in a Supermarket

Kate L. Powell*, Gilbert Roberts† & Daniel Nettle‡

* School of Biology, Newcastle University, Newcastle, UK
† Centre for Behaviour and Evolution & Institute of Neuroscience, Newcastle, UK
‡ Centre for Behaviour and Evolution & Institute of Neuroscience, Newcastle, UK

Correspondence
Daniel Nettle, Centre for Behaviour and Evolution & Institute of Neuroscience, Henry Wellcome Building, Newcastle NE2 4HH, UK.
E-mail: daniel.nettle@ncl.ac.uk

Received: June 7, 2012
Initial acceptance: July 31, 2012
Final acceptance: August 10, 2012
(L. Fusani)

doi: 10.1111/eth.12011

Abstract

A number of studies have shown that the presence of simple images of eyes in the environment increases prosocial behaviour in humans. However, questions remain about the robustness of the effect, its explanation and the factors promoting it. In particular, it is not yet clear whether this effect is restricted to contexts where there is a normative requirement to behave prosocially and thus where punishment is a likely consequence of failing to do so. In an 11-wk field experiment in a supermarket, we displayed either eye images or control images on charity collection buckets. There was no normative requirement to donate in this setting, and most people did not do so. However, the presence of eye images increased donations by 48% relative to control images. The effect of eye images was significantly stronger at times when the supermarket was quiet rather than busy. Results are consistent with models of the evolution of prosociality through reputation-based partner choice and have potential practical benefits for those involved in charitable fundraising.

Introduction

In a study that rapidly became a citation classic, Haley & Fessler (2005) showed that subtly displaying images of eyes caused human participants to be more prosocial (i.e. more inclined to provide benefits to other individuals) than when these images were absent. They did this using a laboratory experimental scenario called the dictator game (Forsythe et al. 1994). A number of studies have replicated and extended Haley and Fessler's results using related laboratory paradigms (Burnham & Hare 2007; Rigdon et al. 2009; Bourrat et al. 2011; Keller & Pfattheicher 2011; Oda et al. 2011), although see also Fehr & Schneider (2010) and Carbon & Hesslinger (2011). However, these studies rely on contrived experimental scenarios, where participants self-select to take part and are aware that their behaviour is being experimentally scrutinized. This means that it is important to obtain evidence from the field, that is, from the behaviour in natural settings of people who are not aware that they are taking part in an experiment, to be confident that the eye-images effect is robust and important in the real world (Levitt & List 2007; Bardsley 2008; Jackson 2012).

Several field experimental studies have taken on this challenge. Bateson et al. (2006) alternately displayed images of eyes and images of flowers above an honesty box in which university staff paid contributions for their coffee. The rate of contribution was significantly higher in weeks when eyes were displayed than when flowers were displayed. Ernest-Jones et al. (2011) displayed posters featuring either eyes or flowers in a university cafeteria. They found that people were more likely to clear up their litter on days when eyes were displayed. They were also able to show that the eye-images effect was not simply due to people's attention being captured by the eye images, incidentally leading them to process any adjacent instructions, because they found the positive effect of eyes even when the instruction to clear up litter was not displayed on the posters. There was some evidence in Ernest-Jones et al.'s data that eye images had a greater effect on behaviour when there were few real

people around in the environment. Francey & Bergmüller (2012) recently showed that displaying eye images in bus shelters made people more careful in following garbage-separation rules than they were when eyes were absent. They also showed that their results were unlikely to be wholly due to eyes drawing greater attention to signs requesting the removal of garbage.

