School of Psychology
SCENE CONSTRUCTION ABILITY IN PEOPLE WITH AND WITHOUT AUTISM

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Introduction

People with autism spectrum conditions (ASC) are thought to have difficulty mentally simulating (i.e., imagining) events that are different from direct (perceptual) experience (Schacter et al., 2012). This difficulty is thought to result from impaired "scene construction" – the ability to mentally generate and maintain a coherent spatial scene in mind. This study aimed to investigate the qualities of scene construction ability in ASC and in neurotypical (NT) adults, and whether gender modulates effects in each group.

Method

The current study used Hassabis et al.'s (2007) scene construction task, in which participants were asked to vividly imagine and describe three fictitious scenes (e.g., "Imagine you're lying on beach in a tropical bay"), to compare the ability to construct a scene and individuals' experience of that scene in adult participants with ASC (N=55; 37 male, 18 female) and matched NT adults (N=63; 41 male, 22 female).

An imagination index score was calculated from the scene construction descriptions, based on self-reported difficulty and coherence, content and quality. We also coded descriptions for frequency of references to the self (i.e., egocentric, e.g., I, me, mine, my, our(s)), and sensory experiences in each of the five sensory modalities (sound, smell, sight, touch, taste).

We aimed to measure three things:
1) Whether scene construction ability is lower in ASC than NT participants
2) Whether frequency of self-reference differs between diagnostic groups
3) Whether frequency of descriptions of sensory experiences differs between diagnostic groups.

egocentric direction and distance of boundaries

allocentric code
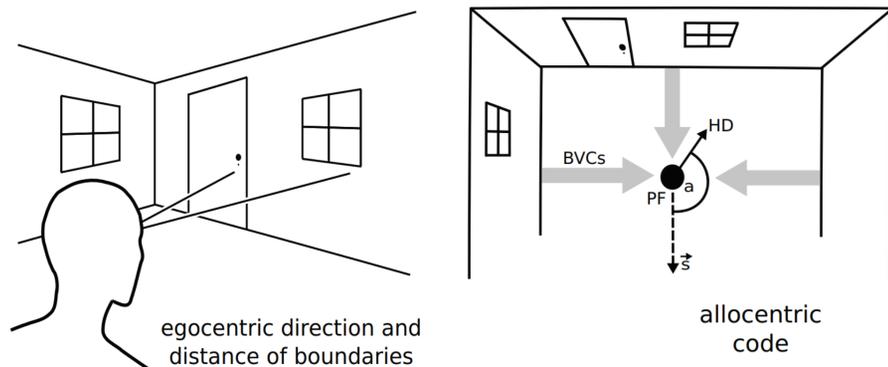
Bicanski & Burgess (2018)

