LEBS
Vol. 14 No. 1 (2023) 26–31
Letters on Evolutionary Behavioral Science

"Watching Eyes" Do Not Strengthen the Behavioral Intention of Donating Blood: A High-Powered Pre-registered Replication Study

Kai Otsubo [1,*], Yoshitaka Masuda [2], Hiroyuki Yamaguchi [1]

[1] Kyushu University, 744 Motooka, Nishi-ku, Fukuoka 819-0395, Japan

[2] Independent Scholar, Niigata, Japan

[*] Author for correspondence (k.otsubo686@gmail.com)

Previous studies have demonstrated that eye-like images promote prosocial behavior and reduce antisocial behavior (watching-eyes effect). However, several recent reports of replication failure have called into question the replicability of the watching-eyes effect. It also remains unclear whether eye-like images promote prosocial tendencies or norm compliance. In this study, we attempted to replicate the watching-eyes effect on the behavioral intention of blood donation and examined the moderation effect of social norms in a high-powered pre-registered experiment. Participants were 1408 Japanese adults. A 2 × 2 (image: eye, control; norm: pro-donation, neutral) between-participants design was used. Participants first read an essay on either the importance of donating blood or a neutral topic. Then they reported their behavioral intention to donate blood while observing an eye-like or control image. The results showed non-significant effects of eye-like images and no interaction between eyes and norms. However, interestingly, our exploratory analysis suggests the possibility that the watching-eyes effect emerges only under specific contexts. We discuss the interpretations of the results and implications for future research.

Keywords
watching-eyes effect, prosocial behavior, blood donation

Introduction

The replicability of the watching-eyes effect is a controversial topic in evolutionary psychology. Many previous studies have demonstrated that eye-like images promote prosocial behaviors (e.g., Haley & Fessler, 2005; Nettle et al., 2013; Oda & Ichihashi, 2016; Sparks & Barclay, 2013). This phenomenon called the watching-eyes effect has been explained by the evolutionarily acquired tendency for humans to try to maintain their social reputation. Cooperation between strangers via indirect reciprocity is thought to have evolved through a reputation mechanism (Nowak & Sigmund, 2005). Thus, some researchers have suggested that individuals have an automatic psychological mechanism for reputation maintenance that is activated when they are under observation by others and even in the presence of eye-like paintings (Haley & Fessler, 2005). However, along with the replication crisis in psychological research (Open Science Collaboration, 2015), some recent studies have reported replication failures of the watching-eyes effect (e.g., Matsugasaki et al., 2015; Rotella et al., 2021; Sparks & Barclay, 2015).

Moreover, the underlying mechanism of the watching-eyes effect remains to be identified. Kawamura and Kusumi (2017) found that the effect of eye-like images on the amount of charitable donations was present only when there was a descriptive norm promoting donations. From this finding, they inferred that the watching-eyes effect arises to avoid a negative reputation as a norm deviator, not to gain a positive reputation. However, they failed to replicate this result in a replication experiment. The results of other studies examining the interaction between eye-like images and norms are also mixed (Bateson et al., 2013; Fathi et al., 2014; Oda et al., 2015; Raihani & Bshary, 2017).

In the present study, we attempted to replicate the watching-eyes effect and examine the interaction between eye-like images and social norms in a high-powered pre-registered experiment. Regardless of whether they have successfully replicated the effect, few previous studies have been pre-registered (e.g., Rotella et al., 2021) and most have used small samples. Because the effect size of the watching-eyes effect is likely to be small (Northover et al., 2017), there is a need for a large-sample experimental study to verify the effect.

The dependent variable was the behavioral intention of donating blood. Blood donation is interpretable as a typical cooperative behavior in a social dilemma situation. Although blood banking to provide transfusions benefits the whole society, individuals can maximize their benefits by free-riding because donating blood is costly. In the context of the watching-eyes effect, Sénémeaud et al. (2017) showed that a picture of eyes on a poster increases blood donation. One of the objectives of the present study was to determine whether eye-like images are effective in promoting blood donation. The dependent variable was a behavioral intention, not actual behavior. We assumed that eye-like images increase the level of self-reported intention of prosocial behaviors, not just actual prosocial behaviors. This is because the reporting of high intentions of prosocial behavior helps to maintain actors' reputations, the same as exhibiting prosocial behavior. Indeed, Bourrat et al. (2011) showed that an eye image prompted participants to report more severe moral judgments. This suggests that eye-like images promote expressions of

doi: 10.5178/lebs.2023.105
Received 21 April 2023.
Accepted 25 April 2023.
Published online 20 May 2023.