Two suggestions have been made as to why eye images are effective in increasing prosociality (Oda et al. 2011). Both interpretations agree that observation of one's behaviour by a conspecific entails that there will be social consequences and that direct-gazing eyes is in general a valid cue that such observation is taking place. Thus, humans have evolved to be psychologically sensitive to eyes. However, on one interpretation, the relevant social consequence is being punished. People are often willing to administer punishment to those who break social norms (Fehr & Fischbacher 2004), and this has argued to be a major force maintaining prosociality in human societies (Gintis et al. 2003). Thus, the presence of eye images, cueing the possibility of punishment, should be predicted to reduce norm-breaking. This could fully account for the results of Bateson et al. (2006), Ernest-Jones et al. (2011) and Francey & Bergmüller (2012). In their study settings, there were clear norms that payment for coffee/clearing of litter/sorting of garbage was expected and required, and thus not doing so was a counter-normative behaviour which might be expected to elicit some form of punishment.

An alternative interpretation of the eye-images effect comes from reputation-based partner-choice theories of the evolution of social behaviour and related empirical evidence (Roberts 1998; Barclay 2004; Sylwester & Roberts 2010). According to the reputation-based partner-choice hypothesis, prosocial acts are performed not to avoid punishment but to increase the likelihood of being chosen by others for mutually beneficial interactions in future. Reputation-based partner choice, unlike punishment models, can explain prosocial behaviours that occur in the absence of a norm requiring them. Furthermore, unlike indirect reciprocity models in which cooperation is directed towards other cooperators (Nowak & Sigmund 1998; Wedekind & Milinski 2000), reputation-based partner choice can promote unconditional prosocial acts (Sylwester & Roberts 2010). Following the logic of reputation-based partner choice, prosocial behaviour should be particularly worth performing when the behaviour is visible to others. Thus, eye cues might be potent releasers for generosity.

It is plausible that eye images are releasers of prosociality for both reasons, that is, because they have over evolutionary time been valid cues of both elevated likelihood of punishment and of future partner-choice benefits. However, it is possible to pit the two accounts somewhat against each other by careful choice of study setting. Here, we examined the effect of eye images in a setting, donating to charity in a supermarket, where there was no injunctive norm to behave prosocially (i.e. there was no rule that one had to do so) and moreover no descriptive norm to behave prosocially (most people did not do so). Thus, non-contribution was normative and not punished. If the ultimate reasons prosocial behaviour is facilitated by eye cues are only to do with the punishment of observed norm violations, then we should see no effect of eyes on generosity in this context. If anything, eyes might reduce generosity, because non-contribution is descriptively normative. If, on the other hand, people have evolved to be sensitive to eye cues at least partly because of future partner-choice payoffs arising from displays of generosity, then we should expect an eye-images effect in this setting.

There is no explicit norm requiring prosociality in the dictator game used in Haley & Fessler's (2005) study. However, there is evidence that people treat this artificial scenario *as if* there were an injunctive norm of prosociality, possibly for reasons to do with knowledge of the experimenter's expectations (Dana et al. 2006; Bardsley 2008). The only study of eye-images effects in a situation where normative obligations are absent and there are no problems of experimenter demand was by Ekström (2011). Ekström placed either eye images or control images onto machines in Swedish supermarkets where people recycle cans and bottles. Recyclers are credited with a small cash amount, which they can either take away or opt to be donated to a charity, with most opting to take the money away. Ekström found no effect of eyes in the whole data set, but when the analysis was restricted to days when there were relatively few people in the supermarket, charity contributions were significantly higher (by around 30%) for the eyes-image than the for control-image machines. Although Ekström's results concur with the evidence from Ernest-Jones et al. (2011) that eye images are more effective in the absence of real people, the lack of an overall main effect makes them somewhat equivocal as evidence for the effectiveness of eye cues on generosity in the absence of normative obligations. Whether the eye-images effect generalizes to scenarios without a prosocial norm therefore remains a question requiring further study. Furthermore, recent

challenges to the eyes paradigm (Fehr & Schneider 2010; Carbon & Hesslinger 2011) renew the need to test the robustness of the effect more generally.

