



Attractiveness qualifies the effect of observation on trusting behavior in an economic game

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Abstract

Recent studies show that subtle cues of observation affect cooperation even when anonymity is explicitly assured. For instance, recent studies have shown that the presence of eyes increases cooperation on social economic tasks. Here, we tested the effects of cues of observation on trusting behavior in a two-player Trust game and the extent to which these effects are qualified by participants' own attractiveness. Although explicit cues of being observed (i.e., when participants were informed that the other player would see their face) tended to increase trusting behavior, this effect was qualified by the participants' other-rated attractiveness (estimated from third-party ratings of face photographs). Participants' own physical attractiveness was positively correlated with the extent to which they trusted others more when they believed they could be seen than when they believed they could not be seen. This interaction between cues of observation and own attractiveness suggests context dependence of trusting behavior that is sensitive to whether and how others react to one's physical appearance.

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1. Introduction

Many classic theories of social exchange assume that individuals are “rational” money or resource maximizers (Colman, 2003). Thus, under conditions of anonymity, individuals are expected to behave in purely self-interested ways (Colman, 2003). However, recent studies have shown that people act as if they value the welfare of others or are concerned with reputational consequences, even when interactions are one-shot and anonymity is explicitly assured (Barclay, 2006; Bateson, Nettle, & Roberts, 2006; Burnham & Hare, 2007; DeBruine, 2002; Fehr & Fischbacher, 2004; Fehr & Gächter, 2002; Haley & Fessler, 2005; Krupp, DeBruine, & Barclay, 2008). For example, in an anonymous, one-shot Ultimatum game, participants are given a sum of

money and told to divide it between themselves and a second player in any way (i.e., it is possible to offer the second player nothing). The second player knows the initial amount to be split and can then accept or reject the first player's offer; if the offer is accepted, both players receive the agreed amount, but if the offer is rejected, both players receive nothing. A money-maximizing strategy suggests that the first player will offer a very low amount because the second player should accept any amount (as they will receive nothing if they reject). In most cases, however, first player offers fall between 30% and 50% of the total amount even when the interaction is anonymous, suggesting a degree of altruism towards individuals with no possible reputational gain in return (see Gintis, Bowles, Boyd, & Fehr, 2003).

Subtle cues of observation also appear to have an effect on individuals' cooperation. One such cue of implicit observation, the presence of pictures of human eyes, has been shown to substantially increase instances of monetary cooperation in individuals (Bateson et al., 2006). Bateson et al. (2006) modified a notice that asked individuals to

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deposit money into a fund box when they used a communal coffee supply. In one condition, the notice included a graphic of human eyes, while in the other condition, the notice included a graphic of flowers. Levels of generosity were almost three times greater when the eye graphic was present. Bateson et al. suggested that this effect of apparent observation occurred because the presence of human eyes triggers behavioral responses that may function to increase an individual's reputation as a cooperative partner. Increased generosity has also been shown to occur when the cue of observation is a mechanical face with large, human-like eyes (Burnham & Hare, 2007) or when the cue is simply an image of stylized, cartoon eyes (Haley & Fessler, 2005).

In Haley and Fessler's (2005) study, participants made economic decisions in the presence of either a computer background with stylized eyes (eyes-present condition) or a control background. Participants were anonymously paired in order to play the Dictator game, a decision-making task where one player is given a sum (in this case US\$10) and told that he or she can allocate any amount of it to the other player and can then keep the remainder. Players in the eyes-present condition allocated significantly more money than players in the control condition. In addition to this, a significantly higher number of participants in the eyes-present condition (88%) donated at least US\$1, as compared to the control condition (55%). This study presents further evidence that subtle cues associated with being observed can affect cooperative behavior.

All of the studies above used faces or parts of faces as a cue of observation (Bateson et al., 2006; Burnham & Hare, 2007; Haley & Fessler, 2005). However, such effects may be induced by non-face cues, such as explicit information that one is being observed (e.g., Kurzban, DeScioli, & O'Brien, 2007). In light of this, our study evaluated the effects of whether participants could see an image of their game partner's face and whether participants believed that their image would be seen by that game partner during interactions in a two-player economic game: the Trust game (Berg, Dickhaut, & McCabe, 1995; DeBruine, 2002; McCabe, Rassenti, & Smith, 1996). If the presence of a face or eyes is sufficient to induce cooperative behavior, we would expect that individuals who can see their game partner will make a greater number of trusting decisions than those who cannot see their game partner, regardless of whether their own face will be seen. However, if the concept of being observed is critical, individuals who believe that their image will be seen by their game partner will make a greater number of trusting decisions than those who believe that their image will not be seen, regardless of whether they can see their game partners' face.

