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RESEARCH ARTICLE

Focused Attention is Crucial in Promoting Prosocial Behavior: An Interdisciplinary Perspective from Optometry and Psychology

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ABSTRACT

Background: Evolutionary psychology research suggests that eye images alone could promote prosocial behaviour.
Objectives: To determine whether an active observation of the eyes is necessary to effectively promote prosocial behaviour or not.
Methodology: A multicentred cross sectional study was conducted to examine the effect of visual images on prosocial behaviour using purposive a non-probability sampling technique. An optometrist performed a thorough eye examination to evaluate the visual health and screen out any probable vision issues. a psychological assessment was conducted to screen for psychological disorders, guaranteeing that the trial would only involve healthy participants. One of three situations was demonstrated to each participant while they had to type a specific 15-letter word: an image of monitoring eyes (direct stare), an image of non-looking eyes (averted gaze), or an image of flowers (which served as the control condition). Participants were given a rigorous cognitive activity to complete after being exposed to the stimuli, which involved choosing whether to help another individual.
Results: The study included a total of 30 candidate with mean age of 24.0 ± 2.20 years. Among the subjects, 26 (86.66%) people in the control group mistook when they saw the image of the flower, and 19 (63.33%) people failed when they saw images of averted eyes. It's interesting to note that when participants were shown photographs of direct staring eyes, just 2 (6.66%) out of 30 made mistakes. This implies that people who had a direct view made significantly less mistakes than people who had the other conditions. Surprisingly, only 12 people finished the task in the control condition, while 18 people finished with their sight averted. All completed the assignment with direct gaze. Individuals' emotional states such as enjoyable, nervous, anxious and natural was also associated with reminder of reputation in regards of different gazes.
Conclusion: Study concluded that direct gaze considerably enhances cognitive accuracy, when compared to averted gaze or control situations. The direction of gaze encountered influences emotional responses such as enjoyment, nervousness, anxious and being natural. The findings highlight the influence of social cues on emotional and cognitive states.

INTRODUCTION

Visual stimuli play a major role in human perception and information generation; the brain processes 90% of the information that comes from the eyes (Leopold and Park 2020). This emphasizes the importance of ocular stimuli in influencing human behavior and perception (Clark *et al.* 2022). Visual cues are crucial in forming cognition, emotions, and decision-making processes (Morelli *et al.* 2022; Alsharif *et al.* 2021). This emphasizes how crucial it

is to look at how different cognitive and social processes are impacted by visual pictures, such as eye contact (Kompatsiari *et al*. 2022; Grondin *et al*. 2023).

People be concerned about establishing a positive impression on those around them, and when individuals think that other people are paying attention and scrutinizing them, they are more likely to act in a prosocial manner (Berman *et al*. 2022; Cañigueral *et al*. 2019) People frequently act prosocially in public settings with the intention of acquiring an excellent reputation that would grant them access to favorable social resources like supporters or collaborators (Kafashan *et al*. 2014; Parks *et al*. 2013). Additionally, when anonymity is not a feasible choice, people frequently act in a prosocial manner toward others in order to avoid social consequences like social isolation that can arise from refusing to work together (Klein *et al*. 2021; Liu *et al*. 2021). Research studies reveal that processes that encourage reputation-based prosocial conduct can be triggered not just by real observers (Van Lange and Manesi 2023) but also by subtle cues that one is being watched, such as images of eyes or artificial symbols that mimic eyes (Nettle *et al*. 2013; Sparks and Barclay 2013).

Numerous in-person and virtual experiments have demonstrated that just the act of displaying images of eyes can enhance a number of cooperative behaviors, including (a) generosity (Baillon *et al*. 2013; Fathi *et al*. 2014) (b) supporting public goods (Burnham *et al*. 2007), (c) upholding social norms or criticizing moral violations (Bourrat *et al*. 2011; Manesi *et al.* 2015) and (d) supporting the preservation of endangered species (Oda *et al*. 2015). In the groundbreaking research, players in the dictator game were more likely to donate the moment they saw a pair of stylized eyes on their computer screens (Haley and Fessler 2005).

