Personality and Individual Differences 52 (2012) 113–117

Contents lists available at SciVerse ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

The role of Theory of Mind in assessing cooperative intentions

Karolina Sylwester [a,*], Minna Lyons [b], Claire Buchanan [c], Daniel Nettle [a], Gilbert Roberts [a]

[a] Centre for Behaviour and Evolution, Henry Wellcome Building, Institute of Neuroscience, Newcastle University, Framlington Place, NE2 4HH Newcastle upon Tyne, United Kingdom
[b] Department of Psychology, Liverpool Hope University, Hope Park, L16 9JD Liverpool, United Kingdom
[c] School of Biological Sciences, University of Liverpool, Crown Street, L69 7ZB Liverpool, United Kingdom

ARTICLE INFO

Article history:
Received 1 June 2011
Received in revised form 2 September 2011
Accepted 8 September 2011
Available online 19 October 2011

Keywords:
Cooperation
Cheater detection
Theory of Mind
Facial expression

ABSTRACT

Folk wisdom indicates that people vary in the extent to which they can assess others' cooperative intentions. In two studies we investigated whether Theory of Mind (ToM), the ability to represent mental states of others, is related to accuracy in the recognition of cooperativeness. Participants completed a ToM task and were asked to assess either video clips of people playing a variation of a Prisoner's Dilemma (PD) game (Study 1, $N = 88$), or photographs of people playing PD taken at the very moment when they were expressing a decision to cooperate or to defect (Study 2, $N = 99$). We found relationships between ToM and cooperative intention recognition only in Study 1, when participants were exposed to long versions of the video clips. In contrast to previous reports, participants in our samples did not score higher than chance in cooperativeness assessment except for Study 1 in the condition with short video clips. Our results question human expertise at identifying defectors and cooperators and do not provide clear support for an association between ToM and cooperativeness assessment. The findings are discussed from the perspective of an evolutionary arms race between interpreting and masking cooperative intentions.

1. Introduction

Large scale cooperation towards unrelated individuals has been identified as a potential driving force behind the evolution of human-specific cognitive machinery (Dunbar, 2003; Hill, Barton, & Hurtado, 2009; Moll & Tomasello, 2007). According to Dunbar (2003), increased group size and, in consequence, more complex social interactions often involving encounters with strangers, put pressure on human cognitive capacities. Not being able to directly observe other individuals' actions creates a problem of how to keep track of free-riders. Free-riders undermine the stability of social systems by reaping the benefits without incurring the costs in cooperative interactions. The need to detect free-riders and maintain high levels of cooperation could explain the existence of language (Dunbar, 1996), some of the pro-social emotions (Price, Cosmides, & Tooby, 2002), and socially oriented reasoning (Cosmides & Tooby, 1992).

When meeting strangers, the means to assess someone's cooperative intentions may include reading subtle cues from a face or interpreting non-verbal body language. Evolutionary research shows that faces reveal important information about potential mates and social partners (e.g. Rhodes, 2006; Stirrat & Perrett, 2010). Decisions about who to trust are affected by stable facial features, e.g. attractiveness, similarity to kin or facial width (for a summary see Stirrat & Perrett, 2010). People also use others' facial expressions to determine cooperative intentions and, as reported by Verplaetse and colleagues (2007), after viewing photographs of individuals playing a Prisoner's Dilemma game, can correctly identify cooperators and defectors with a probability higher than chance.

Theoretically, there could be two opposing evolutionary pressures acting on human cognition: one promoting cooperative intention recognition and another one favouring masking uncooperative intentions (see Hanley, Orbell, & Morikawa, 2003). In fact, signals of cooperation might evolve to be deceptive in a similar way as it occurs in the mating context in animals, e.g. some male crickets instead of a nutritionally valuable nuptial gift may offer a female an empty silken balloon (Maynard Smith & Harper, 2003). The co-evolution of cooperative intention detection and disguising uncooperative intentions would result in an overall low ability to predict cooperativeness (Dawkins & Krebs, 1979). Results from lie-detection research indicate that on average, people are poor judges of dishonesty (see Bond & DePaulo, 2006, for a review). Nevertheless, there are some individuals who appear to be able to reliably detect lies (O'Sullivan & Ekman, 2004). Unlike lie-detection, a number of recent studies suggest that people perform better than chance when assessing others' cooperativeness, but there is also a considerable individual variation in this ability (e.g. Brown, Palameta, & Moore, 2003; Fetchenhauer, Groothuis, & Pradel, 2010; Frank, Gilovich, & Regan, 1993; Oda, Naganawa,

* Corresponding author. Address: Department of Computer Science, University of Bath, Bath BA2 7AY, United Kingdom.
E-mail address: karolina.sylwester@gmail.com (K. Sylwester).

0191-8869/$ - see front matter © 2011 Elsevier Ltd. All rights reserved.
doi:10.1016/j.paid.2011.09.005

Yamauchi, Yamagata, & Matsumoto-Oda, 2009; Oda, Yamagata, Yabiku, & Matsumoto-Oda, 2009; Verplaetse, Vanneste, & Braeckman, 2007). Could this variation be explained by between-individual differences in the Theory of Mind (ToM)?