Figure 1. The eye manipulation stimuli in the eye condition (left) and in the control condition (right).

prosocial attitudes.

We manipulated social norms using a short essay promoting blood donation. Most previous studies have manipulated norms by informing participants of the typical behavior of others; for example, "The average donation amount is xxx dollars" (Fathi et al., 2014; Kawamura & Kusumi, 2017; Oda & Ichihashi, 2016). Such descriptive norms provide information about what others typically do (Cialdini et al., 1990). However, if the watching-eyes effect involves the attempt to avoid a negative reputation, as Kawamura and Kusumi (2017) suggest, the moderation effect of social norms will likely be stronger when there are injunctive norms informing the individual about what they should do (Cialdini et al., 1990). This is because, in such situations, it is clearer that norm violators will earn a negative reputation from others. In this study, we attempted to manipulate injunctive norms using a short essay.

Our hypotheses were as follows:

H1: An eye-like image will strengthen the behavioral intention to donate blood.

H2: A salient injunctive norm will strengthen the behavioral intention to donate blood.

H3: The watching-eyes effect will be stronger when there is a salient injunctive norm.

Method

Participants

We recruited 1408 Japanese adults who were all eligible for blood donation through a Japanese crowdsourcing platform Yahoo! crowdsourcing (https://crowdsourcing.yahoo.co.jp/). Participants were paid 15 Japanese yen (approximately 0.11 US dollars) for their participation. The sample size was decided based on a power analysis using G*Power 3.1.9.7 (Faul et al., 2007). The analysis showed that 1302 participants are needed to detect a small effect ($f = 0.1$) in an analysis of variance (ANOVA; both main effects and interaction) with $1 - \beta = .95$ and $\alpha = .05$. Therefore, 1400 participants were recruited on the assumption that some would fail the attention check.

Procedure

We conducted an online experiment using jsPsych (de Leeuw, 2015). The study protocol was pre-registered with the Open Science Framework before the experiment (https://osf.io/zrbea).

In the experiment, participants first answered demographic questions and read a short essay. Demographic questions were about age, gender, and experiences of donating blood ("never," "once," "twice or more," "I don't know," and no response). The contents of the essay differed according to the condition. In the pro-donation essay condition, the essay emphasized the importance of donating blood and politely asked participants to donate blood. In the neutral essay condition, the essay was about the importance of reading habits. After reading the essay, participants answered three items about their perception of social norms about blood donation. Responses were scored on a 7-point scale (1 = strongly disagree to 7 = strongly agree). The items were "I think people expect me to donate blood," "I think we should donate blood," and "I think donating blood is a good thing to do." Participants then reported their behavioral intention to donate blood in three items adapted from Farley and Stasson (2003) on a 7-point scale (1 = strongly disagree to 7 = strongly agree). The items were "I would donate blood in the near future," "I would donate blood the next time I have an opportunity," and "I wish to donate blood as soon as possible." We translated these items into Japanese. In addition, an attention check was performed using one directed questions scale (DQS; Maniaci & Rogge, 2014) item on the same questionnaire ("Choose 3 in this question."). Participants also underwent the eye manipulation on this page. In the eye condition, an eye-like image was shown at the top of the screen (Figure 1). In the control condition, a control image, which consisted of the same elements as the eye-like image, was displayed on the screen in the same place as the eye-like image. The size of the images was 700 pixels wide × 207 pixels high. Finally, we asked participants to state the number of people who were in the same room as them during the experiment ("none," "one," "two or more," or "I don't know"). This is because some study findings suggest that the watching-eyes effect is stronger when participants are alone while making their decision (e.g., Bateson et al., 2013; Oda, 2019).