While it is evident that images of eyes are a deceptive indicator of surveillance (because no one is genuinely observing or assessing an individual's activity) (Northover 2014; Dear *et al*. 2019), most studies suggests that they are useful in removing the appearance of anonymity and regulating social behavior (Vaish *et al*. 2017; Solove 2021). Indeed, a study by Pfattheicher and Keller shows that seeing eyes might make one feel as though they are being watched. This implies that being watched should be important since it can help to improve prosocial behavior and act as a reminder of one's reputation (Pfattheicher and Keller 2015).

There are multiple reasons to expect watching eyes to elicit higher prosocial conduct than non-watching eyes. For example, direct looks have more power over people than averted ones (Kesner *et al*. 2018) . Faces that are staring are better at drawing attention, raising a person's heart rate, and triggering neurological reactions than faces that are averted (Kanbaty 2021). When subjected to direct gazes, studies have demonstrated higher activation in the fusiform gyrus (engaged in facial recognition), increased activity in the amygdala (which processes emotions and social cues), and heightened galvanic skin reactions (Gothard 2020; Rangarajan *et al*. 2014). The reason for this increased reaction is that people have a propensity to become more vigilant and aware when they think someone is watching them (Conty *et al*. 2016; Khalid *et al*. 2016).

This study's objective was to evaluate prosocial behavior in three scenarios: when a picture is displayed, direct gaze, averted gaze, and no gaze (as a control). Since direct eye gaze is highly sensitive in humans and eye contact plays a significant psychological role, it is expected that the "watching aspect" of eyes plays a key role in creating a sense of being watched. Therefore, compared to non-watching eyes (e.g., closed eyes or eyes turned away from the individual), concerns about one's reputation and the want to seek social approval through prosocial, cooperative acts are likely to be higher when watching eyes are present.

MATERIALS AND METHODS

The multicentred cross-sectional study used non-probability purposive sampling strategies to look into how visual representations affect prosocial behaviour. 30 subjects were recruited to come up with 15 to 35 years from a range of backgrounds. Each participant had a thorough eye exam to evaluate visual health performed by an optometrist prior to participation. The purpose of this phase was to rule out any confounding factors associated with vision impairments that might influence how visual stimuli are perceived. To make sure the subjects were psychologically healthy, a psychological evaluation was also performed to check for any underlying psychological disorders.

Participants in the experiment were randomized to three conditions with visual stimuli. The first condition, called Monitoring Eyes, includes looking at an image of direct eye contact. This condition usually makes people feel as though they are being watched or monitored. The Non-Looking Eyes condition, which involved showing participants an image of eyes that were turned away, may have suggested anonymity or a lack of inspection. Lastly, participants were shown a neutral image of flowers in the third condition, also referred to as the Control Condition. In order to evaluate the precise effect of eye contact on subsequent behaviour, this study used this condition as a baseline comparison versus the circumstances including eye stimuli. Trial/experimental photos used in a previous study were also used in this investigation (Manesi *et al*. 2016).

As a distractor take to divert their minds off the main goal, participants were given a specific 15-letter word to type after being exposed to the visual stimulus. Participants then took part in a demanding cognitive exercise intended for assessing prosocial behaviour. This activity probably included scenarios in which participants had to determine whether to assist a stranger, thereby evaluating their tendency for acts of generosity. The research method was conducted with adherence to ethical guidelines, informed permission and confidentiality. Participants' activities and

Table 1: Typing accuracy

Number of subjects	Direct gaze	Averted gaze	Control group
Mistake in typing	2 (6.66%)	19 (63.33%)	26 (86.66%)

