Underlying mechanisms of visual perspective-taking
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INTRODUCTION

Visual perspective-taking (VPT) is a critical component of human social interaction that allows us to appreciate how the world looks to others, facilitating more sophisticated social abilities such as empathising and mentalising. Despite this significance, there is still no unified account of the underlying mechanisms of VPT and why these abilities vary among people. To investigate this, we sought to answer the following questions:

- What features trigger VPT spontaneously (Expt.1)
- Can VPT be intentionally controlled? (Expt.2)
- What individual differences drive VPT abilities? (Expt.1&2)

EXPERIMENT 1

Experiment 1 (n=541) tested people’s spontaneous VPT abilities and what features of the agent are necessary to trigger VPT. To do this, we varied the type of agent that appeared in each trial. The agent was either a human, a robot, a mannequin, a dog, or a lamp (see figure 2). After the experiment, participants rated each agent on how much they “look”, “act”, and can “think” like a human.

Spontaneous VPT: Participants consistently accessed the perspective of other agents spontaneously (see figure 3), with stronger VPT scores for the agents they rated more highly on how human-like they “looked” and could “think” (see figure 4a & 4b).

Individual differences: Spontaneous VPT scores were negatively correlated with two subscales of the schizotypy (O-Life) questionnaire: cognitive disorganisation and introvertive anhedonia, showing that the higher the participant scored on these schizotypy traits, the less they spontaneously took the perspective of agent.

EXPERIMENT 2

Experiment 2 (n=421) tested people’s ability to intentionally control VPT. To do this, participants performed the same task (with human agents only) but were asked explicitly to either take the agent’s perspective (and suppress their own) or suppress the agent’s perspective (and stick with their own perspective).

VPT control: Participants demonstrated the ability to intentionally control VPT, with higher VPT scores when instructed to take the agent’s perspective, compared to when instructed to suppress it (Figure 5a, pink bars). Interestingly, these instructions also had the opposite effect on ‘own perspective’ scores (equivalent to the mental rotation effect, Figure 5a blue bars). This controlled shift between own and agent’s perspective is demonstrated further in Figure 5b.

Individual differences: VPT control was again related to the schizotypy (O-Life) subscales of cognitive disorganisation and introvertive anhedonia, showing that those high in these traits took the perspective of the agent less and stayed in their own perspective more.

CONCLUSION

We demonstrated that people spontaneously engage in visual perspective-taking, which is activated by the subjective attribution of a human-like appearance and a human-like mind to other agents. The results confirmed that individuals can intentionally control when and when not to take the visual perspective of others, as well as when and when not to stay in their own perspective. Our findings further highlighted the variability amongst perspective-taking abilities, showing that those who possess some schizotypy traits find it difficult to take the visual perspective of others but excel in staying in their own perspective.