Acta Psychologica 178 (2017) 56–65

Contents lists available at ScienceDirect

Acta Psychologica

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

Attentional interference is modulated by salience not sentience

Christopher J. Wilson[a,*], Alessandro Soranzo[b], Marco Bertamini[c]

[a] School of Social Sciences, Business and Law, Teesside University, United Kingdom
[b] Faculty of Development and Society, Sheffield Hallam University, United Kingdom
[c] Department of Psychological Sciences, University of Liverpool, United Kingdom

A B S T R A C T

Spatial cueing of attention occurs when attention is oriented by the onset of a stimulus or by other information that creates a bias towards a particular location. The presence of a cue that orients attention can also interfere with participants' reporting of what they see. It has been suggested that this type of interference is stronger in the presence of socially-relevant cues, such as human faces or avatars, and is therefore indicative of a specialised role for perspective calculation within the social domain. However, there is also evidence that the effect is a domain-general form of processing that is elicited equally with non-social directional cues. The current paper comprises four experiments that systematically manipulated the social factors believed necessary to elicit the effect. The results show that interference persists when all social components are removed, and that visual processes are sufficient to explain this type of interference, thus supporting a domain-general perceptual interpretation of interference.

1. Introduction

Spatial cueing of attention occurs when attention is oriented by the onset of a stimulus at a specific location or by a cue that signals a location and therefore creates an expectation that a stimulus will appear in that location (Posner, 1980). Certain cues such as eyes or arrows have been known to orient attention towards target stimuli due to their social or biological relevance (Ristic & Kingstone, 2012). However, there is debate as to whether socially- or biologically-relevant cues are special when it comes to triggering reflexive shifts in attention (Langton, Watt, & Bruce, 2000; Ristic, Friesen, & Kingstone, 2002). In other words, it is not clear whether all cues belong to the same category, or whether social information has a distinct functional role in cueing attention. In this paper, we study a specific phenomenon of spatial cueing: how cueing affects the speed and accuracy at reporting what the observer sees in the scene.

A number of studies have shown that the presence of a cue in the visual scene can interfere with participants' reporting of what they see – slower reaction times and higher error rates – if the number of stimuli that the cue points to is different from the overall number of stimuli visible to the participant (Samson, Apperly, Braithwaite, Andrews, & Bodley Scott, 2010). Samson et al. (2010) introduced a type of spatial cueing paradigm (sometimes referred to as the 'dot perspective task'; Cole, Atkinson, Le, & Smith, 2016) consisting of a visual scene with a cue pointing towards some target stimuli. Participants were requested to report either the target stimuli that they could see (i.e. participants were adopting a first person-perspective) or the target stimuli that were in the direction of the cue (i.e. participants were adopting a third person-perspective). Based on Vogeley et al. (2004), we refer to the first-person perspective as 1PP and to the third-person perspective as 3PP.

In the dot perspective task, the stimuli are presented on a computer screen and trials begin with the presentation of a perspective prompt on the screen ("YOU" or "S/HE"). After the presentation of the prompt, a number is presented (e.g., 1). This is followed by the experimental scene, which consists of a three-dimensional room with a female or male avatar placed in the middle. The avatar faces to the left, so that it can "see" only the left wall of the room, or to the right, facing the right wall. In the experimental trials, discs are displayed on the left or right wall creating conditions where either the participant and avatar can see the same number of discs (consistent condition) or where the participant can see more discs than the avatar (inconsistent condition). When the scene appears, participants confirm whether the number shown previously is equal to the number of discs visible from the prompted perspective ("YOU" or "S/HE", see Fig. 1).

Samson et al. (2010) found that participants were slower and less accurate when there was inconsistency between the cued targets and the visible targets. This effect has been observed in a number of subsequent studies; however, it is debated whether the interference that occurred when adopting first-person perspective (1PP-interference) is modulated by social factors such as visual perspective attribution. Two positions have been advanced: one position argues that perceptual

* Corresponding author at: School of Social Sciences, Business and Law, Teesside University, United Kingdom.
E-mail address: Christopher.wilson@tees.ac.uk (C.J. Wilson).

http://dx.doi.org/10.1016/j.actpsy.2017.05.010
Received 6 February 2017; Received in revised form 2 May 2017; Accepted 25 May 2017
Available online 01 June 2017
0001-6918/

