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Intergroup visual perspective-taking: Shared group membership impairs self-perspective inhibition but may facilitate perspective calculation

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ABSTRACT

Reasoning about what other people see, know, and want is essential for navigating social life. Yet, even neurodevelopmentally healthy adults make perspective-taking errors. Here, we examined how the group membership of perspective-taking targets (ingroup vs. outgroup) affects processes underlying visual perspective-taking. In three experiments using two bases of group identity (university affiliation and minimal groups), interference from one's own differing perspective (i.e., egocentric intrusion) was stronger when responding from an ingroup versus an outgroup member's perspective. Spontaneous perspective calculation, as indexed by interference from another's visual perspective when reporting one's own (i.e., altercentric intrusion), did not differ across target group membership in any of our experiments. Process-dissociation analyses, which aim to isolate automatic processes underlying altercentric-intrusion effects, further revealed negligible effects of target group membership on perspective calculation. Meta-analytically, however, there was suggestive evidence that shared group membership facilitates responding from others' perspectives when self and other perspectives are aligned.

1. Introduction

The demands of social life require that people actively reason about what other agents see, know, and want. Without direct access to other people's minds, however, inferring their contents is challenging: Even neurodevelopmentally healthy adults sometimes stumble in such endeavors (Birch & Bloom, 2004; Nickerson, 1999; Royzman, Cassidy, & Baron, 2003). Recent research has identified various perceiver-based factors, including experiences of high power (Blader, Shirako, & Chen, 2016; Galinsky, Magee, Inesi, & Gruenfeld, 2006), cognitive load (Lin, Keysar, & Epley, 2010; Qureshi, Apperly, & Samson, 2010; Schneider, Lam, Bayliss, & Dux, 2012), and anxious uncertainty (Todd, Forstmann, Burgmer, Brooks, & Galinsky, 2015; Todd & Simpson, 2016), that can magnify these perspective-taking difficulties. Comparatively less is known about how *target-based* factors affect perspective-taking. Contrary to conventional wisdom – and some prior work (e.g., Adams et al., 2010) – suggesting that similarity between oneself and a perspective-taking target should ease mental-state inference, Todd, Hanko, Galinsky, and Mussweiler (2011) found that adults made more errors on a false-belief task (Birch & Bloom, 2007) when the protagonist was an ethnic ingroup member than when the protagonist was an ethnic outgroup member. Our aim here was to extend this prior work by shedding light on the mechanisms that shape perspective-taking in intergroup contexts.

2. Processes underlying perspective-taking

A major undertaking of much theoretical and empirical work on 'theory of mind' has been to explicate the cognitive processes involved in mental-state reasoning (see Apperly, 2010, for a review). On one noteworthy theoretical account, the ascription of mental states to oneself and others involves several distinct processes: an implicit *calculation* of possible mental contents (e.g., what another agent sees, knows, or wants) and an explicit *selection* of the most plausible among these potential contents while *inhibiting* competitors (Leslie, Friedman, & German, 2004; Leslie, German, & Polizzi, 2005; for related accounts, see Apperly & Butterfill, 2009; Qureshi et al., 2010; Ramsey, Hansen, Apperly, & Samson, 2013). Many of the most widely used mental-state reasoning tasks, including the false-belief task used by Todd et al. (2011), assess the calculation and selection of another person's perspective while inhibiting one's own perspective, thereby conflating these different

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processes (Ramsey et al., 2013). A major objective of the current investigation was to overcome some of the limitations of tasks used in prior intergroup perspective-taking work by using a task that can tease apart these different processes.

In one such task, a level-1 visual perspective-taking (hereafter, L1-VPT) task,[1] adults view a human avatar standing in the center of a room that has a varying number of dots on the side walls (Samson, Apperly, Braithwaite, Andrews, & Bodley Scott, 2010). On some trials, participants and the avatar can see the same number of dots (i.e., consistent trials); on other trials, the avatar cannot see some of the dots that are visible to participants (i.e., inconsistent trials). Two interference effects commonly emerge in this task: First, on trials in which participants must respond from the avatar's perspective (i.e., other trials), they have more difficulty doing so if their own perspective conflicts with that of the avatar than if self and avatar perspectives are aligned. This *egocentric*-intrusion effect resembles other egocentric biases commonly found on tasks requiring explicit inferences about others' perspectives (e.g., Epley, Keysar, Van Boven, & Gilovich, 2004; Keysar, Lin, & Barr, 2003; Sommerville, Bernstein, & Meltzoff, 2013). Second, on trials in which participants must simply report their own perspective (i.e., self trials), they have more difficulty doing so if the avatar's perspective conflicts with their own than if their perspectives are identical; that is, processing of the avatar's perspective interferes with reporting one's own perspective. This *altercentric*-intrusion effect is commonly interpreted as reflecting a rapid and implicit processing of the avatar's visual perspective and thus is thought to provide an indirect measure of spontaneous perspective calculation[2] (e.g., Nielsen, Slade, Levy, & Holmes, 2015; Qureshi et al., 2010; Surtees & Apperly, 2012; for alternative, non-mentalistic interpretations of altercentric-intrusion effects, see Cole, Smith, & Atkinson, 2015; Heyes, 2014; Santiesteban, Catmur, Hopkins, Bird, & Heyes, 2014). We used this task in the current research to investigate how target group membership affects these processes during visual perspective-taking.

