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Seeing the world through others' minds: Inferring social context from behaviour

Yvonne Teoh [a], Emma Wallis [c], Ian D. Stephen [b], Peter Mitchell [c,*]

[a] School of Psychology, University of Nottingham Malaysia Campus, Semenyih, 43500 Selangor, Malaysia
[b] Department of Psychology, Macquarie University, Sydney, Australia
[c] School of Psychology, University of Nottingham, Nottingham, United Kingdom

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ABSTRACT

Past research tells us that individuals can infer information about a target's emotional state and intentions from their facial expressions (Frith & Frith, 2012), a process known as *mentalising*. This extends to inferring the events that caused the facial reaction (e.g. Pillai, Sheppard, & Mitchell, 2012; Pillai et al., 2014), an ability known as *retrodictive mindreading*. Here, we enter new territory by investigating whether or not people (perceivers) can guess a target's social context by observing their response to stimuli. In Experiment 1, perceivers viewed targets' responses and were able to determine whether these targets were alone or observed by another person. In Experiment 2, another group of perceivers, without any knowledge of the social context or what the targets were watching, judged whether targets were hiding or exaggerating their facial expressions; and their judgments discriminated between conditions in which targets were observed and alone. Experiment 3 established that another group of perceivers' judgments of social context were associated with estimations of target expressivity to some degree. In Experiments 1 and 2, the eye movements of perceivers also varied between conditions in which targets were observed and alone. Perceivers were thus able to infer a target's social context from their visible response. The results demonstrate an ability to use other minds as a window onto a social context that could not be seen directly.

1. Introduction

Over the past century researchers have struggled to understand people's ability to read others' minds. This ability has variously been called *mentalising*, *mindreading*, *mind perception*, *empathic accuracy*, *mental simulation* and *theory of mind* amongst other things. Inspired by the work of Charles Darwin (1872), researchers have investigated the ability to interpret facial expressions to infer underlying psychological states and traits (e.g. Baron-Cohen, Jolliffe, Mortimore, & Robertson, 1997; Frith & Frith, 2012; Wu, Sheppard, & Mitchell, 2016). Such ability has great value in professional counselling as recognized by Carl Rogers (1957), who set the goal of finding people with a talent for 'accurate empathy', in other words the ability to infer what a client is thinking and feeling. This stimulated a research tradition extending far beyond its origins in counselling psychology to determine how accurately people can read other minds, but, according to Zaki and Ochsner (2011), the early work in the field of person perception devoted little attention to the process of *how* people read minds. Subsequently, researchers working in a different tradition investigated the development of a 'theory of mind' (Wimmer & Perner, 1983), and how that development might be adversely affected by autism (Baron-Cohen, Leslie, & Frith, 1985). These researchers expended much effort in trying to understand the *processes* of mentalising but did not, until recently, give much attention to how accurately mature mentalisers perform (Zaki & Ochsner, 2011).

In determining how accurately a person (the perceiver) can mentalise, it is useful to know the true mental state of the person whose mind is being read (henceforth the target). West and Kenny (2011) recognize that knowing the true state of the target's mind presents a difficult problem and they refer to the procedure devised by Ickes (e.g. 2001, 2009). In the procedure, the target is videoed in conversation with another person. The video is then played back to the target who recalls and records what they were thinking and feeling during the conversation. Subsequently, perceivers watch the video of the target and are asked to infer what the target is thinking and feeling; they are adjudged to be correct if their responses correspond with what the target declared at any given moment.

* Corresponding author.
E-mail address: peter.mitchell@nottingham.ac.uk (P. Mitchell).

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This procedure presumes that when the target declares that they are thinking and feeling X and Y then they are really thinking and feeling these things. Another possibility is that targets do not know or at least do not recall what they were thinking and instead merely guess at these things based on visible clues in the recordings of their own observable behaviour. If so, then investigating how well the perceiver's judgment corresponds with the target's declaration is merely the same as investigating judgments made by two independent perceivers about the behaviour of a target. A procedure that overcomes this problem was developed by North, Todorov, and Osherson (2010). In their task, targets were surreptitiously videoed while viewing two photographs presented one after the other. Perceivers subsequently watched the videos of the targets and were able to infer which photo the target preferred (the first or the second), presumably by recognising that the target had a more positive expression when viewing one of the photographs than the other. In this procedure, we know objectively which preference the target expressed (thus satisfying the 'truth condition' as defined by West and Kenny).

In addition to inferring what others are thinking and feeling, how well can people use others' minds as a lens onto an otherwise inaccessible view of the world? Such ability was fictionalised in Sherlock Holmes (Conan Doyle, 1902), who was able to observe and interpret fleeting clues in behaviour to infer what the person had been doing, where they had been and with whom. While ordinary people might not perform at the extraordinary level of Sherlock Holmes, based on findings described above, perhaps they can nevertheless achieve something similar by a matter of degree.