Individuals tend to act in a more positive manner towards those people that they consider physically attractive, despite the fact that attractive individuals exhibit less trustworthiness than others expect of them (Andreoni & Petrie, 2008; Wilson & Eckel, 2006). Additionally, attractive individuals are often automatically ascribed positive attributes such as honesty,

trustworthiness, independence, and sociability (e.g., Dion, Berscheid, & Walster, 1972; Feingold, 1992). Consequently, we also examined trusting decisions in relation to the attractiveness of the individual making the initial decision. We predicted that the effects of observation on trusting behavior would be qualified by the attractiveness of the individual, such that more attractive individuals will be more willing to trust game partners who can observe them, while relatively unattractive individuals will be less willing to trust game partners who can observe them. Because people are more likely to behave in a trusting manner towards attractive game partners than unattractive game partners (Wilson & Eckel, 2006), we controlled for such effects by counterbalancing the identities of seen game partners between participants.

We defined attractiveness using both self-rated attractiveness (SRA) and other-rated attractiveness (ORA). If an effect of attractiveness is mediated primarily by a strategic decision involving beliefs about one's own attractiveness and its effects on others' behavior, then an effect of observation on trusting behavior should be qualified by SRA. However, if an effect of attractiveness is mediated primarily by previous experience of others' behavior towards oneself, then an effect of observation on trusting behavior should be qualified by ORA but not necessarily SRA.

2. Methods

Seventy-eight first-year psychology students from the University of Aberdeen (25 male, 53 female; mean age=19.1 years, S.D.=1.46) completed eight different rounds of the Trust game at individual isolated computer booths. There were four within-subjects conditions of visibility, which were repeated for male and female second players. In the "implicit and explicit observation" condition, participants were told that they would be visible to a second player, who was also visible to the participants. In the "explicit observation only" condition, participants were told that they would be visible to a second player, who was not visible to the participants. In the "implicit observation only" condition, participants were told that they would not be visible to a second player, who was visible to the participants. In the "no observation" condition, participants were told that they would not be visible to a second player, who was also not visible to the participants.

The sex of the second player and the visibility of both players in relation to one another were reinforced by a text prompt at the top of each screen on which the player could make his or her decision. In the four trials where the second player's face was visible, two male and two female faces with neutral expression were used (these individuals were from a different university and matched to the age range of participants). The identities were fully counterbalanced among the conditions where the second player was visible to the participants. In the cases where the second player was not visible, a simple silhouette was used in place.

2.1. The Trust game

The particular Trust game used in this experiment consisted of two decisions that were made in sequence (i.e., not simultaneously). The first player makes the first decision to trust or not to trust the second player to split a sum of money. The second player makes the second decision to respond to the first player's trust with a selfish or unselfish split of the money. The first player can either gain or lose money by trusting the second player. This game is widely used in experimental economic games in order to assess trust and its reciprocation (e.g., DeBruine, 2002; Scharlemann, Eckel, Kacelnik, & Wilson, 2001).

Before the trials began, participants were informed that they would be playing for real money and that they would receive the outcome of one randomly selected round. They were also informed that they would interact with each second player only once and would be very unlikely to know the second players (i.e., interactions were anonymous). Participants played with what were ostensibly eight different playing partners online at other universities, but in fact, the second player did not exist. As the attractiveness of the second player would likely be very important under these circumstances, we eliminated the possibility of this becoming a confounding variable through controlling the identities of the individuals that every participant interacted with. This also allowed us to garner a genuine response from the participant while controlling for any potential confounding effects of the behavior or appearance of the second player. Although the use of deception in economic game experiment is debated, many researchers argue that this type of deception is scientifically justified (Cook & Yamagishi, 2008).