3. Shared group membership and perspective-taking processes

How might the avatar's group membership affect patterns of egocentric and altercentric intrusion? Prior work suggests that people are more likely to use accessible self-knowledge when making inferences about the beliefs, preferences, and visceral states of similar versus dissimilar others (e.g., Ames, 2004a, 2004b; O'Brien & Ellsworth, 2012; Robbins & Krueger, 2005; Tamir & Mitchell, 2013; Todd, Simpson, & Tamir, 2016). Because reasoning about these and other higher-level mental states has been posited to be grounded in lower-level, visuospatial forms of perspective-taking (e.g., Erle & Topolinski, 2017; Kessler & Thomson, 2010), we anticipated that egocentric intrusion would be stronger with an ingroup avatar than with an outgroup avatar. This prediction aligns with theoretical claims that, when self-other differences are salient, as is typical in intergroup contexts (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987), people rely less heavily on self-knowledge, and more heavily on group knowledge (e.g., stereotypes), to guide their mental-state inferences (Ames, 2004a, 2004b; see also Mussweiler, 2003).

It is less clear how avatar group membership might affect altercentric intrusion in L1-VPT. We considered three possibilities, each of which was guided by prior empirical and theoretical work. First, insofar as decrements in explicit perspective-taking (i.e., the deliberate attribution of mental states) based on shared group membership (e.g., Todd et al., 2011) are accompanied by, or even rooted in, implicit cognitive processes (see Lieberman, Gaunt, Gilbert, & Trope, 2002), then similar decrements in spontaneous perspective calculation, as indexed by weaker altercentric intrusion, might also be anticipated. On this *perspective-calculation* account, the pattern of stronger egocentric intrusion with an ingroup avatar versus an outgroup avatar should be accompanied by *weaker* altercentric intrusion with an ingroup avatar versus an outgroup avatar. Prior work suggests that the presence of a non-social (e.g., a dual-colored stick) or a semi-social (e.g., an arrow) entity rather than a social agent (e.g., a human avatar) can bias visual perspective-taking via such a perspective-calculation process (e.g., Nielsen et al., 2015; Samson et al., 2010; Surtees & Apperly, 2012; Todd & Simpson, 2016; but see Gardner et al., 2017; Santiesteban et al., 2014). Although altercentric intrusion is the typical metric used for assessing perspective calculation in L1-VPT (e.g., Qureshi et al., 2010; Todd & Simpson, 2016), impaired perspective calculation could also be revealed by greater difficulty in responding from the avatar's perspective when there is no perspective conflict to resolve (i.e., on consistent trials) and thus little need to recruit effortful processes (Ramsey et al., 2013; Samson et al., 2010).

An alternative account is suggested by the representation and incorporation of close others' responses (RICOR) model of social influence (Smith & Mackie, 2016), which proposes that spontaneous perspective calculation should be especially pronounced for perspective-taking targets to whom one feels socially connected, as is typical in cases of shared group membership (Smith & Henry, 1996). On this view, shared group membership with the avatar would be expected to impair visual perspective-taking not via a process of perspective calculation (i.e., because spontaneous perspective calculation should be *stronger* for ingroup versus outgroup avatars) but rather via a process of viewpoint-independent perspective selection (Ramsey et al., 2013). This *perspective-selection* account predicts that shared group membership should impede the explicit selection of the cued perspective (self or other) whenever self and avatar perspectives are in conflict, resulting in both stronger egocentric intrusion *and* stronger altercentric intrusion with an ingroup versus an outgroup avatar. Prior work has found that cognitive load can bias visual perspective-taking through such a viewpoint-independent perspective-selection process: In one study, for example, both egocentric intrusion and altercentric intrusion were stronger under conditions of divided attention (Qureshi et al., 2010).

Finally, we considered a third possibility: a more specific instantiation of perspective selection in which shared group membership biases visual perspective-taking not by impairing the ability to process an ingroup versus an outgroup avatar's perspective per se but rather by selectively impairing the inhibition of one's own visual perspective when responding from an ingroup versus an outgroup member's perspective (Apperly, Samson, & Humphreys, 2005; Samson, Apperly, Kathirgamanathan, & Humphreys, 2005). On this *self-perspective-inhibition* account, shared group membership with an avatar should strengthen egocentric intrusion but should leave altercentric intrusion relatively unchanged.[3] Todd et al. (2011) found that performance on a

[1] Level-1 visual perspective-taking entails understanding *what* another person can see; this can be contrasted with level-2 visual perspective-taking, which entails understanding *how* something looks from another's perspective (Flavell, Everett, Croft, & Flavell, 1981).

[2] That visual perspective-taking *can* occur spontaneously does not mean that it occurs *inevitably*. Rather than being reflexively triggered by the mere presence of another agent, altercentric-intrusion effects appear to depend, in part, on whether the agent is physically able to "see" the dots (Baker, Levin, & Saylor, 2016; cf. Conway, Lee, Ojaghi, Catmur, & Bird, 2017; Furlanetto, Becchio, Samson, & Apperly, 2016) and on whether sufficient attention is directed toward the agent (Bukowski, Hietanen, & Samson, 2015; cf. Gardner, Hull, Taylor, & Edmonds, 2017).

[3] It is also possible that shared group membership eases responding from the avatar's perspective when the avatar's perspective is aligned with one's own (i.e., on the consistent trials); such a pattern of *enhanced* perspective calculation (Ramsey et al., 2013) with an ingroup versus an outgroup avatar could be accommodated both by this account and by the viewpoint-independent perspective-selection account.