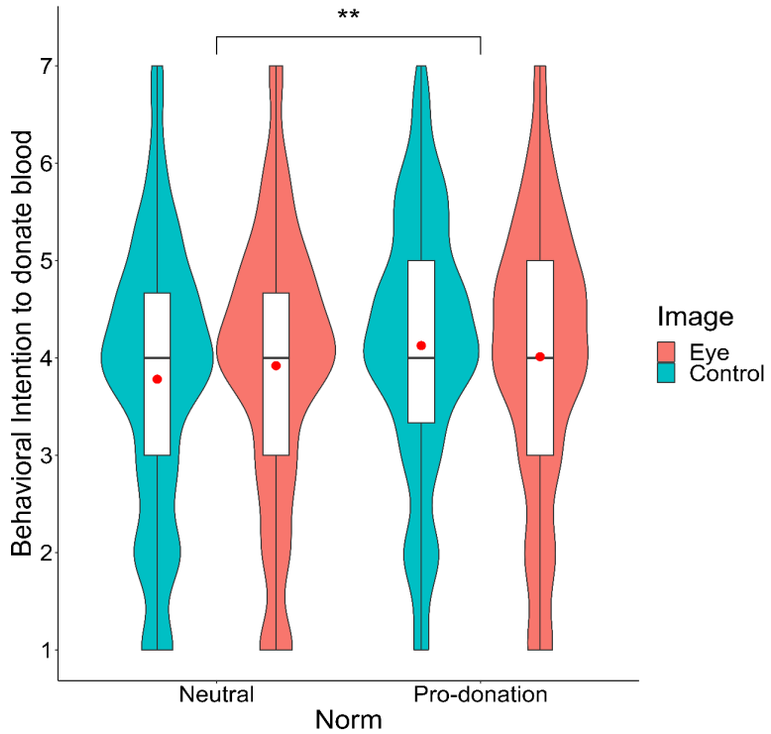

Figure 2. Score distributions of the behavioral intention to donate blood in each condition (**p < .01; red dots indicate mean scores).

Results

We used R version 4.1.2 (R Core Team, 2021) for the data analysis. We used *psych* package version 2.3.3 (Revelle, 2023) to calculate Cronbach's alpha, *effectsize* package version 0.8.2 (Ben-Shachar et al., 2020) to calculate Cohen's d and generalized η^2. The data and analysis code are available from the Open Science Framework (https://osf.io/de6j2/files/osfstorage).

We excluded data from 23 participants (1.6%) who incorrectly answered the DQS item. Thus, the final sample size was 1385 (M_{age} = 49.34; 1000 men, 365 women, 1 other, 19 unknown). The data exclusion and analysis were all conducted as per the pre-registration. Then, we calculated the mean scores on the three norm perception items (Cronbach's α = .70) and the three items for behavioral intention to donate blood (α = .93) and created single variables.

Manipulation check

For the manipulation check, we conducted Welch's t-test on the means of the perceived blood donation norm in the pro-donation essay condition (M = 4.99, SD = 0.91) and in the neutral essay condition (M = 4.70, SD = 0.95). We merged the eye conditions because participants reported their norm perceptions before the eye manipulation. The analysis showed that the mean of the perceived norm in the pro-donation essay condition was significantly higher than that in the neutral essay condition (t (1379.3) = 5.83, p < .001, Cohen's d = 0.31, 95% CI [0.21, 0.42]). The result showed that we successfully manipulated participants' norm perception.

Hypothesis testing

Figure 2 shows score distributions of the behavioral intention to donate blood in each condition. To test our hypotheses, we conducted a two-way ANOVA with the norm conditions and eye conditions as independent variables, and the behavioral intention of donating blood as the dependent variable. The analysis showed a significant main effect of norm condition (F (1, 1381) = 8.71, p < .01, generalized η^2 = .006, 95% CI [.001, .017]), and non-significant effects of eye condition (F (1, 1381) = 0.01, p = .92, generalized η^2 = .000, 95% CI [.000, .002]) and their interaction (F (1, 1381) = 2.90, p = .09, generalized η^2 =.002, 95% CI [.000, .010]). Participants who read the pro-donation essay reported significantly higher intentions of donating blood than those who read the neutral essay, supporting H2. However, neither the main effect of the eye-like image nor the effect of the interaction between eye condition and norm condition on the behavioral intention of donating blood were significant. Thus, H1 and H3 were not supported.

Exploratory analysis

First, to investigate the effect of participants' past experience of donating blood, we conducted a two-way ANCOVA with eye and norm conditions as independent variables, the experience of donating blood (dummy variable: 0 = never, 1 = once or more) as the covariate[1], and the behavioral intention of donating blood as the dependent variable. Before the analysis, we excluded data from 57 participants who did not report their experience of donating blood or answered the relevant question as "I don't know." The result showed significant effects of norm condition (F (1, 1323) = 10.82, p < .01, generalized η^2 = .008 95% CI [.001, .020]) and past experience of donating

[1] For simplicity, we merged two answers "once" and "twice or more" in the question about the experience into "once or more"; "one" and "two or more" in the question about the existence of others into "one or more."

blood (F (1, 1323) = 265.04, p < .001, generalized η^2 = .167, 95% CI [.133, .203]), and non-significant effects of eye condition (F (1, 1323) = 0.01, p = .91, generalized η^2 = .000, 95% CI [.000, .002]) and interaction (F (1, 1323) = 1.01, p = .32, generalized η^2 = .001, 95% CI [.000, .007]). Participants who have experience of donating blood reported significantly higher intention to donate blood than those who do not have such experience. The effect of eye condition and interaction between eyes and norms were not significant.

