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Is Empathizing intuitive and Systemizing deliberative?

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ABSTRACT

This is the first study to explore the relationship between Empathizing–Systemizing (E–S) theory that provides an account of sex differences in human cognition and dual process theories of cognition. 68 Undergraduates undertook both performance and self-report assessments of Empathizing, intuition, Systemizing and deliberation. A fast (500 ms) and slow (5000 ms) version of the Reading the Mind in the Eyes Task (RMET) was included to explore the effects of rapid presentation on emotional stimuli. Consistent with E–S theory, sex differences were found in Empathizing (favouring females) and Systemizing (favouring males). Females were also found to be more intuitive and males more deliberative for performance, but not self-report, assessments of intuition and deliberation. Empathizing significantly positively correlated with intuition and negatively with deliberation. Conversely, Systemizing significantly positively correlated with deliberation and negatively with intuition (trend). This pattern was replicated in a study of 65 participants from the general population. The exception was the RMET which had no significant sex differences or correlates (fast or slow). The implications for considering both dual process theories of cognition and E–S theory are discussed, with a focus upon the implications for Autism Spectrum Disorder and psychosis.

1. Introduction

Empathizing–Systemizing (E–S) theory proposes that individual differences in cognition and emotion processing can be classified along these two dimensions and that human sex differences can largely be explained by variation in mean levels of Empathizing (favouring females) and Systemizing (favouring males; Baron-Cohen, 2002, 2003, 2009). Empathizing relates to social processing and has been defined as the drive to identify and understand the thoughts and feelings of others and to respond to these with appropriate emotions (Baron-Cohen, 2002, 2003, 2009). Empathizing allows for the understanding of human behaviour that often does not conform to highly predictable rules. Empathizing has been conceived of a multidimensional construct comprising of different but related components of cognitive (e.g. perspective taking) and affective (e.g. empathic concern) empathy (Blair, 2005; Davis, 1983). Self-report assessments of Empathizing (the Empathizing Quotient) are agued to assess both cognitive and affective empathy, upon which females typically report higher levels of Empathizing than males (Baron-Cohen & Wheelwright, 2004; Wakabayashi et al., 2006). Behavioural assessments of cognitive empathy (the Reading the Mind in the Eyes Test) also typically demonstrate a female advantage (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001). Systemizing, on the other hand, relates to non-social processing and has been defined as the drive to analyse or build systems (Baron-Cohen, 2002, 2003, 2009). Systemizing allows one to predict the behaviour of a system and to control it. Self-report assessments of Systemizing (the Systemizing Quotient) and behavioural assessments (the Intuitive Physics Test) typically demonstrate a male advantage (Baron-Cohen, Richler, Bisarya, Gurunathan, & Wheelwright, 2003; Baron-Cohen, Wheelwright, Scahill, Lawson, & Spong, 2001; Wakabayashi et al., 2006). Empathizing and Systemizing are hypothesised to be normally distributed across the population with males characteristically having relatively greater Systemizing relative to Empathizing abilities and females characteristically having greater Empathizing relative to Systemizing abilities. In terms of mapping onto wider personality constructs, Empathizing has been found to significantly correlate with Agreeableness from the 'Big 5' (Costa & McCrae, 1992), though Systemizing has no correlates (Nettle, 2007). Whilst the general population vary along these two continua, extreme Systemizing relative to Empathizing and extreme Empathizing relative to Systemizing have been argued to have clinical implications, characterising Autism Spectrum Disorders (ASD) and psychosis respectively (Baron-Cohen, 2002; Brosnan, Ashwin, Walker, & Donaghue, 2010; see Crespi & Badcock, 2008).

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This is pertinent as in ASD, for example, it has been suggested that Systemizing strengths can compensate for Empathizing deficits (Rutherford & McIntosh, 2007; Walsh, Vida, & Rutherford, 2013). These authors provide evidence consistent with the hypothesis that those with ASD use explicit Systemizing strategies ('corners of mouth turned down, lowered eyebrows = sad') rather than the rapid Empathizing abilities typically used during emotion recognition tasks. The application of either Systemizing or Empathizing abilities to tasks potentially has parallels with dual process theories of human cognition. Dual-process accounts of human cognition suggest two distinct types of reasoning and decision-making; a fast 'intuition' that is independent of working memory and cognitive ability and a slower analytic-logical 'deliberation' that is heavily dependent on working memory and related to individual differences in cognitive ability (see Evans, 2008; Evans & Stanovich, 2013; Kahneman, 2011; Stanovich & West, 2000, 2008 for reviews). Rapid autonomous processes ('intuitive') are assumed to yield default responses unless intervened on by distinctive higher order reasoning processes ('deliberative'; Evans & Stanovich, 2013). Empathizing has been argued to be a rapid, automatic process requiring no effortful attention in the typical population whereas Systemizing has been argued to be a slower more deliberative process (e.g. Brosnan, Chapman, & Ashwin, 2014; Stone, Baron-Cohen, & Knight, 1998). Rapidly jumping to conclusions, for example, has been associated with higher levels of Empathizing and lower levels of Systemizing (Brosnan, Ashwin, & Gamble, 2013).

