



# Individual differences in the intentionality bias and its association with cognitive empathy



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## ABSTRACT

Previous research indicates that we tend to over-attribute intention when interpreting the actions of others. This 'intentionality bias' is explained by a dual-process model of intention attribution (Rosset, 2008). However, it is currently unclear whether individual differences exist in the intentionality bias, and specifically whether cognitive and/or affective empathy skills are associated with hyper-intentionality. In the current study, we adopted Rosset's (2008) ambiguous sentence paradigm to test whether individual differences in the intentionality bias are associated with self-reported perspective taking, online simulation, emotion contagion, proximal responsivity and peripheral responsivity. Regression analyses revealed that cognitive empathy, but not affective empathy, significantly predicted the proportion of intentional judgements when participants were asked to interpret ambiguous sentences that were prototypically accidental. Moreover, greater perspective taking skills predicted a higher proportion of intentional over accidental judgements of ambiguous actions. The implications of these findings for understanding prosocial behaviour and 'shared intentionality' among humans are discussed.

## 1. Introduction

Discerning intentional from unintentional actions is a cornerstone of social cognition and fundamental to our social lives (Baldwin & Baird, 2001; Tomasello, Carpenter, Call, Behne, & Moll, 2005). We regularly need to interpret other people's behaviour and make decisions to act according to judgements of intentionality. For example, we might respond differently if we thought someone spilt a drink on us on purpose or if we thought it was an accident. We may hold someone accountable for an action if we deemed it to be intentional, but may exculpate them if we thought the action was unintentional (Malle & Knobe, 1997).

### 1.1. Intentionality bias

Recent research has revealed a common cognitive bias, characterised by the tendency to over-attribute intention when presented with ambiguous actions that could be interpreted as either intentional or unintentional (Moore & Pope, 2014; Peyroux, Strickland, Tapiero, & Franck, 2014; Rosset, 2008). It has been suggested that this *intentionality bias* is an adaptive cognitive heuristic as the risk of a false-positive error (reasoning that an action was intentional when it was in fact an accident) is lower than that of a false-negative error (reasoning that an action was accidental when it was in fact intentional), as the former allows us to act quickly in the case of an actual threat

(Moore & Pope, 2014).

A dual-process model of intention attribution, proposed by Rosset (2008), helps explain the intentionality bias. According to this model, intentional explanations for actions represent our default interpretation of behaviour, activated automatically when perceiving the actions of others. Unintentional explanations for behaviour are reached only when higher-level cognitive processes override this automatic bias allowing us to reason that an action may be unintentional. This higher-level processing stream uses knowledge of behavioural cues, alternative unintentional causes of behaviour and social norms (Rosset, 2008).

Evidence for the dual-process model was presented by Rosset (2008) who found that participants were more likely to judge ambiguous actions such as "He hit the man with his car" to be carried out "on purpose" rather than "by accident" when making these judgements quickly compared with participants who had more time. Making an intentional judgement quickly meant that participants had less time to override their initial interpretation of the action (Rosset, 2008). (However, it should be noted here that one study has failed to find higher intentionality bias scores under speeded versus unspeeded conditions, Hughes, Sandry, & Trafimow, 2012). Research has also demonstrated that alcohol intoxication magnifies the intentionality bias, presumably by disrupting effortful cognitive processing, such as inhibitory control, abstract reasoning and mental flexibility, that would typically be utilised to override the intentionality bias (Bègue, Bushman, Giancola,

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Subra, & Rosset, 2010).

Current research supports the dual process model of intentional reasoning and the existence of the intentionality bias in adults, however less is known about individual differences in this cognitive bias. It is unclear whether the tendency to over-attribute intention when interpreting the actions of others varies among individuals, and whether other cognitive or affective traits relate to the intentionality bias.

Exploring the intentionality bias in the context of *empathy* is a logical first step in understanding the individual differences in this cognitive heuristic given the theoretical link between mental state attribution and empathy (e.g. Bird & Viding, 2014; Shamay-Tsoory, Harari, Aharon-Peretz, & Levkovitz, 2010). Specifically, discerning intentional from unintentional actions requires theory-of-mind (ToM) skills (Brunet, Sarfati, Hardy-Baylé, & Decety, 2000) and a recent theoretical model of empathy by Bird and Viding (2014) posits that ToM plays a necessary role in empathy by allowing individuals to process situational cues to infer affective states in others. For example, to understand how a person feels in a given situation, ToM skills may be utilised to draw inferences about the person's desires and intentions to subsequently infer their affective state (Bird & Viding, 2014). Perspective taking skills are therefore likely used to attribute intentions to actions by way of predicting what a person might be feeling (Frith & Frith, 2006). In this way, the intentionality bias may reflect an overly sensitive intention attribution system, to which highly empathic individuals may be particularly prone.