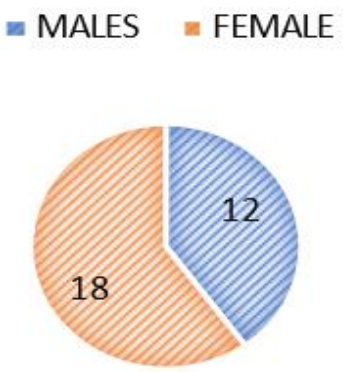

Fig. 1: Participants gender distribution

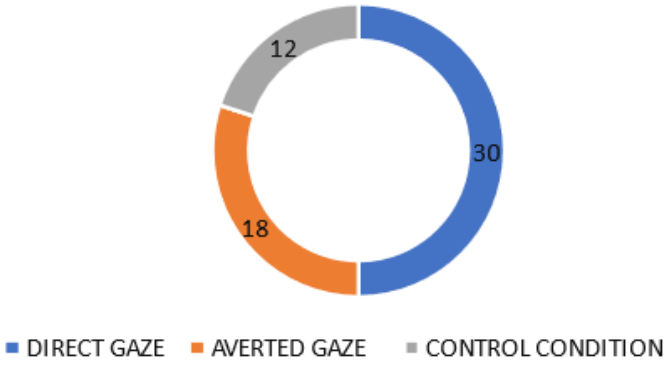

Fig. 2: Completion of task by individuals

responses in each condition were systematically noted and analysed. Using SPSS software, statistical methods like descriptive statistics and frequency distribution were used to carry out statistical analysis on the mean age, gender distribution, typing accuracy, frequency of task completion, and emotional status.

RESULTS

A total of 30 individuals in the study sample were included with a mean age of 24.0±2.20 and range of 15 to 35 years. The distribution of genders was 12 males and 18 females (Fig. 1). These demographic features were found by descriptive statistical analysis. Following an ophthalmological examination, all individuals showed emmetropia and best-corrected visual acuity of 6/6. The study excluded individuals with psychological conditions, so ensuring a sample of participants in good health.

Among the subjects, 26 (86.66%) people in the control group mistook when they saw the image of the flower, and 19 (63.33%) people failed when they saw images of averted eyes. It's interesting to note that when participants were shown photographs of direct staring eyes, just 2 (6.66%) out of 30 made mistakes (Table 1). This implies that people who had a direct view made significantly less mistakes than people who had the other conditions. These results suggest that the reminder of reputation comes from actively looking at a person rather than from any surrogate for social presence (like just the eyes).

The task completion rates among the thirty subjects differed depending on the gaze conditions. Remarkably, all individuals finished the task with direct observe, whereas 18 people finished it with averted gaze. By comparison, in the control condition, only 12 subjects finished the task; the remaining subjects opted not to finish it (Fig. 2). These results imply that social cues—direct gaze in particular—may improve task completion and engagement. The significant decline in task completion rates seen in the control condition suggests that the lack of social cues may have an impact on task involvement. These findings

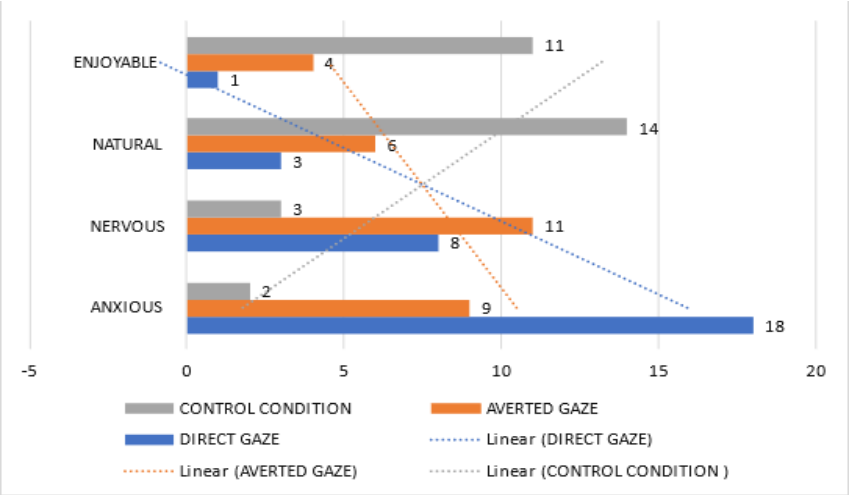

Fig. 3: Emotional status in different conditions

underline how crucial social context is in influencing behaviour and task performance, which calls for more research into the underlying mechanisms. All things considered, these comprehensive results demonstrate the varying impacts of gaze direction on task engagement and completion; direct gaze seems to increase motivation and task persistence in contrast to averted gaze or neutral stimuli.