Second, to examine the possibility that the watching-eyes effect was absent because some participants were with other people during the experiment, we conducted a three-way ANCOVA with eye and norm conditions and whether participants were with other people during the experiment (dummy variable: 0 = no, 1 = yes) as independent variables[1], the experience of donating blood as the covariate, and the behavioral intention of donating blood as the dependent variable. We excluded data from 8 participants who answered the question about the existence of other people as "I don't know." The result showed significant effects of norm condition (F (1, 1311) = 9.72, p < .01, generalized η^2 = .007, 95% CI [.001, .019]), past experience of donating blood (F (1, 1311) = 265.77, p < .001, generalized η^2 = .169, 95% CI [.134, .205]), and three-way interaction (F (1, 1311) = 4.76, p = .03, generalized η^2 = .004, 95% CI [.000, .013]). Post-analysis showed that the interaction between eyes and norms was significant among participants who participated in the presence of one or more people (F (1, 253) = 5.80, p = .02, generalized η^2 = .022, 95% CI [.001, .070]), but it was not among those who participated alone (F (1, 1057) = 0.04, p = .85, generalized η^2 = .000, 95% CI [.000, .004]). For those who participated in the experiment with other people, the eye-like images significantly increased the behavioral intention of donating blood in the neutral essay condition (Eye: M = 4.23, SD = 1.35, Control: M = 3.59, SD = 1.44; F (1, 120) = 8.38, p < .01, generalized η^2 = .065, 95% CI [.007, .166]) whereas the effect of the eye condition was not significant in the pro-donation essay condition (Eye: M = 4.12, SD = 1.45, Control: M = 4.48, SD = 1.43; F (1, 132) = 2.29, p = .13, generalized η^2 = .017, 95% CI [.000, .084]).

Discussion

Overall, we failed to replicate the watching-eyes effect despite using a considerably larger sample than previous studies. The effect of the eye-like image was not significant regardless of whether there was a pro-blood donation norm. We discuss below possible explanations for this null finding.

First, it is possible that the study design caused the null results. We conducted the experiment online using a crowdsourced sample. Some previous studies on the watching-eyes effect that used large crowdsourced samples similar to the present study also reported a null effect of eye-like images (e.g., Raihani & Bshary, 2017; Saunders et al., 2016). Therefore, it is possible that the effect is hard to replicate in online experiments. It is known that participants recruited from crowdsourcing platforms tend to try to finish tasks as soon as possible (*satisficing*). Although the percentage of participants who failed the attention check was quite low in this experiment (1.6%), we cannot completely exclude the possibility that some participants did not fully attend when participating in the experiment. Indeed, the median time spent on the page containing questions about the behavioral intention of donating blood and eye manipulation was only 16.0 seconds in this experiment. It is possible that the effect was absent because participants did not pay attention to the eye stimuli. One possible solution is asking participants to choose an image they saw in the experiment as a post-experimental questionnaire and excluding data from those who chose incorrect stimuli. On the other hand, some evidence suggests that the watching-eyes effect likely emerges when exposure to the eye-like stimulus is relatively short (Sparks & Barclay, 2013). Future research needs to investigate the precise length of exposure to eye-like stimuli that produces the effect. In addition, our use of the behavioral intention of donating blood as a dependent variable may have concealed the effect. As blood donation entails high physical and time costs, eye-like images may be insufficient to promote blood donation. To the best of our knowledge, only one study has investigated the watching-eyes effect on blood donation (Sénémeaud et al., 2017). More research is needed to explore the possibility that the occurrence of the effect depends on the type of prosocial behavior. Furthermore, the eye-like image we used was originally created in this study. Although various types of eye-like images are reported to give rise to the watching-eyes effect (e.g., Baillon et al., 2013; Rigdon et al., 2009), it is still possible that the use of the newly developed stimuli caused the null result.

