Consciousness and Cognition 36 (2015) 434–437

Contents lists available at ScienceDirect

Consciousness and Cognition

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

Domain-specific and domain-general processes in social perception – A complementary approach

John Michael [a,*], Alessandro D'Ausilio [b]

[a] Central European University, Budapest, Hungary
[b] Italian Institute of Technology, Italy

ARTICLE INFO

Article history:
Received 1 December 2014
Accepted 11 December 2014
Available online 30 December 2014

Keywords:
Social perception
Perspective-taking
Action understanding
Spatial cueing
Gaze cueing
Associative learning

ABSTRACT

In this brief discussion, we explicate and evaluate Heyes and colleagues' deflationary approach to interpreting apparent evidence of domain-specific processes for social perception. We argue that the deflationary approach sheds important light on how functionally specific processes in social perception can be subserved at least in part by domain-general processes. On the other hand, we also argue that the fruitfulness of this approach has been unnecessarily hampered by a contrastive conception of the relationship between domain-general and domain-specific processes. As an alternative, we propose a complementary conception: the identification of domain-general processes that are engaged in instances of social perception can play a positive, structuring role by adding additional constraints to be accounted for in modelling the domain-specific processes that are also involved in such instances.

In an important series of recent papers, Heyes and colleagues (Cook, Bird, Catmur, Press, & Heyes, 2014; Heyes, 2014; Santiesteban, Catmur, Hopkins, Bird, & Heyes, 2014; Catmur, Walsh, & Heyes, 2007) have developed a deflationary approach to interpreting apparent evidence of domain-specific processes for social perception. Briefly, the approach consists in demonstrating how the apparent evidence can be accounted for by domain-general processes, i.e. without postulating any additional, domain-specific processes that track mental states. If successful, the resulting deflationary explanations would in each case show how findings observed in paradigms that seem to tap specifically *social* perception can in fact be brought about directly by domain-general processes – i.e. bypassing any need for dedicated social-perceptual to identify others' mental states. In the following, we explicate and evaluate this deflationary approach. Focusing on two separate areas of research to which the approach has been applied (visual perspective-taking and action understanding), we argue that the deflationary approach has been successful in illuminating how functionally specific processes for social perception can be subserved at least in part by domain-general processes, but that its potential to contribute to ongoing research has been limited by an artificial dichotomy between domain-general and domain-specific processes. As an alternative to this *contrastive* conception of the relationship between domain-general and domain-specific processes, we propose a *complementary* conception: the identification of domain-general processes that are engaged in instances of social perception can play a positive, structuring role by adding additional constraints to be accounted for in modelling the domain-specific processes that are also involved in such instances.

* Corresponding author at: Department of Cognitive Science, Central European University, Frankel Leo Ut 30-34, 1023 Budapest, Hungary. Fax: +36 305 399 329.
E-mail address: michaelj@ceu.hu (J. Michael).

http://dx.doi.org/10.1016/j.concog.2014.12.009
1053-8100/

Let us begin by considering a current dispute about the results from a paradigm purportedly tapping an automatic process for calculating other agents' visual perspectives. In the basic paradigm (Samson, Apperly, Braithwaite, Andrews, & Bodley Scott, 2010), participants view an image of a room in which an avatar is standing in the middle and facing either to the left or to the right (this is varied from one trial to the next). On each trial, anywhere from zero to three red discs are displayed on the walls of the room, such that on some trials the avatar can see all of them (if she, for example, is facing to the left, and three discs appear on the wall to the left but none appear on the wall to the right), but on other trials the avatar can only see some but not all of the discs (e.g. if she is facing to the left, and one disc appears on the wall to the right). Participants have the task of either calculating how many discs the avatar can see or calculating how many discs they themselves see (this is varied from one trial to the next). The basic finding on the latter type of trial is that participants' performance is impaired when they themselves can see a different number of discs than the avatar can see. In other words, participants appear to have been calculating how many discs the avatar could see even though it was irrelevant to, and indeed interfering with, their task (Samson et al., 2010). In a follow-up study using the same paradigm, Qureshi, Apperly, and Samson (2010) presented participants with an additional cognitive load during the experiment, and found that the interference from the avatar's perspective increased. The authors interpret this as evidence that participants calculated what the avatar could see (level-1 perspective taking) automatically, in parallel to the calculation of what the subject herself could see. As the authors put it: 'This is the first direct evidence of a cognitively efficient process for "theory of mind" in adults that operates independently of executive function' (Qureshi et al., 2010: 230). In contrast, the selection of which perspective to draw upon in judging the number of discs is a controlled process requiring executive resources, and is therefore impaired by the cognitive load manipulation.

