How sensitive are we to different action qualities?

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Introduction

- Action perception is very important for humans interacting in social spaces.
- Since it is the only way in which we can interact with and influence the world, studying human abilities to observe and interpret behaviours gives critical insights into the minds of people and how we make sense of each other.
- Recently a 4-dimensional model of action space has been proposed by *Vinton et al. (2022)*; there are 4 key action qualities on which we evaluate human actions: **friendliness**, **formidableness** (intensity or powerfulness of the action), whether the action is **planned** or intentional, and **abduction** (movement of limbs or objects towards or away from the actor's body)
- Previous research has suggested interindividual variability in action perception. For example, Autistic Spectrum Condition (ASC) is one of the most important conditions impacting action perception (e.g. Cole et al., 2017)
- In this study, we set out to achieve 2 principal aims: The first aim of the experiment was to measure the ability of individuals to discriminate actions along the 4 different action dimensions. The second aim was to measure how Autistic traits impacted action discrimination performance.
- ***Hypothesis***: 1. Participants will discriminate best action qualities on which actions vary the most. 2. Participants' ability to discriminate action qualities will be influenced by the degree to which they show autistic traits.

Methods

Participants:

- 16 University of York students – normal to corrected-to-normal vision (more data to be collected this year)

Stimuli

- Actions were selected based upon the 4-dimensional model of action perception; actions were located on either end of one dimension (i.e. one friendly, and one unfriendly) whilst they varied very little on the other dimensions (formidableness, planned, abduction).
- The actions chosen were: Stealing, Laughing (Friendliness), Tearing up paper, Pushing an object gently (Formidableness), Mopping the floor, Shivering (Planned), Throwing, Opening a bottle (Abducting).
- Unity game engine (https://unity.com), used for morphing actions along dimension in 1% steps (from 0% action 1 + 100% action 2 up to 100% action 1 + 0% action 2). In total: 101 morphs x 4 action continua = 404 actions.

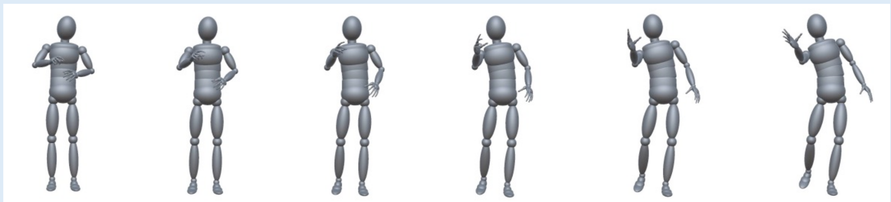

Figure 1. Illustration of frames (0, 20, 40, 60, 80, 100) from Opening a bottle to throwing action morph (Abducting).

Procedure:

- Discrimination tasks compacted of series of 4 separate blocks (approximately 15 minutes long), where participants were presented with sequential pairs of actions (a standard: 50% action 1 and 50% action 2 & a "comparison"). Participants decided which action conveyed the most of the different action qualities. The quality conveyed by the comparison action was determined a 4 interleaved staircases – these were determined by the previous responses of the participant. This 'adaptive' method is efficient and focuses data where we can best understand the participant's perceptual performance. Tasks were repeated until we had the 'best' estimate of each participants' discrimination performance – measured by fitting psychometric functions to the data
- In some tasks the action morph quality coincided with the tasks, in others it was different.
- Finally, a short online questionnaire (Autistic Quotient; Baron-Cohen et al., 2001) was used to measure the degree of autistic traits in each participant.

Results

Figure 2. Ability to discriminate action qualities from morphed actions. JNDs represent perceptual performance, here low values indicate high performance, whilst high values represent poor performance. Light green (same) participants discriminate the same quality on which the actions vary. Dark green (different) participants are discriminating other qualities than the quality on which the actions vary.

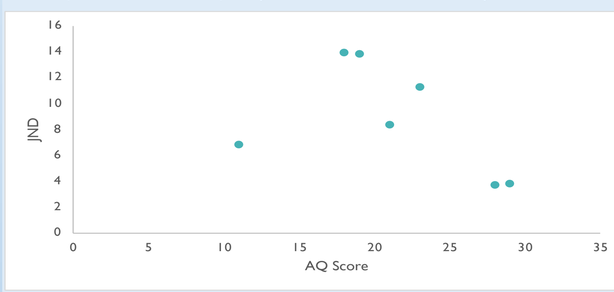

Figure 3. Action discrimination as a function of AQ.

Conclusions

- So far, the data is largely in line with our predictions: participants perform better when they discriminate the action quality on which the actions vary the most.
- However, participants appear also to be able to discriminate other action qualities even when stimuli don't vary much on that dimension.
- Higher discrimination performance is associated with a higher degree of autistic traits. This might suggest that autistic traits enhance action perception.
- This research is ongoing, and the collection of data will continue through the coming months. We expect additional data to help clarify the patterns we have observed to date.

References

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