Participants' choices were scored as trusting or non-trusting. At a later date, when all participants had completed the experiment, participants were paid the maximum amount attainable (£4 GBP), as real monetary rewards based on their actions during the game-play had been promised at the beginning of each session.

Participants were informed that they would be playing the Trust game with individuals at another university. The pay structure of the game was also detailed in instructions before the trials began, and the participants were made aware that they were playing this game for real monetary gain. The participants then viewed the eight trials in random order.

2.2. Attractiveness

SRA was assessed via self-ratings on a 7-point Likert scale with the end points *much less attractive than average* (1) and *much more attractive than average* (7). This rating task was embedded in a questionnaire included in a block of additional tasks, so that no connection would be made to the Trust game. This method for assessing SRA has been used in several previous studies (Jones et al., 2005; Little, Burt, Penton-Voak, & Perrett, 2001) and correlates with ORA (Penton-Voak et al., 2003).

ORA was assessed by 10 independent raters (5 male and 5 female, mean age=28.4 years, S.D.=4.63) who rated each participant's face photograph on a 7-point scale (1=*very unattractive*, 7=*very attractive*). Inter-rater agreement was very high ($\alpha=.950$). ORA was positively correlated with SRA ($r=.274, p=.015$).

3. Results

Data were analyzed using a mixed-design ANCOVA with sex of participant (male or female) as a between-subjects factor and sex of face (same sex or opposite sex), visibility of participant (visible to game partner or not visible to game partner), and visibility of game partner (visible to participant or not visible to participant) as within-subjects factors. SRA and ORA were included as covariates. Two-tailed p values are reported for all analyses.

Our analysis revealed a main effect of visibility of the participant [$F(1,74)=7.08, p=.010$] that was qualified by a significant interaction with ORA [$F(1,74)=5.80, p=.019$]. The effect of visibility of the participant did not interact with SRA [$F(1,74)=1.11, p=.30$]. The only further significant effect was an interaction between sex of face and visibility of game partner [$F(1,74)=4.08, p=.047$], whereby the game partner being invisible resulted in decreased trusting behavior to a greater extent for same-sex game partners than for opposite-sex game partners (see Fig. 1). All other main effects and interactions were nonsignificant, including the main effect of visibility of game partner [$F(1,74)=0.09, p=.76$].

To interpret the significant interaction between visibility of participant and ORA, we calculated a score to represent the difference in behavior towards game partners when game partners were visible versus when game partners were not visible. This score was the sum of the four trials where game partners were visible minus the sum of the four trials

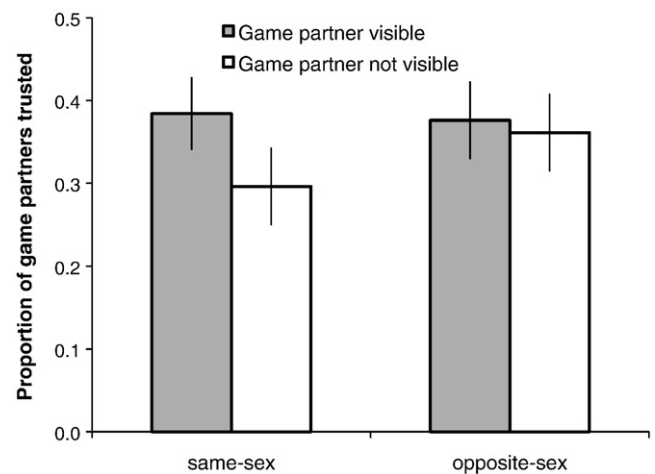


Fig. 1. The proportion of trials on which trusting decisions were made by the participant; these scores are based on the visibility of the second player and the sex of that second player (same sex as participant or opposite). Bars show means and standard errors of the means.