This pattern of results is highly suggestive of a dedicated and automatic process for level-1 visual perspective-taking. Nevertheless, it is important to be cautious. As Heyes and colleagues have pointed out (Heyes, 2014; Santiesteban et al., 2014), it is possible that the effect is at least partially driven by domain-general spatial-cueing, with the avatars serving as cues to trigger attention either to the left or to the right. In fact, this interpretation is supported by the findings of Santiesteban et al. (2014), who replicated Samson et al.'s effect using arrows instead of avatars. According to Heyes (2014) and Santiesteban et al. (2014), we should conclude that the paradigm in fact does not tap any specifically *social*-perceptual or *social*-cognitive process at all (i.e. perspective-taking). Instead, Heyes argues, we should conclude that the effect is driven by 'submentalizing processes', i.e. by 'domain-general cognitive processes that do not involve thinking about mental states but can produce in social contexts behaviour that looks as if it is controlled by thinking about mental states' (2014: 132). In other words, the effect observed in the paradigm could be brought about by a domain-general attentional process, bypassing any dedicated mechanism for tracking other agents' perspectives.

But while Santiesteban et al.'s findings do indeed suggest that a domain-general attentional process may be playing an important role in this paradigm, it would be overly hasty to conclude from this that the paradigm does not also involve domain-specific processes for identifying agentic features (e.g. a human-like body, the gaze direction of the avatar). Indeed, human or human-like bodies are uniquely salient and biologically significant cues. It is therefore unsurprising that when presented with images of scenes containing human faces as well as arrows, people are far more likely to fixate on the human faces and to follow the gaze direction of those faces than to fixate on the arrows – even if the arrows are much larger and more prominently positioned. Moreover, there is ample research to motivate the conjecture that Samson and colleagues' paradigm engages a medley of domain-specific processes, and that the effect tapped in the paradigm is not only similar to spatial cueing using arrows, but also, and in important ways, different from it. First of all, it has been shown that gaze cueing, unlike spatial cueing with arrows, is automatic in the sense that faces (but not arrows) trigger spatial cueing even if the gaze direction of the face has very low cue validity (20%), and participants are informed of this (Driver et al., 1999; Friesen & Kingstone, 1998). Secondly, participants tend to evaluate faces in quasi-moral terms (i.e. as trustworthy or untrustworthy) depending on the cue validity of their gaze direction (Bayliss & Tipper, 2006). Thirdly, by systematically varying not only the locations of targets, but also the objects (i.e. rectangular figures) in which those targets appeared, Marotta, Lupiánez, Martella, and Casagrande (2012) were able to show that faces, unlike arrows, trigger a pure location-based cueing effect, whereas arrows, unlike faces, trigger a pure object-based cueing effect. They interpret this finding as evidence that faces and arrows engage qualitatively different (i.e. location-based versus object-based) orienting mechanisms.

These findings strongly suggest that social cues, such as human-like bodies and faces, function differently from non-social cues – even though they may also engage a common attentional process. This highlights the importance of investigating similarities and differences between avatars and other types of cue (such as arrows) in the Samson paradigm. In other words, a moderate application of Santiesteban and colleagues' deflationary strategy points in the direction of interesting new hypotheses for further research rather than to mere debunking. Specifically, a complementary approach that incorporates a moderate version of the deflationary strategy generates the prediction – contra Santiesteban and colleagues – that reducing the validity of the avatar's gaze direction to 20% would have little effect upon participants' performance. On the other hand, contra Samson and colleagues' interpretation of the finding as evidence of a mechanism for automatic perspective-taking, a complementary approach predicts that various other systems can cooperate with the systems engaged in this paradigm. Thus, we predict that performance in the Samson paradigm could be modulated by manipulating participants' social knowledge, such as their beliefs about the avatar, e.g. about whether the avatar is sighted or blind, whether a pair of goggles that s/he is wearing is transparent or opaque, etc. Intriguingly, this latter prediction is motivated by the findings of Teufel et al. (2009), who reported that participants' processing of gaze direction was facilitated when a subject believed that a person wearing goggles was able to see through them (as opposed to the goggles being opaque). In sum, the identification of a