

# Does Perceptual Salience Explain Altered Social Categorisation in Children with Autism Spectrum Disorder?



**BETA**

Biological & Experience-based Trajectories in Adolescent brain & cognitive development

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## SOCIAL CATEGORISATION PARADIGM

**permanent** versus **transient** visual traits

HAIR COLOUR or SKIN TONE CLOTHING colour

social categorisation simplifies stimulus processing

→ less energy is needed to navigate social world

detail oriented information processing in autism

→ decreased efficiency of simplification

### PREVIOUS FINDINGS

(Kiss, Oláh, Fehér & Topál, *SciRep* 2021)

**ASD children (3-12y) do not, while neurotypical (NT) children strongly rely on skin tone over clothing colour as a basis of category formation.** (There was no difference in the case of hair colour.) We employed a card sorting task which is easy to use in ASD and in children, however, methodological concerns have been raised.

### CURRENT AIMS

**Theoretical question:** Altered social processing or altered lower level visual processing (Weak Central Coherence - WCC) explains the above results?

**Methodological piloting:**

- Is transient feature preference in ASD still observable with balanced perceptual salience of the two features?
- Can ASD children carry out an eye-movement based version of the task?
- Is transient feature preference still there in the eye-movement based version?

### SKIN vs T-shirt

### HAIR vs T-shirt

#### PROTOTYPE:

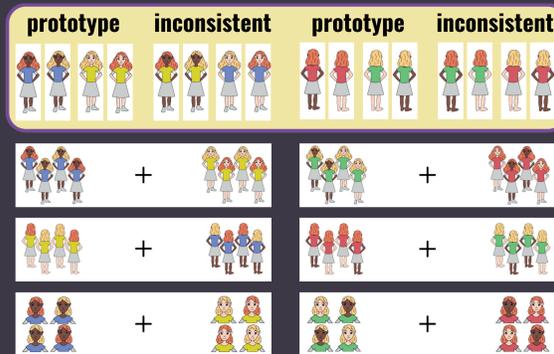
Individual that fits perfectly in one group

#### INCONSISTENT:

Individual that fits into one group by Transient and the other by Permanent trait --> shows what is used for categorisation

#### 2 Main Types:

- Skin tone vs Clothing (blue, yellow)
- Hair colour vs Clothing (red, green)



### 3 CONDITIONS (visual distribution of traits):

- **FRONT facing** (original study) - clothing central, skin scattered (face, arms, legs)
- **BACK facing** (NEW) hair more central, skin scattered
- **only TOP** (NEW) hair more scattered, skin central

### BALANCING SALIENCY:

- differently coloured surfaces have equal surface area
- saliency of colours is balanced while still using natural hair and skin tones

## RELEVANCE OF PILOT

### Possible roadblocks for participants:

- Difficulties in understanding task
    - More abstract than card sorting
    - Requires some receptive language skills
  - Less adaptable to individual behavioural/communication needs
- Paradigm changes** (calibrated salience, new conditions, eye-tracking)