In this study, then, we performed a field experiment by applying very subtle eyes-image cues or control-image cues to charity collection buckets which were placed behind the checkouts of a British supermarket, over an 11-wk period. These buckets allowed shoppers to donate some of their change to a well-known cause, but only a small minority actually did so. Our aims were to establish whether a robust eye-images effect on generosity appeared in this setting where there is no norm of prosociality in operation and to investigate whether there was any evidence for a stronger eye-images effect when fewer real people were around, as suggested by the studies of Ernest-Jones et al. (2011) and Ekström (2011).

Methods

The study took place in a large, busy supermarket in the Tyne and Wear conurbation. The supermarket contained nine parallel checkouts in a main bank, plus four self-service checkouts and a customer service desk. Charity buckets are positioned at the end of six of the main bank checkouts. These are white plastic buckets bearing the branding of the supermarket and the name and logo of the currently active charitable cause, which did not change during the study. We applied either subtle eye images or control images to buckets on alternate checkouts. Thus, eyes and control images were evenly distributed across the width of the store, and so treatment should not be confounded with spatial variation in business or lighting.

Our eye images consisted of a pair of self-adhesive stickers of cartoon eyes, each 2.5 cm in diameter, placed on the sloping top of the bucket. The control images were geometric stars 1.5 cm in diameter. As a pair of stars might well be sufficiently eye-like to generate an eye-images effect, our control image was a line of three. Thus, the overall size of the stimuli was similar in the two conditions (both forming a rectangle of <10 cm in length by <3 cm in height), as were the colours and contours. However, the eye image was immediately identifiable as eye-like, whereas the control image was not (Fig. 1).

The stimuli were left in place for 11 wk between 24 Nov. 2011 and 9 Feb. 2012. Buckets were emptied by supermarket staff at weekly intervals, and the amount donated was counted. The supermarket also kindly supplied us, from their cash register data, with the number of people who had come through that particular checkout during the corresponding week, plus how much they spent. For the analysis, we took the unit of replication to be the bucket-week, thus providing 66 data points. Our outcome variable was the amount of money donated per thousand customers using the cash register. Results are essentially the same if unadjusted amount donated is used instead (data not shown). The distribution of donation per thousand customers did not depart significantly from normality, and hence, the data were analyzed using general linear mixed models. In a first model, we entered treatment (eyes vs. control) as a fixed effect and week as a random effect. In a second model, we additionally entered the number of customers at the checkout as a covariate and tested for a significant interaction between treatment and number of

Fig. 1: Eye (left) and control (right) images in situ in the supermarket.

customers. An alpha level of $p < 0.05$ was used throughout.

Results

The eye checkouts did not differ significantly from the control checkouts in terms of number of customers in each week (eyes: mean 2360.85, SD 145.52; control, mean 2356.76, SD 146.96; $t_{64} = 0.11$, ns). The mean amount donated per thousand customers overall was £6.69 (SD £2.67). The mean for buckets on the eyes checkouts was £7.90 (SD £2.12) and for buckets on the control checkouts, £5.48 (SD £2.64). Thus, donations were 48% higher to eyes than to control buckets. Figure 2 shows the means for eyes and control buckets in each of the 11 wk, as well as for the whole study period. The figure suggests an overall effect of images, but also shows that there is considerable variation between weeks in the difference between eye and control buckets.

In the first general linear mixed model, there was a significant effect of treatment ($F_{1,54} = 29.27$, $p < 0.05$, $B = 2.42$, SE (B) $= 0.45$), as well as a significant effect of week ($F_{10,54} = 5.71$, $p < 0.05$). In the second general linear mixed model, we added number of customers using the checkout that week, and its interaction with treatment, to the model. The treatment effect remained significant ($F_{1,52} = 8.52$, $p < 0.05$, $B = 20.27$, SE (B) $= 6.94$), as did the effect of week ($F_{10,52} = 6.49$, $p < 0.05$). The main effect of number of customers was not significant ($F_{1,52} = 2.82$, $p = 0.10$, $B = 0.01$, SE (B) $= 0.02$), but there was a significant interaction between number of customers and treatment ($F_{1,52} = 6.62$, $p < 0.05$, $B = -0.1$, SE (B) $= 0.003$). To visualize this interaction, Fig. 3 plots the mean donation per thousand customers for control vs. eyes registers separately for checkouts that were relatively not busy in the week of that collection (below median number of customers for all checkouts in all weeks) vs. those that were relatively busy in the week of that collection (above median customers for all checkouts in all weeks). The figure shows that the interaction effect is due to control buckets having particularly low donation rates in weeks when the checkout was not busy. The eyes buckets received 59% more in donations per thousand customers in weeks when the checkout was relatively quiet, compared with only 28% more in weeks when it was relatively busy.