The potential relationship between Empathizing and intuition is most likely related to the emotion recognition component of empathy. Kahneman (2011: 19), for example, proposes that emotion recognition is an inherently intuitive process. Clark, Winkielman, and McIntosh (2008) argue the ability to rapidly and automatically extract emotional information feeds 'downstream' empathy processes and related social–emotional functioning. A number of studies have explored emotion recognition in both typically developing and ASD populations with limited stimuli exposure time. For example, Tracy, Robins, Schriber, and Solomon (2011) argue that under rapid time constraints, deliberative strategies such as Systemizing would fail (i.e. result in a lower emotion recognition) and would result in greater response times. The authors found that participants (ASD and typically developing) tended to show higher levels of emotion recognition accuracy when they responded more quickly. As such studies assess reaction time, typically a 2-choice decision is made (e.g. whether the target emotion is present or not). Rump, Giovannelli, Minshew, and Strauss (2009) presented stimuli for 500 ms after which participants were asked to select which emotion they had seen from a forced-choice of four options (or 'none'). The authors found decreased performance in all (ASD and typically developing) child and adolescent participants relative to an untimed pre-test. This was also the case in adult participants, although, unlike the younger participants, the adults with ASD underperformed relative to typically developing adults.

Despite potential similarities between a rapid, automatic, non-effortful Empathizing and intuition, no research to date has empirically explored this relationship, nor the relationship between Systemizing and deliberation. Sex differences indicating females registering as more intuitive and males registering as more deliberative have been reported for performance but not self-report, measures (e.g. Epstein, Pacini, Denes-Raj, & Heier, 1996; Frederick, 2005). This is the first study to explore both self-report and performance-based measures of Empathizing and Systemizing as well as intuition and deliberation. Given the potential significance of timing, the present study adjusted the performance measure of Empathizing to fast and slow presentations. Finally, to explore if a general impulsivity related to rapid responding, an index of impulsivity was also taken.

2. Methods

2.1. Participants

Participants were 68 undergraduate psychology students, 25 of whom were male. Participants were aged 17–24 years old (mean = 18.5, s.d. = 1.0). Participants undertook the assessments described below as part of a course requirement. All but one participant were native English speakers, and this one participant had an excellent level of English (International English Language Testing System level 7). The research was approved by the Departmental Ethics Committee which implements the ethical guidelines of the British Psychological Society.

2.2. Materials and methods

The following computer-based assessments were undertaken in a random order.

2.2.1. Intuition and deliberation

2.2.1.1. The Rational–Experiential Inventory (REI: Epstein et al., 1996) is the most widely used self-report assessment of intuition and deliberation. The short version contains 10 items, equally divided between intuitive and deliberative subscales. Respondents score each item on a 5-point scale, from 1 = completely false to 5 = completely true. Scores range from 5 indicating a low ability/engagement through to 25 indicating a high ability/engagement for each thinking style.

2.2.1.2. The Cognitive Reflection Task (CRT: Frederick, 2005) is a widely used 3-item performance measure of intuition and deliberation. Each question has a potentially intuitive and deliberative answer, as well as the potential for wrong answers. Scores can therefore range from 0 to 3 for each subscale. (Note, the intuitive response is a wrong answer.)

2.2.2. Empathizing and Systemizing

The short form of the Empathizing-Quotient (EQ: Wakabayashi et al., 2006) is a self-report questionnaire assessing Empathizing. This is a 22 item scale, scored zero for (strongly or slightly) disagreeing, one for slightly agreeing and two for strongly agreeing with items (some items are reversed). Potential scores ranged from 0 to 44. The short form of the Systemizing-Quotient (SQ: Wakabayashi et al., 2006) is a self-report questionnaire assessing Systemizing. This is a 25 item scale scored in the same way as the EQ, with potential scores ranging from 0 to 50.

2.2.2.1. The Reading the Mind in the Eyes Test (RMET: Baron-Cohen, Wheelwright, Hill, et al., 2001) is a widely used performance measure of Empathizing. The original format of the RMET presents a rectangle image containing the eye region of a face. A series of 36 images are presented, each surrounded with four emotion-related terms, one of which correctly characterised the expressed emotion. The task therefore requires the attribution of the relevant mental state to the image of the eyes but does not require any inferring of the content of the mental state (e.g. why they may be experiencing that mental state) nor an emotional response. The RMET therefore has been used to assess cognitive rather than affective empathy (e.g. van Honk et al., 2013). The RMET was adjusted so that the images were presented in 2 blocks of 18 images: fast and slow. Following Rump et al., the fast stimuli were presented for 500 ms and then removed as the 4 response options immediately appeared. The slow stimuli were presented in exactly the same manner but for 5000 ms each. The order of the blocks was randomised as was the images that went into the fast and slow blocks. Timing of responses was initiated as the response options appeared and terminated when the response was made by clicking