The mind is embodied in observable behaviour, especially in the facial expressions that are made in reaction to some event. Kraut (1982) claimed, moreover, that facial expressions potentially provide information about the environmental and social contexts that caused the reaction in the target. It is for this reason, presumably, that perceivers tested by North et al. (2010) were able to infer the preferences of targets who viewed pairs of photos. Facial expressions might also reveal other information about targets' states and the aspects of the world they inhabit that caused those states. For example, Cassidy, Ropar, Mitchell, and Chapman (2013, 2015) reported that perceivers were correctly able to infer which gift had been offered to a target (chocolate, homemade novelty and monopoly money) by observing their reactions.

In another study, Pillai, Sheppard, and Mitchell (2012), Pillai et al. (2014), Sheppard, Pillai, Wong, Ropar, and Mitchell, (2016) examined perceivers' ability to guess what the experimenter had said to the target after viewing the target's reaction for a few seconds. Either the experimenter told a joke, gave a compliment, related her difficult day or rudely used her mobile phone to speak with a friend instead of attending to the target. As with the study by Cassidy, Ropar, Mitchell, and Chapman (2013), perceivers were able to guess what the experimenter had said to the target after observing the target's reaction for a few seconds. Perceivers were thus able to infer the antecedent event based on a small sample of the target's behaviour. This ability, known as retrodictive mindreading (Gallese & Goldman, 1998), is reputed to be a common form of mentalising that allows people to determine from a facial expression (a) the proximal cause, which is the target's mental state and (b) the distal cause, which is the event in the world that gave rise to the mental state that in turn caused the facial expression. Hence, amongst the various practical benefits of mentalising, one of the foremost is using another mind as a lens onto aspects of the world that are not apprehended directly. Such ability emerges very early in development in a basic form known as 'social referencing' (Sorce, Emde, Campos, & Klinnert, 1985): From about the age of 18 months it seems infants can interpret an adult's facial expression to determine their attitude on whether an aspect of the world is safe or dangerous which in turn has the effect of regulating the infant's approach and avoidance behaviour towards that particular aspect of the world.

The current study investigated a new phenomenon - people's ability to infer social context (was the target alone or accompanied by the experimenter?), along with perceivers' sensitivity to how this social context moderated target's reactions to positive or negative stimuli. The presence of the experimenter would surely have a subtle effect on the target's behaviour. A large body of research demonstrates that individuals behave differently in different social contexts (e.g., Ekman, 1972; Fridlund, 1991; Zaalberg, Manstead, & Fischer, 2004) by inhibiting or intensifying their behaviour when in the presence of others depending on the emotions experienced (e.g., Kilbride & Yarczower, 1980; Kraut, 1982). Specifically, when individuals experience negative emotions (e.g., irritation, disgust), they tend to inhibit their behaviour (Spain, Eaton, & Funder, 2000), but when experiencing positive emotions (e.g., happiness, surprise) they tend to be more expressive (Buck, 1984; Ekman & Friesen, 1975). We already know that social context influences people's behaviour, and re-confirming such a finding was not the purpose of the current research; rather we take it as given that social context will have an effect on the target's behaviour and we move beyond this basic assumption to explore *whether or not perceivers can determine social context from the target's behaviour*. If they could do so, then it would raise the possibility that perceivers have some understanding (implicitly or explicitly) of how social presence regulates behaviour, an understanding they might use to good effect in guessing whether the target is alone or accompanied. In so far as retrodictive mindreading is possible, it thus implicates a well-developed albeit informal understanding of social processes, such as how social presence impacts upon the way one behaves. Hence, a further aim was to shed light on the process by which perceivers made inferences of social context as elaborated below.

If perceivers understand (either implicitly or explicitly) that social presence suppresses the expression of negative emotions but intensifies the expression of positive emotions then this should be reflected not only in their judgments of whether the target is accompanied or alone; it should also be apparent in their explicit judgments of how expressive the target is. The latter was tested explicitly in Experiments 2 and 3, reported below, allowing us to investigate the possibility that perceivers infer social presence on the basis of sensing that targets were regulating their expressions of negative and positive emotions relative to whether they were alone or accompanied. In this respect, the current research forms a bridge between the tradition of investigating accuracy in person perception (which in the past has neglected the question of *process*) with the tradition of investigating process under the umbrella of research into 'theory of mind' (which in the past has neglected to consider the findings of 'accuracy research' in the area of person perception).

In addition to asking perceivers to make judgments about the targets (in Experiments 1–3), we also recorded the eye movements of the perceivers in Experiments 1 and 2, principally to rule out any low-level strategies in judging the social context of targets. In addition to ruling out the use of low level strategies, we might also find that sensitivity to social context is apparent in more subtle features of the eye movements of perceivers. Pillai, Sheppard, and Mitchell's (2012) study showed that perceivers tended to focus on the mouth more than the eyes for the joke, story and compliment scenarios, but for the waiting scenario, perceivers preferred to look at the eyes than the mouth. Meanwhile, Pillai et al. (2014), found similar patterns for the joke, story and compliment scenarios, but perceivers focused equally on the mouth and eyes in the waiting scenario. Cassidy et al.'s (2013) study suggested that perceivers' eye movements differed depending on the gift the targets received, where perceivers tended to look at the mouth more than the eyes when targets received homemade novelty and chocolate gifts, but