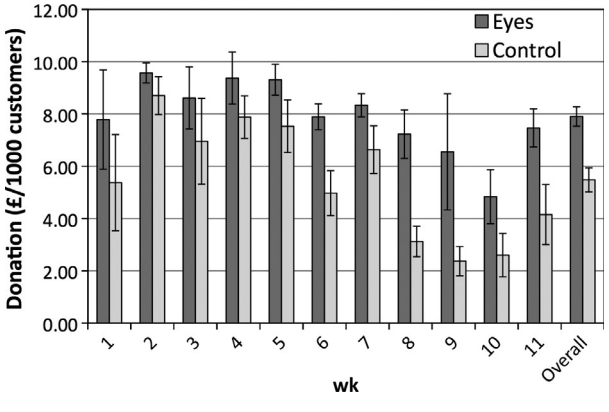

Fig. 2: Mean donation (£) per thousand customers for eyes vs. control buckets in each week of the study and overall. Error bars show ±1 between-checkout standard errors.

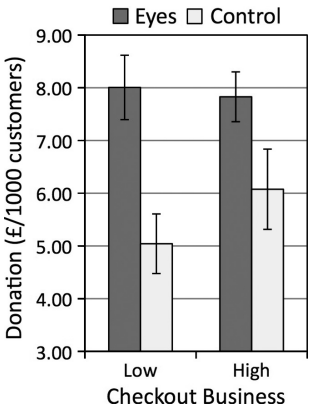

Fig. 3: Mean donation (£) per thousand customers for eyes vs. control buckets by whether the checkout was not very busy that week (Low = below median) vs. busy that week (High = above median). Error bars show ±1 between-checkout standard errors.

Discussion

We displayed eye-like or non-eye-like images on charity collection buckets in a supermarket setting over 11 wk. Donations were 48% higher in the eye buckets than in the control-image buckets. There was an interaction between the eye-images treatment and the business of the supermarket. When the supermarket was busy, donations to the control-image buckets were relatively high and the eye-images effect was 28% over the control images. When the supermarket was quiet, donations to the control-image buckets were lower and the eye-images effect was 59%.

Our study thus further confirms the generality of the eye-images effect on human prosociality first demonstrated by Haley & Fessler (2005), by adding a novel real-world study. Our manipulation was extremely subtle, adding a couple of small stickers to an extremely complex visual environment (Fig. 1), and yet the effects were substantial. This suggests that the

effect of eye images is non-trivial in the real world, not an artefact of simplified laboratory contexts, and also confirms that stimuli can be quite minimally eye-like and still evoke an eye-images effect (Rigdon et al. 2009). We found evidence that the eye-images effect was significantly greater when the supermarket was quiet, concurring with the findings of Ernest-Jones et al. (2011) and Ekström (2011) that eye images are most effective when there are few real people around. Underlying this effect, both in the present study and in that of Ernest-Jones et al., is the fact that prosociality is at its lowest when there are *neither* real people nor eye images present. Introducing either one increases prosociality, but their combined effects are not additive. This makes sense if there are psychological mechanisms responsive to possible social consequences of one's actions, which require a threshold of observation cues in order to be activated, but are not linearly responsive to the magnitude of cues beyond that.

