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# The influence of personality on social attention

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ABSTRACT

The intersection between personality psychology and the study of social attention has been relatively untouched. We present an initial study that investigates the influence of the Big Five personality traits on eye movement behaviour towards social stimuli. By combining a free-viewing eye-tracking paradigm with canonical correlation and regression analyses, we discover that personality relates to fixations towards eye regions. Specifically, Extraversion and Agreeableness were related to greater gaze selection, while Openness to Experience was related to diminished gaze selection. The results demonstrate that *who* a person is affects *how* they move their eyes to social stimuli. The results also indicate that personality is a stronger factor in predicting social attention than past studies have suggested. Critical to the influence of personality on attention is the social situations viewers are placed in.



## 1. Introduction

Current theory suggests that people have an automatic tendency to attend to the eyes of social agents because they provide foundational information for understanding the intentions and internal states of others (see for a review, Shepherd, 2010). Stemming from this theory, researchers have explored the idea that individual differences in the capacity for social understanding may determine how people attend to social stimuli. For example, Bayliss, Pellegrino, and Tipper (2005) found that participants who scored higher on the Autism Quotient (AQ; Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001) had reduced cuing effects in a gaze-cuing paradigm.

This question about the relationship between the AQ and social attention has recently been extended beyond the gaze-cuing paradigm to how people select and attend to natural social stimuli. A recent study by Freeth, Foulsham, and Kingstone (2013) found that participants who had a higher AQ looked less at other people when they were depicted in a video, but in a live situation there was no relationship between the AQ scores and social attention. However, these results contradict previous findings that a higher AQ is correlated with reduced attention to individuals embedded in a real world situation, but not when people are depicted in video (Laidlaw, Foulsham, Kuhn, & Kingstone, 2011). While in general these studies support the theory that looking at the eyes of others is based on the need for social understanding, the conflicting findings involving the AQ suggest that it is not a particularly reliable indicator of the relationship between social attention and looking behaviour.

We think it would be premature to conclude from these particular AQ findings, however, that personality overall is not a strong determinant of social attention. Yet, researchers asking the question "where do people look" have rarely explored differences in *who* those people are. To the extent that individual differences have been investigated in the social attention literature, they largely concern gross physiological differences like gender, age, or clinical disorders (see for a review, Frischen, Bayliss, & Tipper, 2007). Other personality traits besides the AQ have not been explored systematically in relation to social attention. Therefore it may be that the AQ is simply one personality trait that is not a strong predictor of social attention, and it is not representative of the importance of other personality traits. Support for this view comes from questionnaire studies suggesting that the AQ is an independent personality dimension, not captured by other personality dimensions (Austin, 2005; Wakabayashi, Baron-Cohen, & Wheelwright, 2006), and from recent empirical investigations indicating that other traits, such as perceptual curiosity, are strongly related to exploratory looking behaviour (Risko, Anderson, Lanthier, & Kingstone, 2012). Therefore, the purpose of this investigation is to expand the literature on personality and social attention to determine whether personality traits other than the AQ can strongly predict social attention. To do this, we examined the influence of the most comprehensive personality model, the Big Five personality traits, on looking behaviour

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towards social stimuli, specifically the eye regions of static social scenes in a free-viewing paradigm.

The Big Five personality traits (also called the Five Factor Model) is the most widely-accepted personality model in psychology (Digman, 1990; Goldberg, 1990; John & Srivastava, 1999; McCrae & John, 1992). The Big Five personality traits are Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience. It has been used in many different fields of study outside of personality psychology, including clinical psychology (Samuel & Widiger, 2008), applied psychology (Zhao & Seibert, 2006), and neuroscience (DeYoung et al., 2010). The Big Five traits have revealed that "who one is" is a strong and pervasive predictor of human behaviour and cognition, from entrepreneurship (Zhao & Seibert, 2006) to artistic preference (Chamorro-Premuzic, Reimers, Hsu, & Ahmetoglu, 2009). Notably absent from the social attention literature is the use of the Big Five. Since the beginning, social attention research has focused on how external factors, like task demands, influence attention (Yarbus, 1967). Given that the Big Five appears to relate to so many aspects of human behaviour, it seems to be an excellent starting point for bringing together the literature on personality and social attention.