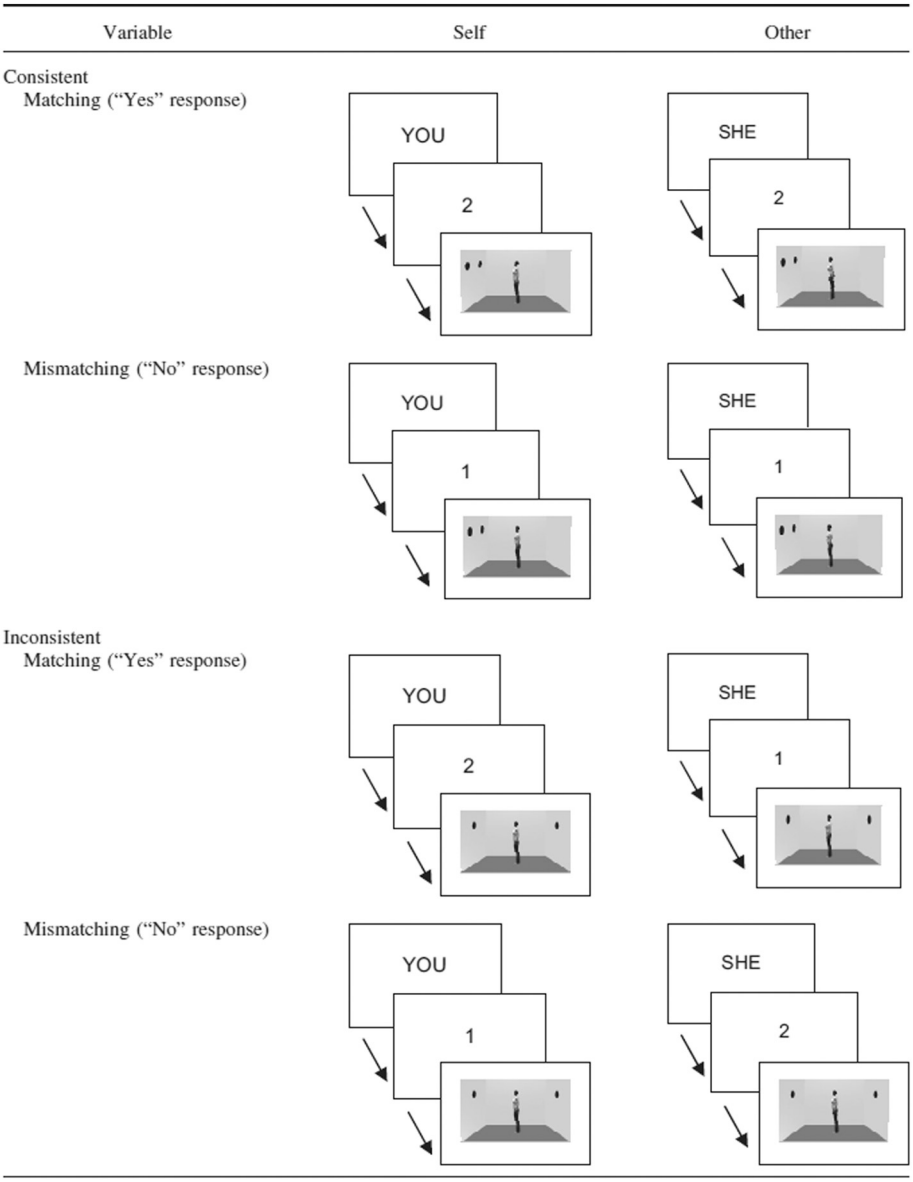

Fig. 1. Sketch of the experimental design employed by Samson et al. (2010) and replicated in the current study.

factors of the cueing task are sufficient to explain 1PP-interference (e.g. Cole et al., 2016; Cole, Smith, & Atkinson, 2015; Santiesteban, Catmur, Hopkins, Bird, & Heyes, 2014), whilst the other argues that perceptual factors are not sufficient on their own and that additional social factors are necessary (e.g. Baker, Levin, & Saylor, 2016; Capozzi, Cavallo, Furlanetto, & Becchio, 2014; Furlanetto, Becchio, Samson, & Apperly, 2016; Nielsen, Lance, Levy, & Amanda, 2015; Samson et al., 2010). For the sake of consistency, these positions will now be referred to as the perceptual interpretation and the social interpretation, respectively.

Generally speaking, the perceptual interpretation is that 1PP-interference emerges because attention is oriented towards the stimulus in the cued location. This leads to interference when there is inconsistency between what is present at the cued location and what the participant is asked to attend to (e.g. Cole et al., 2015; Cole et al., 2016; Green & Woldorff, 2012; Posner, Snyder, & Davidson, 1980). The social interpretation of 1PP-interference is that attentional orientation is modulated by social factors: visual state attribution to the cue, social-relevance of the cue and social-perspective-taking. As such, 1PP-interference either does not occur, or is lessened when these social factors are not present (Baker et al., 2016; Capozzi et al., 2014; Furlanetto et al., 2016; Nielsen et al., 2015; Samson et al., 2010). The next sections outline the two interpretations in more detail and discuss the conflicting evidence for the social interpretation.

1.1. The perceptual interpretation of 1PP-interference

The perceptual interpretation of 1PP-interference argues that the effect can be attributed to the directional features, and not social relevance, of the cue. In consistent conditions, there is a shift in attention towards the cued location that facilitates the processing of the target stimuli. In inconsistent trials there is a conflict between the number of target stimuli pointed to by the cue and the total number on screen. These two pieces of information need to be calculated simultaneously so that the conflict can be resolved before a response is given, leading to slower response times and reduced accuracy (Cole et al., 2015; Santiesteban et al., 2014). If this is the case, it follows that the effect should occur for any cue where the directional features are unambiguous and salient enough to orient attention.

Indeed, there is a strong similarity between the dot-perspective task described earlier (Baker et al., 2016; Capozzi et al., 2014; Furlanetto et al., 2016; Nielsen et al., 2015 and Samson et al., 2010) and the experimental paradigm traditionally employed in spatial cueing studies (e.g. Posner, 1980; Qian, Feng, Yong, & Miao, 2015; Ristic & Kingstone, 2012). In both cases participants react to the onset of a target that