ToM is one of the dimensions of social intelligence and refers to the ability of reading others' minds, i.e. understanding and interpreting mental states of others. It consists of at least two components subserved by different neural mechanisms (Sabbagh, 2004). The social-perceptual component involves reading facial or body cues and from them representing others' thoughts and desires. In the classic task testing this skill participants have to visually assess an individual's mental state from a photograph of their eye region (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001). The social-cognitive component, on the other hand, describes the capacity to infer about the reasoning of others, e.g. "I suppose he thinks...". Social-cognitive ToM can be represented hierarchically by using different levels of social embeddedness, e.g. "I understand that you want me to believe that he thinks...". The classic task measuring the social-cognitive component involves reading or listening to stories about characters socially interacting with each other. Participants are then asked to answer questions about the characters' beliefs containing different levels of embeddedness (Stiller & Dunbar, 2007).

Are there any grounds for expecting a positive relationship between ToM and the ability to assess cooperative intentions? A person with high ToM skills, by definition, should be able to infer about others' mental states pertaining to cooperative behaviour. The Eyes Task, used to measure the social-perceptual component of ToM, relies on attributing a belief or an intention to a person (Baron-Cohen et al., 2001). People scoring high on this task should also excel at recognising cooperative or uncooperative plans of others. Cooperation and defection invoke certain emotions such as gratitude, liking, nervousness, shame or anger. Hence, the ability to recognise such emotions correctly might help in determining someone's cooperative intentions. People can inhibit the expression of true emotions, however, true emotions will usually manifest themselves as microexpressions lasting for 1/25–1/5 of a second (Ekman & Friesen, 1969) or slightly longer expressions that do not match the intended or declared expressions (Porter & Brinke, 2008). Proficiency in recognising emotions in general may translate to spotting any false or inconsistent emotions and in consequence, the willingness to behave uncooperatively. Alternatively, another cue of cooperativeness could be emotional expressiveness itself: cooperative individuals display more both positive and negative emotions (Boone & Buck, 2003; Schug, Matsumoto, Horita, Yamagishi, & Bonnet, 2010). Predicting others' cooperative behaviour could also be related to the social-cognitive component of ToM. In this case, however, it is more likely that individuals of high ToM skills would make more accurate assessments of cooperative intentions based on third-party information (gossip) rather than on facial cues.

This research examines the possible role of social intelligence in cooperative intention assessment. In order to determine whether cooperativeness recognition could be linked to ToM skills we conducted two studies. In Study 1, participants completed the ToM task measuring the social-perceptual component, and were asked to assess the cooperativeness of contestants in a TV game show "Golden Balls". We investigated the ability to predict cooperativeness under both short and long exposures to the stimuli. Our rationale for varying the length of the stimuli is that there is evidence for more than one cooperative intention recognition mechanism. People can form accurate impressions of others very quickly (Bar, Neta, & Linz, 2006). However, analysing speech content also aids in detecting lies (Vrij & Mann, 2004), and long clips provide much more verbal information than short ones. To explore these putative recognition methods, we used two classes of stimuli, in the hopes of capturing these differences. In Study 2, we used photographs of people who cooperated or defected in a Prisoners' Dilemma game. We administered both the social-perceptual and the social-cognitive ToM measures and examined participants' ability to guess the cooperative decisions of the photographed people. For both studies we predicted that social-perceptual ToM would be positively associated with cooperative intentions recognition. Based on research highlighting human sophistication in guessing cooperative intentions, we expected that participants would be able to correctly assign cooperative intentions with a probability higher than chance.

2. Study 1 – Method

2.1. Participants

72 females and 16 males (mean age = 24.10, SD = 10.27) were recruited from the student and general population in the North West of England. The study was approved by the psychology ethics committee at Liverpool Hope University.

2.2. Materials

2.2.1. Reading the mind in the Eyes test (Baron-Cohen et al., 2001)

This test consists of 36 pictures of pairs of eyes. Each picture is surrounded by four words depicting complex emotions. Participants are required to match the eyes with the correct emotion. Participants are provided with instructions, including a glossary for the terms used to describe the emotions. Each correct response scores a point. The test has been used as a measurement of affective Theory of Mind capacity in both clinical and non-clinical populations.

2.2.2. "Golden Balls" video clips

This test consist of 20 short video-clips (length varies between approximately 2 min and 5 s) recorded from the ITV game show "Golden Balls". In the show, contestants compete for sometimes large sums (up to £100,000) of money in a Prisoner's Dilemma-type of situation. At the end of each show, two of the remaining contestants try to convince each other about their intentions to share the money. In the case of mutual cooperation, the players split the money. In mutual defection, neither of the players receives the reward. If one of the players defects while the other cooperates, the defector receives all of the money while the cooperator loses everything.

In the present experiment, clips from 20 episodes are shown (six cooperator–cooperator pairs, five defector–defector pairs, and nine cooperator–defector pairs). Altogether, participants evaluated clips of 19 (12 females) defectors and 21 (14 females) cooperators. Half ($N = 44$) of the participants watched long versions (1–2 min) of the clips, where the game show contestants were verbally convincing each other about their intentions to share the money. The other half were shown short clips (1–5 s) at the time of the decision making, where the game show contestants had stopped talking, and were just about to reveal their decisions. Each correct guess scored a point. The clips were presented in a balanced order, alternating between different types of pairs (e.g. a clip of a cooperator–cooperator pair was always followed by clip of a different type, e.g. cooperator–defector pair). One of the pre-requisites for participation in the study was that participants had not seen the "Golden Balls" series before.

2.4. Procedure

Participants were tested either in their workplace, or in a quiet seminar room in University. The experiment consisted of