Ultra-rapid categorization of meaningful real-life scenes in people with and without ASD

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Introduction

Ultra-fast categorization paradigm
(paradigm by Thorpe and colleagues, 1996)

Participants get a clear categorization goal in advance and succeed at detecting the object (animal) almost perfectly. Studies consistently report population-level reaction time differences in performance on different categorization tasks explained by a superset advantage (animal vs dog), perceptual similarity (animals vs vehicles) and object category size (natural vs animal vs dog).

In a previous study (Vanmarcke & Wagemans, 2015), we replicated these separate findings and found subtils, yet consistent, gender differences in typically developing adults (women faster than men).

Current study description

Variable | All (n=19) | Men (n=10) | Women (n=9) | All (n=19) | Men (n=10) | Women (n=9)
---|---|---|---|---|---|---
Age | 20.75 (8.97) | 20.80 (9.10) | 20.70 (7.64) | 20.79 (8.10) | 20.78 (7.58)
IQ | 114.3 (18.22) | 114.7 (17.74) | 114.0 (19.58) | 114.0 (18.02) | 113.6 (19.10)
Full Scale IQ | 116.3 (7.44) | 116.5 (7.34) | 116.1 (7.55) | 116.3 (7.39) | 116.0 (7.81)
SRRT-A (Overall) | 86.06 (9.11) | 86.97 (9.20) | 85.16 (8.83) | 86.06 (9.12) | 85.49 (5.51)
SRRT-A (Overall) | 98 (11.11) | 98.70 (11.15) | 98.00 (11.75) | 98.70 (11.80) | 97.64 (7.59)

Results

Baseline

Animal/vehicle Task

Questions

Was the scene manmade?
Was there an animal in the scene?
Was there a dog in the scene?
Was the scene natural?
Was there a vehicle in the scene?
Was there a car in the scene?

Social Task

Questions

Did the scene happen indoor?
Did the scene depict a positive interaction?

Stimuli

1. Behavioral baseline
2. Animal / vehicle task
3. Social task

Experimental design

Conclusions

(1) Replication of the three central observations (Level of categorization, Goal and Animacy) in ultra-rapid categorization in typically developing adults within a group of young adults with a clinical ASD diagnosis.
(2) Simple, but rapid, motor responses and the basic go/no-go categorization of geometrical figures (circle/triangle) did not differentially affect performance between people with/without ASD.
(3) Result argue against a general deficit in ultra-rapid gist perception of visual information in participants with ASD.
(4) Specific problem with the fast processing and correct categorization of social relations in people with ASD.

Future research

(1) Adjusting the specific task demands (e.g., meaningfulness, relevance, duration) and task design (e.g., change blindness, perceptual mask).
(2) ASD is a developmental disorder, deficits in the rapid extraction of the global gist of an image might become more visible when testing younger children.
(3) Further quantifying the observed differences in responding on emotionally relevant social information (e.g., semantic appraisal, ...).

References