Second, the existing evidence for the watching-eyes effect may reflect false positive results. As in the present study, several recent large-sample studies on the effect have reported replication failure (e.g., Raihani & Bshary, 2017). It is possible that the first studies to report the watching-eyes effect were due to α error, and that claims for the effect reflect publication bias.

Finally, and most importantly, the watching-eyes effect may appear only in specific contexts. The results of our exploratory analysis are consistent with this notion. The analysis indicated that the eye-like image strengthened the behavioral intention of donating blood among participants who (1) read the neutral essay and (2) participated with someone in the same room. Although the influence of (1) was in the opposite direction to our prediction, a possible interpretation is that the watching-eyes effect was undetectable when participants first read the pro-donation essay because either the salience of social norms or the eye-like image (but not both) affect the behavioral intention to donate blood. Regarding (2), as mentioned above, some researchers have argued that the watching-eyes effect is weaker when participants make decisions in the presence of other people because of habituation to being watched (e.g., Bateson et al., 2013; Oda, 2019). Conversely, other researchers claim that the effect is attenuated when participants are alone because there is no real possibility of being watched and evaluated by others (e.g., Raihani & Bshary, 2017; Tane & Takezawa, 2011). Our results seem to support the latter claim. Future research should examine the effect of this factor to confirm this assumption.

Acknowledgments

We would like to thank Kengo Nawata, Yugo Maeda, and an anonymous reviewer for their useful comments. We thank Daiichiro Kuroki for the technical support. We thank Diane Williams from Edanz (https://jp.edanz.com/ac) for editing a draft of this manuscript.

Author contribution

KO and YM developed the study concept. HY advised on the study protocol. KO collected and analyzed data and drafted the manuscript. YM and HY proofread the manuscript.

Ethical statement

The protocol of this study was approved by the ethical committee of Kyushu University (approval no. 2022-033).

Data accessibility & program code

Data and the analysis code are available on the OSF (https://osf.io/de6j2/files/osfstorage).

Supplementary material

The materials we used in the experiment are available on the OSF (https://osf.io/de6j2/files/osfstorage).

References

Baillon, A., Selim, A., & van Dolder, D. (2013). On the social nature of eyes: The effect of social cues in interaction and individual choice tasks. *Evolution and Human Behavior*, *34*(2), 146–154. https://doi.org/10.1016/j.evolhumbehav.2012.12.001

Bateson, M., Callow, L., Holmes, J. R., Redmond Roche, M. L., & Nettle, D. (2013). Do images of "watching eyes" induce behaviour that is more pro-social or more normative? A field experiment on littering. *PloS One*, *8*(12), Article e82055. https://doi.org/10.1371/journal.pone.0082055

Ben-Shachar, M. S., Lüdecke, D., & Makowski, D. (2020). effectsize: Estimation of effect size indices and standardized parameters. *Journal of Open Source Software*, *5*(56), Article 2815. https://doi.org/10.21105/joss.02815

Bourrat, P., Baumard, N., & McKay, R. (2011). Surveillance cues enhance moral condemnation. *Evolutionary Psychology*, *9*(2), Article 147470491100900206. https://doi.org/10.1177/147470491100900206

Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology*, *58*(6), 1015–1026. https://doi.org/10.1037/0022-3514.58.6.1015

de Leeuw, J. R. (2015). jsPsych: A JavaScript library for creating behavioral experiments in a web browser. *Behavior Research Methods*, *47*(1), 1–12. https://doi.org/10.3758/s13428-014-0458-y

Farley, S. D., & Stasson, M. F. (2003). Relative influences of affect and cognition on behavior: Are feelings or beliefs more related to blood donation intentions? *Experimental Psychology*, *50*(1), 55–62. https://doi.org/10.1027//1618-3169.50.1.55

Fathi, M., Bateson, M., & Nettle, D. (2014). Effects of watching eyes and norm cues on charitable giving in a surreptitious behavioral experiment. *Evolutionary Psychology*, *12*(5), Article 147470491401200502. https://doi.org/10.1177/147470491401200502

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior research methods*, *39*(2), 175–191. https://doi.org/10.3758/BF03193146

Haley, K. J., & Fessler, D. M. T. (2005). Nobody's watching?: Subtle cues affect generosity in an anonymous economic game. *Evolution and Human Behavior*, *26*(3), 245–256. https://doi.org/10.1016/j.evolhumbehav.2005.01.002