The ability to empathise varies considerably among neurotypical individuals (Eisenberg & Strayer, 1987; Farrington & Jolliffe, 2001). Furthermore, the subcomponents of empathy, cognitive and affective empathy, are both clinically and neurally distinguished intra-individually (Cox et al., 2012). Therefore, the current study aimed to explore whether cognitive and affective empathy are related to individual differences in the intentionality bias using Rosset's ambiguous sentence paradigm.

### 1.2. Components of empathy

Empathy is a multifaceted construct that can be defined as the capacity to comprehend and vicariously experience the emotional states of others (Gallese, 2003). There is general agreement within the literature that empathy comprises two dissociable neurocognitive components: cognitive and affective empathy (e.g. Decety & Jackson, 2006; Gini, Albiero, Benelli, & Altoe, 2007; Jolliffe & Farrington, 2006; Lawrence, Shaw, Baker, Baron-Cohen, & David, 2004; Rankin, Kramer, & Miller, 2005; Reniers, Corcoran, Drake, Shryane, & Völlm, 2011; Young, Gudjonsson, Terry, & Bramham, 2008). We use the definitions of cognitive and affective empathy adopted by the Questionnaire of Cognitive and Affective Empathy (QCAE) devised by Reniers et al. (2011). The comprehension of other people's emotional states (cognitive empathy) involves intuitive perspective taking as well as intentionally projecting how a person is feeling (Reniers et al., 2011). On the other hand, vicariously experiencing the emotions of others (affective empathy) requires the automatic mirroring of the emotional states of others and experiencing an affective response when witnessing the mood of others (Reniers et al., 2011).

Given the defining attributes of cognitive empathy, specifically the ability to effortfully infer another person's intention, a strong prediction is that the intentionality bias will be more pronounced in those who score higher on measures of cognitive empathy. However, it is currently unclear how the subcomponents of cognitive empathy might relate to the intentionality bias. The current study therefore aims to investigate whether individual differences in the intentionality bias may be explained by variability in the capacity to empathise.

## 2. Methodology

### 2.1. Participants

A total of 78 participants took part in this study, 19 of which had over 25% missing data for one or more measures and so were excluded from the analysis. The final sample consisted of 59 participants aged 15–42 years ( $M = 22.95$ ,  $SD = 6.08$ ) with 38 females. Of this final sample, 30 were recruited through a research participation scheme for Psychology undergraduates and 29 were recruited online. No differences were observed between four participants who were under 18 years and the rest of the sample so they were included in the analysis.

### 2.2. Stimuli

#### 2.2.1. Intentionality bias task

The intentionality bias task used in this study was the same paradigm described by Rosset (2008) and consisted of short sentences describing an agent's action. There were 34 test sentences that described ambiguous actions that could be either intentional or unintentional. Of the test sentences there were two conditions: 22 ambiguous sentences describing prototypically accidental actions (e.g. He broke the window) and 12 ambiguous sentences where three described neutral and nine described prototypically intentional actions (e.g. She cut him off driving). Additionally, 40 control sentences were included which described actions that were unambiguously accidental (e.g. She caught a cold) or unambiguously intentional (e.g. He buttoned his jacket). The control sentences examined participants' reading ability and highlighted any indiscriminate responders. To compute the intentionality bias score, the total number of intentional judgements was divided by the total number of sentences for each condition and multiplied by 100 to give a percentage score.

#### 2.2.2. Questionnaire of Cognitive and Affective Empathy (QCAE)

The QCAE (Reniers et al., 2011) is a 31-item self-report questionnaire that examines the respondent's ability to understand the emotional states of others (cognitive empathy) and their ability to vicariously experience what others are feeling (affective empathy). As part of the development of the QCAE, the authors combined items from other validated empathy scales that measured affective or cognitive empathy (e.g. interpersonal reactivity index; Davis, 1983 and the Empathy Quotient; Baron-Cohen & Wheelwright, 2004) to form a multi-dimensional measure of empathy. Principal Component Analysis indicated five components of the QCAE (Reniers et al., 2011), two of which pertained to cognitive empathy including perspective taking (e.g. "I am good at predicting how someone will feel") and online simulation (e.g. "I find it easy to put myself in somebody else's shoes"). Three components were related to affective empathy including emotion contagion (e.g. "It worries me when others are worrying and panicky"), proximal responsivity (e.g. "It affects me very much when one of my friends seems upset") and peripheral responsivity (e.g. "I often get deeply involved with the feelings of a character in a film, play or novel"). Respondents rate on a 4-point scale how much they agree or disagree with each statement. The QCAE has been shown to have good validity and internal consistency (Reniers et al., 2011). In the current study, Cronbach's alpha for the cognitive empathy subscale was 0.94 and the affective empathy subscale was 0.79.

### 2.3. Procedure

The experiment was completed online using Qualtrics Survey Software and participants were instructed to complete the experiment using either a laptop or desktop. The intentionality bias task was completed first, followed by the empathy measure. Instructions for the task indicated that a series of sentences describing an action would

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