Individuals' emotional states differed after completing tasks in three distinct conditions: direct gaze, averted gaze, and control condition. Of the participants in the direct stare condition, 8 felt nervous, 3 felt natural, and 8 felt anxious. On the other hand, 6 people reported feeling natural, 11 people felt anxious, and 9 people felt nervous when the gaze was diverted. In the control group, only 2 subjects reported feeling anxious, 3 reported being nervous, and 14 reported being casual/ natural. Interestingly, 11 participants in the control condition reported feeling enjoyable, compared to 1 in the direct gaze condition and 4 in the averted gaze condition. This puts the number of reports of feeling enjoyable at the greatest level. These findings imply that gaze direction may have an impact on post-task emotional states (Fig. 3).

DISCUSSION

In present study, of the 30 participants in the control group, 86.66% misunderstood the image of a flower, 63.33% made mistakes with their eyes averted, and only 6.66% made mistakes with their eyes directly staring. Remarkably, all completing the assignment with direct gaze, only 12 finished in control condition, and 18 finished with averted gaze. The results of this study demonstrate that the observing component of the eyes mitigates the effect of eye images on prosociality, contributing to and complementing the range of knowledge previously established about the eye images effect (Bateson *et al*. 2013; Dear 2018).

The current study provides evidence for the potential implementation of gaze detection techniques (Khan and Lee 2019) that look for the presence of the honest indicator of monitoring—that is, watching eyes—and if reputation is at uncertainty, hence validating previous hypotheses. The "eye images effect's" validity, however, is strongly debated, with conflicting results from different research pointing to different directions. Compared to pictures of flowers, exposure to images of inattentive eyes did not significantly promote prosocial behaviour. Although inattentive eyes could serve as a reminder of a person's social setting, they don't appear to have the same influence on prosocial tendencies as control stimuli (Teufel *et al*. 2009). This study indicates that while there is proof that inattentive eyes cause psychological effects and activate the social brain, they might not have the same impact on reputation-related worries and prosocial behaviour as attentive eyes. Instead of being closed or diverted, eyes must be actively monitoring in order to identify concerns about reputation. Replicating the study in a variety of demographics, investigating underlying mechanisms, carrying out longitudinal studies, putting the results to use in practical contexts, guaranteeing scientific rigor, taking cross-cultural viewpoints into account, and adhering to ethical standards are some of the recommendations.

Although the study offers insightful information, it should be noted that it has several limitations. Initially, employing a simulated task might not accurately represent prosocial behaviour in the real world. Furthermore, the specific setting and stimuli used could not accurately capture the complicated nature of social relationships. Additionally, the study does not examine individual differences or other moderating factors. To give a more thorough knowledge of the connection between gaze direction and prosocial behaviour, future research should address these shortcomings.

CONCLUSIONS

This study emphasizes how much direct gaze can improve cognitive accuracy and task completion rates compared to averted gaze or control conditions. When faced with direct eye contact, people are noticeably better at accurately typing and task completion. The direction of gaze encountered influences emotional responses such as enjoyment, nervousness, anxious and being natural. The findings highlight the influence of social cues on emotional and cognitive states. The prosocial activity may be facilitated by "eyes that pay attention" since they have the ability to break down the anonymity barrier. Results showed how important the observing part of the eyes is for making decisions in this situation.

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AUTHOR CONTRIBUTIONS

KJ: conceptualization, data collection, literature review; MJ:, writing – original draft , methodology; MS: formal analysis, writing – review and editing.

CONFLICT OF INTEREST

The authors affirm that they possess no conflicts of interest.

DATA AVAILABILITY

The data will be made available on a fair request to the corresponding author

ETHICS APPROVAL

Not applicable to this paper

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