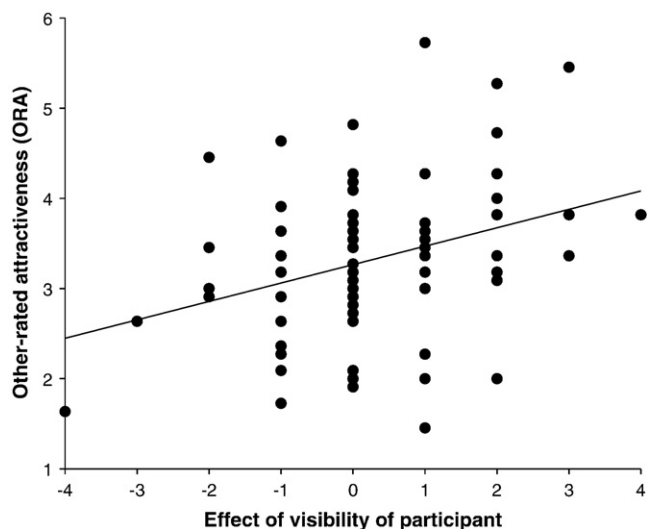


Fig. 2. Positive relationship between ORA and the effect of visibility of the participant, calculated as the number of trusting decisions made when the participants believed that they would be seen minus the number of trusting decisions made when the participants believed that they would not be seen.

where game partners were not visible. This new variable correlated positively with ORA ($r=.32$, $p=.004$), indicating that more attractive participants were more likely to increase their trusting behavior towards seen versus unseen game partners (Fig. 2).

4. Discussion

As we predicted, the effects of explicit observation on trusting behavior were qualified by the attractiveness of the participant. The extent to which participants trusted game partners who could see them more than game partners who could not see them was positively related to their attractiveness as judged by third parties. Because we counterbalanced the identities of the seen game partners between conditions with and without explicit observation, this effect cannot be due to previously reported effects of the attractiveness of the game partner (Andreoni & Petrie, 2008; Wilson & Eckel, 2006).

By contrast with our findings for ORA, SRA (when controlling for ORA) did not predict trusting behavior. This finding suggests that the interaction between explicit observation and ORA is unlikely to reflect a conscious strategy whereby people consider the effect of their own physical appearance on others' behavior before making trusting decisions. Previous social experience of others' responses when physical appearance is or is not apparent, such as interactions in person versus on the phone, may lead to nondeliberate behavioral strategies for economic social interactions.

Several lines of evidence support the proposition that people are more cooperative with attractive individuals. The "halo" effect (Dion et al., 1972) suggests that people presume that attractive individuals are trusting and trust-

worthy. People also treat attractive individuals more favorably than unattractive individuals, including giving greater amounts of cooperation (see Langlois et al., 2000, for a meta-analysis). Within the domain of economic games, several studies have demonstrated that people are more generous to, and cooperative with, attractive partners (Andreoni & Petrie, 2008; Hancock & DeBruine, 2003; Mulford, Orbell, Shatto, & Stockard, 1998; Wilson & Eckel, 2006). Thus, first players' strategies that are contingent on their own attractiveness and whether their appearance will be observed by their game partner may be rational responses to the average behavior of others, especially in the absence of the potential for punitive sanctions by aggrieved social partners (Andreoni & Petrie, 2008; Wilson & Eckel, 2006).

In our study, the presence of a face or eyes (i.e., the visibility of the second player) was not sufficient to induce an increase in cooperative behavior, as we would have expected if this implicit visual cue was enough to infer a state of observation. While Burnham and Hare (2007) and Haley and Fessler (2005) showed that implicit cues of observation (i.e., human-like eyes) affected social economic interactions (where the pro-social trait of generosity was under investigation), here we did not find an effect of implicit cues. However, our study differs from these previous studies in several ways. In earlier work, the individual participant was the only person who could affect the outcome of the interaction (or, in the case of Burnham & Hare, the decision was made simultaneously). In our study, however, participants' decisions are dependent on the predicted behavior of another individual. This may make explicit cues more salient than implicit cues. Furthermore, instead of eyes versus a non-face stimulus (e.g., flowers or neutral background, Bateson et al., 2006; Haley & Fessler, 2005), we compared the presence of a face with that of a silhouette, which may be more of an implicit cue of observation than a non-face stimulus. However, if explicit information overrides implicit cues of observation, our findings would be entirely compatible with those of these earlier studies.

In conclusion, our findings suggest that an individual's physical attractiveness qualifies the effect of observation on his or her trusting behavior. Attractive individuals are more likely to trust others when they believe that they can be seen than are relatively unattractive individuals. This sensitivity to both one's own attractiveness and cues of observation suggests context dependence of trusting behavior that reflects whether and how others react to one's physical appearance.

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