Results

1) Scene Construction

- Main effect of diagnostic group: lower imagination index scores in ASC compared to NT participants, $F(1, 114) = 4.70$, $p = .03$, $\eta_p^2 = 0.04$. Imagination index was also negatively associated with ASC traits, $r(117) = -.23$, $p = .01$, whereby participants with fewer autistic traits had higher scene construction ability.
- No main effect or interaction effect involving gender.
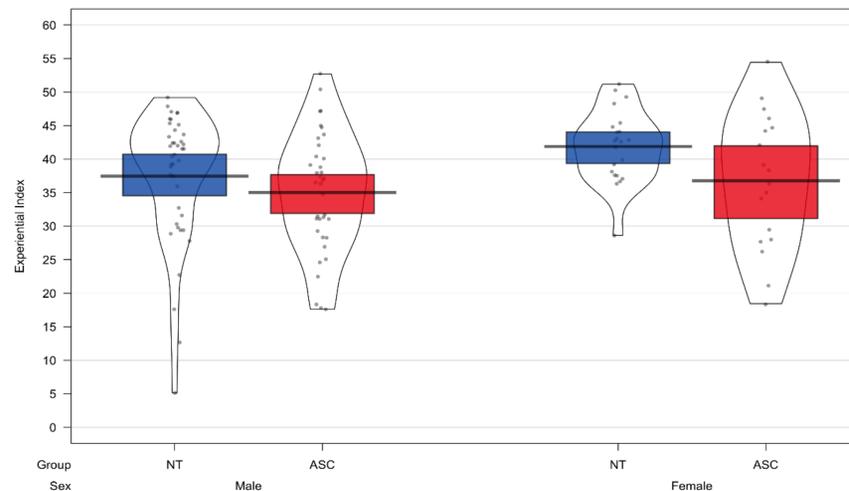
- Theory of Mind (ToM) ($\beta = .45$, $p = .002$) and Alexithymia (TAS-20) ($\beta = -.49$, $p = .02$) were significant predictors (positive and negative, respectively) of scene construction ability.
- Neither Autistic traits (AQ)($\beta = .21$, $p = .33$) or diagnosis (ASC/NT) ($\beta = -.05$, $p = .79$) significantly predicted scene construction once these effects were accounted for.
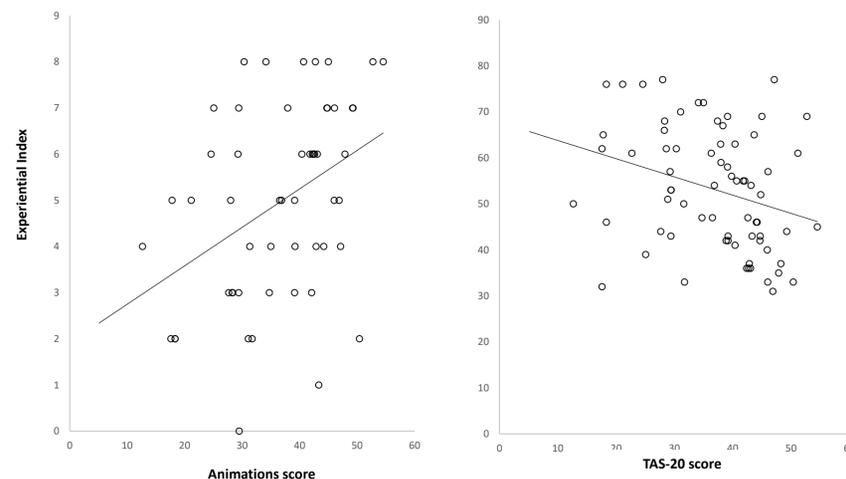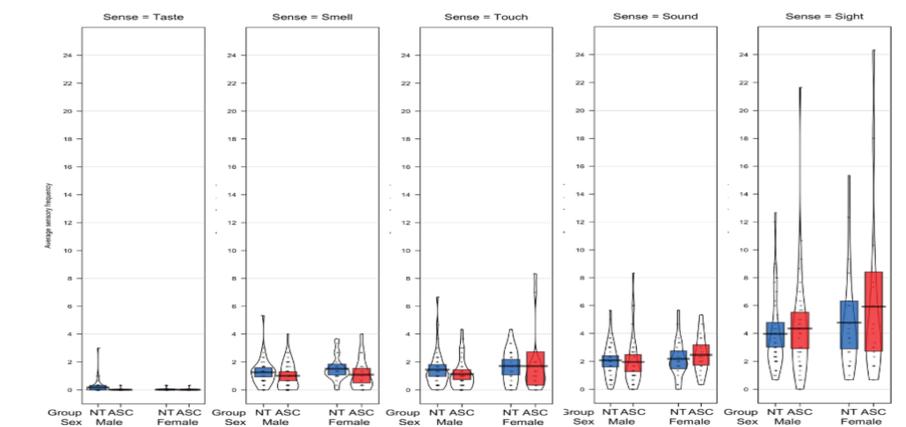

2) Self-Reference
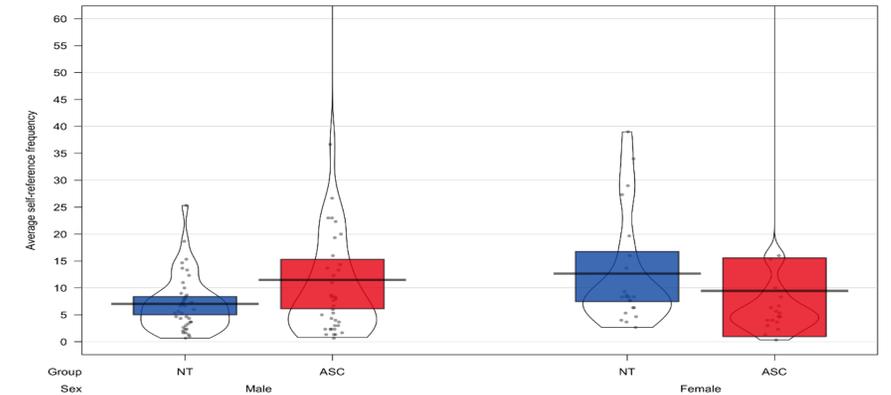
- Frequency of self-reference did not differ according to either diagnosis or gender, contrary to our predictions.

3) Sensory Experiences

- There was a main effect of sensory modality, $F(4, 456) = 97.00$, $p < .001$, $\eta_p^2 = .46$, whereby frequency of sensory references for each sensory modality followed the pattern of taste < smell = touch < sound < sight.
- No main effects or interaction effects involving diagnosis or gender.

Conclusions

- Overall, the results suggest that scene construction ability is impaired in ASC, however it might not be caused by autism per se., but by co-morbid social difficulties (including ToM and alexithymia) which are more prevalent in ASC than in the general population.
- Whilst the evidence appeared to suggest that scene construction impairment in ASC is not influenced by impaired self-referential cognition, it might be that in high functioning individuals with ASC, learnt strategies allow them to compensate for their self-referential cognition difficulty in social contexts (e.g., when describing a scene).

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