The significance of the study arises from the fact that, unlike our previous field studies, prosociality in this context was not normative, either in the injunctive sense (there was no social obligation to donate) or in the descriptive sense (most people did not donate). The results therefore suggest that the eye-images effect is not restricted to contexts where prosociality is a norm enforced by punishment, and eyes are a cue that any norm violation is likely to be detected. These results are instead consistent with models of the evolution of prosociality in which individuals who are unconditionally prosocial reap future positive benefits in terms of partner choice (Roberts 1998). Thus, it pays more to be prosocial when such prosociality is likely to be visible. Our results did, however, differ somewhat from those of the most similar previous study (Ekström 2011), which also used charitable donations in supermarkets. Whereas we found eye-images effects of around 60% when the supermarket was quiet and 30% when it was busy, Ekström found an effect of around 30% when it was busy and zero when it was quiet. The reasons for this heterogeneity are unclear, but differences in details about the population, the motivation of the participants (all customers in our case, just people who had made the effort to recycle in Ekström's), the visual and spatial environment and stimuli themselves (we note that our cartoon eyes on a white background had much more luminance contrast than the more naturalistic images used by Ekström) are all likely to be important.

An important weakness of our study is that we are unable to adjudicate between two competing accounts of the eye-images effect observed in the study by Bateson et al. (2006). The first is that eyes are simply potent at capturing attention, and once attention has been captured by them, the person processes information in their vicinity. The second is that there is a more fundamental, perhaps unconscious, link between the being the target of gaze and the desire to be prosocial. Ernest-Jones et al. (2011) and Francey & Bergmüller (2012) did test between these possibilities and showed that the attentional mechanism was not sufficient to explain the eye-images effects they found. We also note that the attentional account is unlikely to be able to explain Haley & Fessler's (2005) original findings. However, as our stimuli were on the bucket where the donation was to be made, we are unable to show that the attentional mechanism is not behind the effect in our current study situation. Capturing attention might be particularly important where the prosocial behaviour under study is rare and non-normative.

Whilst the theoretical import of this study is that it shows norms do not need to be present for an eye-images effect on prosociality to be found, it has considerable potential practical importance. As a result of our simple manipulation, £183.86 more was collected for charity in our eyes buckets than in control buckets. This is clearly important information for those designing charitable initiatives. There is a vast literature on the determinants of charitable giving (Bekkers & Wiepking 2007). Studies have already shown the importance of the fundraiser meeting the potential donor face-to-face (Brockner et al. 1984) and looking them in the eye (Bull & Gibson-Robinson 1981), as well as the donor's generosity being public information (Bereczkei et al. 2007). Thus, there is an implicit understanding in this literature of the importance of activating the psychology of reputation-based partner choice. However, the current results go further in showing that actual observation is not necessary to increase charitable giving. It is sufficient to provide cues (eye images) which we have evolved to be sensitive to because over evolutionary time they tended to be associated with social consequences, even if, in the current environment, they are artificial and thus the perceived visibility of actions is illusory.

Literature Cited

Barclay, P. 2004: Trustworthiness and competitive altruism can also solve the "tragedy of the commons". Evol. Hum. Behav. **25**, 209—220.

Bardsley, N. 2008: Dictator game giving: altruism or artefact? Exp. Econ. **11**, 122—133.

Bateson, M., Nettle, D. & Roberts, G. 2006: Cues of being watched enhance cooperation in a real-world setting. Biol. Lett. **2**, 412—414.

Bekkers, R. & Wiepking, P. 2007: Generosity and philanthropy: A literature review. Available at SSRN: http://ssrn.com/abstract=1015507 or http://dx.doi.org/10.2139/ssrn.1015507.

Bereczkei, T., Birkas, B. & Kerekes, Z. 2007: Public charity offer as a proximate factor of evolved reputation-building strategy: an experimental analysis of a real-life situation. Evol. Hum. Behav. **28**, 277—284.

