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Social Cognition in Adults with Autism Spectrum Disorders: Validation of the Edinburgh Social Cognition Test (ESCoT)

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THE UNIVERSITY of EDINBURGH — Centre for Cognitive Ageing and Cognitive Epidemiology

Lifelong Health & Wellbeing — Research for Healthy Ageing

Current Project

Current neuropsychological tools used to assess social cognition have:
1) Limited use in clinical settings.
2) Do not assess the different aspects of social cognition within the same test.

The objective of this project was to validate a novel measure of social cognitive functioning called the Edinburgh Social Cognition Test (ESCoT) using adults with ASD.

The ESCoT consists of ten dynamic, animated scenarios that are all self-contained narratives that depict an array of interactions.

It measures Cognitive Theory of Mind (ToM) and Affective ToM[1] and Interpersonal and Intrapersonal Understanding of Social Norms.

ESCoT Questions

Cognitive ToM
- What is X thinking?

Affective ToM
- How does X feel at the end of the animation?

Interpersonal Understanding of Social Norms
- Did X behave as other people should behave?

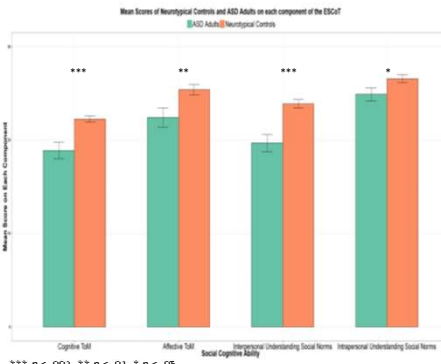Intrapersonal Understanding of Social Norms (Self-Reference)
- Would you have acted the same as X in the animation?

All questions are scored on a 0 – 3 point graded system. Participants can score a maximum of 30 in each component and a total of 120.
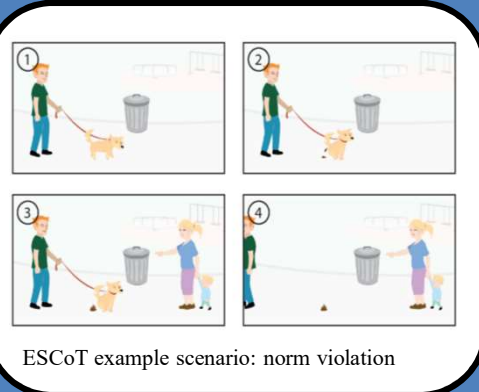
ESCoT example scenario: norm violation

Results

*** $p < .001$, ** $p < .01$, * $p < .05$

A MANOVA was used to compare performance on each of the four components of the ESCoT.

The multivariate result was significant, V =.40, $F_{(4, 52)} = 8.97$, $p < .001$, $\eta p2 = .408$, indicating differential performance on the ESCoT between the two groups.

Bayesian analyses

Due to the relatively small sample size of the ASD group, Bayesian analyses were conducted to examine the evidence for the alternative hypotheses. The neurotypical group were predicted to perform significantly better than the ASD group in all components of the ESCoT.

The analyses used the default effect size prior of .707.

	BF[10]	Error % (±)	p(H1|D) (%)
Cognitive ToM	834.476	2.722e-7	99.88
Affective ToM	10.677	3.982e-6	91.43
Interpersonal Understanding of Social Norms	608.396	1.553e-7	99.83
Intrapersonal Understanding of Social Norms	4.452	3.015e-7	81.65
Total ESCoT Score	47788.078	9.386e-11	99.99

*higher Bayes Factors (BF[10]) indicates stronger evidence for the alternative hypothesis. p(H1|D) = the likelihood that this result would occur next time, expressed as a percent.

ESCoT example scenario: non-norm violation

Discussion

The results demonstrated that the ASD group were impaired in all components of the ESCoT compared to neuro-typicals.

Bayesian analysis indicated that there is extreme evidence for the alternative hypotheses in the Cognitive ToM and Interpersonal Understanding of Social Norms components.

Evidence for a significant difference between the groups in Affective ToM was strong and moderate for Intrapersonal Understanding of Social Norms.

These results suggest that the ESCoT is a sensitive measure of social cognition. It is hoped that the ESCoT will be used as a tool to assess social abilities in healthy and clinical populations.
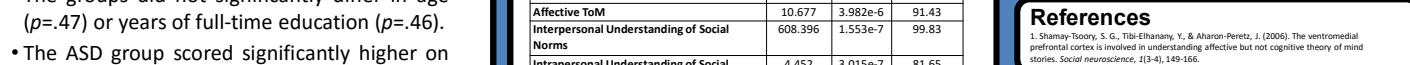
Method

Participants

• N=19 adults with High-Functioning Autism or Asperger syndrome. Diagnosis of ASD was confirmed via official diagnosis letters.
• N=38 neurotypical controls.
• Aged between 19 and 67.

	ASD Group	Neurotypical Group
Mean Age (S.D.)	38.97 (14.77)	38.47 (15.63)
Years of Full-Time Education (S.D.)	15.21 (2.53)	15.76 (2.68)
Males:Females	12:7	23:15
Autism Spectrum Quotient (AQ; 0-50)	34.63 (7.43)	15.31 (5.86)

• The groups did not significantly differ in age (p=.47) or years of full-time education (p=.46).
• The ASD group scored significantly higher on the AQ than the neurotypical controls ($p < .0001$).

References

1. Shamay-Tsoory, S. G., Tibi-Elhanany, Y., & Aharon-Peretz, J. (2006). The ventromedial prefrontal cortex is involved in understanding affective but not cognitive theory of mind stories. *Social neuroscience*, 1(3-4), 149-166.

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