While no one has yet explored how the Big Five influences eye movements, there are some predictions that can be made based on prior personality and social attention research. A study by Berry and Hansen (2000) found that Extraversion, Agreeableness, and Openness to Experience were positively related to the quality of social interaction between female strangers in a spontaneous real-world situation where the dyads were left alone to interact for six minutes. Extraversion and Agreeableness were both positively related to the quality of the interaction as rated by the participants and third party observers. Moreover, Agreeableness and Openness were specifically related to the degree of visual contact between participants, and they mediated how third party observers rated the interactions. If the quality of social interaction is related to social understanding, and social understanding underlies attention towards eyes, then the three personality traits of Extraversion, Agreeableness, and Openness to Experience should be related to gaze selection. Agreeableness and Openness may be an especially strong predictor based on Berry and Hansen (2000)'s finding.

## 2. Methods

### 2.1. Participants

Fifty students from the University of British Columbia were given course credit or paid $5 to participate in the present study.

### 2.2. Stimuli

Thirty unique images featuring fractals, landscape, and human scenes were presented (10 of each type; fractals and landscapes were from Foulsham & Kingstone, 2010; human scenes were from Birmingham, Bischof, & Kingstone, 2008). Fractal and landscape scenes were used to investigate another research question unrelated to this study (see Wu, Anderson, Bischof, & Kingstone, in press). Human scenes involved pictures of three-people interacting (e.g., playing a board game), three-people not interacting, and scenes with just one person. In all images the models were seated in interior settings. Because both the number of people in a scene and the level of interaction can influence the amount of attention towards eye regions (Birmingham et al., 2008), a sampling from these scenes provided a reasonable average. The scenes were 1024 × 768 pixels, and corresponded to a horizontal visual angle approximating 42°, and a vertical visual angle approximating 33°.

### 2.3. Questionnaires

Each participant was asked to complete the 44-item Big Five Inventory (BFI; Benet-Martínez & John, 1998; John & Srivastava, 1999). This inventory is widely used in the literature, and has high internal reliability for each Big Five trait, ranging from $\alpha = .79$ to .88, with a mean $\alpha = .83$ (Benet-Martínez & John, 1998). This is comparable to other shortened Big Five questionnaires, but the BFI is considerably more efficient taking only five minutes to complete, and is also easier to understand (John & Srivastava, 1999).

### 2.4. Apparatus

An SR Research Eyelink 1000 eye-tracking system, recorded participants' eye movements at 1000 Hz. Stimuli were presented to participants on a 23" monitor. Scenes and eye movements were also presented to the experimenter on an adjacent monitor located in the testing room, relaying real-time feedback on system accuracy.

### 2.5. Procedure

Participants were seated 60 cm from the computer monitor, with their heads positioned in a chin rest. Participants were told to freely view each image as they would normally. Images were presented for 10 s. Participants viewed 30 randomly ordered images before being asked to complete the questionnaires.

### 2.6. Data analysis

Interest areas were defined for the eye regions of the human scenes as was done in Birmingham et al. (2008). We quantified both the total amount of time participants spent looking at these eye regions, and the average duration of fixations in these eye regions. Previous results using these humans scenes showed that participants fixate more to the eyes than any other region in the scene (Birmingham et al., 2008). This tendency remained true across different tasks (e.g., free-viewing versus describing the picture), and across the amount of activity in the scene (e.g., whether people in the scene were interacting or not).

## 3. Results

### 3.1. Canonical correlation analysis

To investigate the relationship between the variable sets, personality and social attention, a canonical correlational analysis (Sherry & Henson, 2005) was conducted with the Big Five traits as the *predictor variables*, and the average fixation duration towards the eye region and the total time spent in the eye region of human scenes as the *dependent variables*. A canonical correlation creates synthetic predictor and dependent variables (i.e., variables extrapolated from direct measurement) using linear equations from the underlying variable sets (analogous to multiple regression). These two linear equations are created to yield the maximum possible correlation between the two synthetic variables. Canonical correlation analysis is advantageous when there are multiple predictor and dependent variables because it limits the possibility of a Type I error. As a multivariate technique, it does not require separate analyses for each dependent variable