Kawamura, Y., & Kusumi, T. (2017). The norm-dependent effect of watching eyes on donation. *Evolution and Human Behavior*, *38*(5), 659–666. https://doi.org/10.1016/j.evolhumbehav.2017.05.003

Maniaci, M. R., & Rogge, R. D. (2014). Caring about carelessness: Participant inattention and its effects on research. *Journal of Research in Personality*, *48*, 61–83. https://doi.org/10.1016/j.jrp.2013.09.008

Matsugasaki, K., Tsukamoto, W., & Ohtsubo, Y. (2015). Two failed replications of the watching eyes effect. *Letters on Evolutionary Behavioral Science*, *6*(2), 17–20. https://doi.org/10.5178/lebs.2015.36

Nettle, D., Harper, Z., Kidson, A., Stone, R., Penton-Voak, I. S., & Bateson, M. (2013). The watching eyes effect in the dictator game: It's not how much you give, it's being seen to give something. *Evolution and Human Behavior*, *34*(1), 35–40. https://doi.org/10.1016/j.evolhumbehav.2012.08.004

Northover, S. B., Pedersen, W. C., Cohen, A. B., & Andrews, P. W. (2017). Artificial surveillance cues do not increase generosity: Two meta-analyses. *Evolution and Human Behavior*, *38*(1), 144–153. https://doi.org/10.1016/j.evolhumbehav.2016.07.001

Nowak, M. A., & Sigmund, K. (2005). Evolution of indirect reciprocity. *Nature*, *437*(7063), 1291–1298. https://doi.org/10.1038/nature04131

Oda, R. (2019). Is the watching-eye effect a fluke? *Letters on Evolutionary Behavioral Science*, *10*(1), 4–6. https://doi.org/10.5178/lebs.2019.68

Oda, R., & Ichihashi, R. (2016). Effects of eye images and norm cues on charitable donation: A field experiment in an izakaya. *Evolutionary Psychology*, *14*(4), Article 1474704916668874. https://doi.org/10.1177/1474704916668874

Oda, R., Kato, Y., & Hiraishi, K. (2015). The watching-eye effect on prosocial lying. *Evolutionary Psychology*, *13*(3), Article 1474704915594959. https://doi.org/10.1177/1474704915594959

Open Science Collaboration. (2015). Estimating the reproducibility of psychological science. *Science*, *349*(6251), Article aac4716. https://doi.org/10.1126/science.aac4716

R Core Team. (2021). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org/

Raihani, N., & Bshary, R. (2017). Eye images do not promote prosocial behaviour or norm compliance in an online dictator game. *PsyArXiv*. https://doi.org/10.31234/osf.io/7a8ft

Revelle, W. (2023). *psych: Procedures for psychological, psychometric, and personality research*. Northwestern University, Evanston, Illinois. R package version 2.3.3, https://CRAN.R-project.org/package=psych

Rigdon, M., Ishii, K., Watabe, M., & Kitayama, S. (2009). Minimal social cues in the dictator game. *Journal Of Economic Psychology*, *30*(3), 358–367. https://doi.org/10.1016/j.joep.2009.02.002

Rotella, A., Sparks, A. M., Mishra, S., & Barclay, P. (2021). No effect of "watching eyes": An attempted replication and extension investigating individual differences. *PloS One*, *16*(10), Article e0255531. https://doi.org/10.1371/journal.pone.0255531

Saunders, T. J., Taylor, A. H., & Atkinson, Q. D. (2016). No evidence that a range of artificial monitoring cues influence online donations to charity in an MTurk sample. *Royal Society Open Science*, *3*(10), Article 150710. https://doi.org/10.1098/rsos.150710

Sénémeaud, C., Sanrey, C., Callé, N., Plainfossé, C., Belhaire, A., & Georget, P. (2017). The watching-eyes phenomenon and blood donation: Does exposure to pictures of eyes increase blood donation by young adults? *Transfusion and Apheresis Science*, *56*(2), 168–170. https://doi.org/10.1016/j.transci.2016.11.001

Sparks, A., & Barclay, P. (2013). Eye images increase generosity, but not for long: The limited effect of a false cue. *Evolution and Human Behavior*, *34*(5), 317–322. https://doi.org/10.1016/j.evolhumbehav.2013.05.001

Tane, K., & Takezawa, M. (2011). Perception of human face does not induce cooperation in darkness. *Letters on Evolutionary Behavioral Science*, *2*(2), 24–27. https://doi.org/10.5178/lebs.2011.15