Bourrat, P., Baumard, N. & McKay, R. 2011: Surveillance cues enhance moral condemnation. Evol. Psychol. **9**, 193—199.

Brockner, J., Guzzi, B., Kane, J., Levine, E. & Shaplen, K. 1984: Organizational fundraising: further evidence on the effect of legitimizing small donations. J. Consum. Res. **11**, 611—614.

Bull, R. & Gibson-Robinson, E. 1981: The influences of eye-gaze, style of dress and locality on the amounts of money donated to a charity. Hum. Relat. **34**, 895—905.

Burnham, T. C. & Hare, B. 2007: Engineering human cooperation – does involuntary neural activation increase public goods contributions? Hum. Nat. **18**, 88—108.

Carbon, C. C. & Hesslinger, V. M. 2011: Bateson et al.'s (2006) cues-of-being-watched paradigm revisited. Swiss J. Psychol. **70**, 203—210.

Dana, J., Cain, D. M. & Dawes, R. M. 2006: What you don't know won't hurt me: costly (but quiet) exit in dictator games. Organ. Behav. Hum. Decis. Process. **100**, 193—201.

Ekström, M. 2011: Do watching eyes affect charitable giving? Evidence from a field experiment Exp. Econ. **15**, 530—546.

Ernest-Jones, M., Nettle, D. & Bateson, M. 2011: Effects of eye images on everyday cooperative behavior: a field experiment. Evol. Hum. Behav. **32**, 172—178.

Fehr, E. & Fischbacher, U. 2004: Third-party punishment and social norms. Evol. Hum. Behav. **25**, 63—87.

Fehr, E. & Schneider, F. 2010: Eyes are on us, but nobody cares: are eye cues relevant for strong reciprocity? Proc. R. Soc. Lond. B Biol. Sci. **277**, 1315—1323.

Forsythe, R., Horowitz, J. L., Savin, N. E. & Sefton, M. 1994: Fairness in simple bargaining experiments. Games Econ. Behav. **6**, 347—369.

Francey, D. & Bergmüller, R. 2012: Images of eyes enhance investments in a real-life public good. PLoS ONE **7**, e37397.

Gintis, H., Bowles, S., Boyd, R. & Fehr, E. 2003: Explaining altruistic behavior in humans. Evol. Hum. Behav. **24**, 153—172.

Haley, K. J. & Fessler, D. M. T. 2005: Nobody's watching? Subtle cues affect generosity in an anonymous economic game Evol. Hum. Behav. **26**, 245—256.

Jackson, C. 2012: Internal and external validity in experimental games: a social reality check. Eur. J. Dev. Res. **24**, 71—88.

Keller, J. & Pfattheicher, S. 2011: Vigilant self-regulation, cues of being watched and cooperativeness. Eur. J. Pers. **25**, 363—372.

Levitt, S. D. & List, J. A. 2007: On the generalizability of lab behaviour to the field. Can. J. Econ. **40**, 347—370.

Nowak, M. A. & Sigmund, K. 1998: Evolution of indirect reciprocity by image scoring. Nature **393**, 573—577.

Oda, R., Niwa, Y., Honma, A. & Hiraishi, K. 2011: An eye-like painting enhances the expectation of a good reputation. Evol. Hum. Behav. **32**, 166—171.

Rigdon, M., Ishii, K., Watabe, M. & Kitayama, S. 2009: Minimal social cues in the dictator game. J. Econ. Psychol. **30**, 358—367.

Roberts, G. 1998: Competitive altruism: from reciprocity to the handicap principle. Proc. R. Soc. Lond. B Biol. Sci. **265**, 427—431.

Sylwester, K. & Roberts, G. 2010: Cooperators benefit through reputation-based partner choice in economic games. Biol. Lett. **6**, 659—662.

Wedekind, C. & Milinski, M. 2000: Cooperation through image scoring in humans. Science **288**, 850—852.