### CONCLUSIONS OF PILOT

**More excluded subjects** than in card sorting:

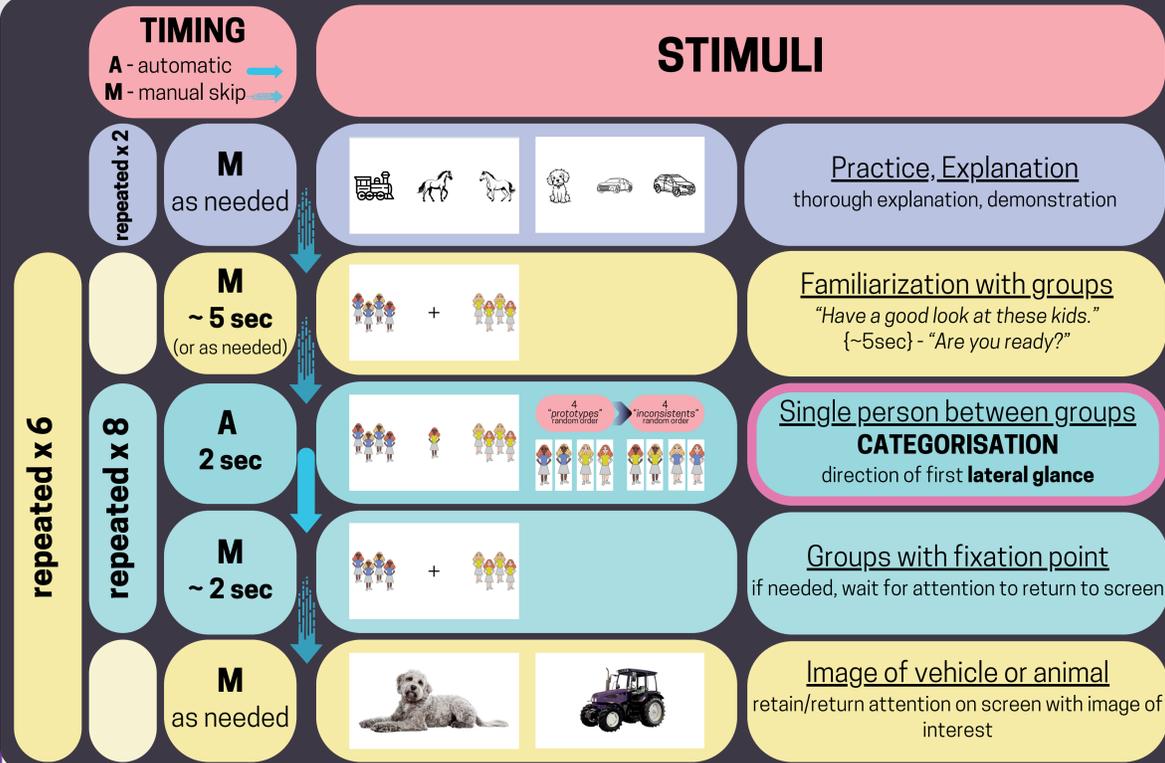
- Less easy to understand task
- Stimming behaviours (rocking, hand movements in front of screen) and extraneous movement (severe ADHD) interfere with recordings
- Attention retention for 7-10 minutes can be a challenge

As hoped, **viewing patterns can be identified**

- TOP condition appears to be most generally salient
  - Possibility for shortened task using only these conditions
- Not enough data for final conclusions yet

### PRELIMINARY RESULTS

- **ASD children showed a general preference for the Transient trait**
- Specificity for SKIN in TOP condition

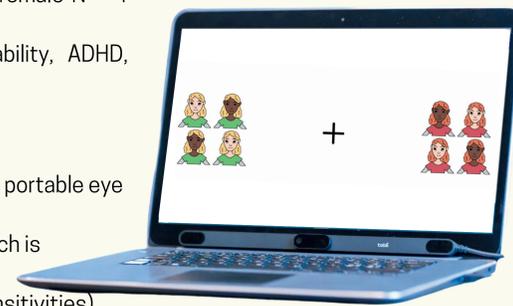


### PARTICIPANTS

- **7-12** (m = 9.61) year old **Autistic children** (N = 14 male, female N = 4 female)
- **Level 2-3 ASD**, majority with comorbid Intellectual Disability, ADHD, language disorders, etc

### DATA ACQUISITION

- **Stimuli were presented** on computer screen equipped with a portable eye tracker (Tobii Pro Spark)
- **Data acquisition in non-novel environment** (e.g. school), which is important for this cohort
- Subject can move (to a degree) and no head gear (sensory sensitivities)



### Why Eye-Tracking?

- **Implicit responses** instead of previously used behavioural choices --> **First lateral glance** coded as categorisation choice
- **Nonverbal response** (target demographic includes level 2-3 autistic children, often non-verbal/intellectual disabilities/other comorbid conditions)
- **Adds important extra datapoints** --> possible explanations of background behind categorisation strategies
- **Viewing patterns** of the stimuli --> what part of the figures attract gaze (face, other areas of skin, hair or clothing?)

One Sample Chi-Square test within all conditions: There was a significant difference\* between the number of Permanent and Transient category choices in all conditions except TOP HAIR where no significant difference was found.



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