

Integrating intention and context: assessing social cognition in adults with Asperger syndrome

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INTRODUCTION

Deficits in social cognition are an evident clinical feature of the Asperger syndrome (AS). Recent reports suggest that adults with Asperger Syndrome (AAS) exhibit deficits in multiple social cognition domains including face recognition (Ashwin et al., 2007), emotional processing (O'Connor et al., 2007; Dziobek et al., 2008), ToM (Baron-Cohen et al., 2001; Zalla et al., 2009), empathy (Rogers et al., 2007; Dziobek et al., 2008) and moral judgment (Moran et al., 2011). Nevertheless, previous studies have not taken into account several factors that should be considered simultaneously in the social cognition research of these individuals. These factors include: (a) the simultaneous assessment of multiple social cognition domains, (b) the sample selection, (c) the assessment executive functions (EF), and (c) the cognitive heterogeneity of the AS. In the present study, we considered all of these aspects, which are essential for establishing the underlying factors that contribute to the social cognition deficits of AAS.

RESULTS

Phonological fluency	13.10 (4.78)	14.92 (2.43)	0.21
Simple design fluency	8.50 (2.71)	10.00 (3.01)	0.17
Switching design fluency	8.9 (2.70)	11.14 (2.47)	0.03
T.M.T-B	74.50 (27.23)	63.30 (14.17)	0.19
Hayling Test	9.07 (7.36)	6.00 (3.89)	0.19
Flanker Task			
Reaction Time (congruent)	667.32 (164.66)	629.11 (134.89)	0.52
Accuracy (congruent)	99.71 (0.89)	99.77 (0.83)	0.85
Reaction Time (incongruent)	718.50 (145.11)	713.19 (121.49)	0.91
Accuracy (incongruent)	98.57 (2.45)	98.65 (2.02)	0.92
Set Shifting Task			
Reaction Time (shape)	602.15 (118.08)	632.04 (191.65)	0.43
Accuracy (shape)	93.74 (2.78)	97.91 (3.56)	0.38
Reaction Time (color)	654.78 (314.38)	588.42 (130.57)	0.47
Accuracy (color)	97.91 (4.27)	98.47 (2.12)	0.67
Reaction Time (incongruent)	794.03 (166.71)	745.03 (192.72)	0.24
Accuracy (incongruent)	95.82 (2.84)	96.42 (2.65)	0.59
1-Back			
Reaction Time	870.58 (169.03)	825.90 (173.86)	0.50
Accuracy	90.24 (12.59)	88.80 (8.53)	0.72
Dot counting task	23.92 (11.16)	24.28 (11.11)	0.93

Table 1. EF assessment.

No differences in verbal fluency, inhibitory control, interference control, or working memory were observed (Table 1). However, the AAS performed significantly lower than controls on the switching design fluency task ($F(1, 28) = 5.10, p < .05$).

The AAS showed impairments in several social cognition domains (emotion recognition, ToM, empathy and self-monitoring in social settings). Specifically, the AAS performed poorly on those social cognition tasks (TASIT, FPT and EPT) that involve an implicit encoding of socially relevant information and the automatic integration of contextual information to solve a given social situation.

Conversely, AS individuals performed as well as controls in some tasks (RMET, moral judgment task and SNQ) that had common features. See figure 1.

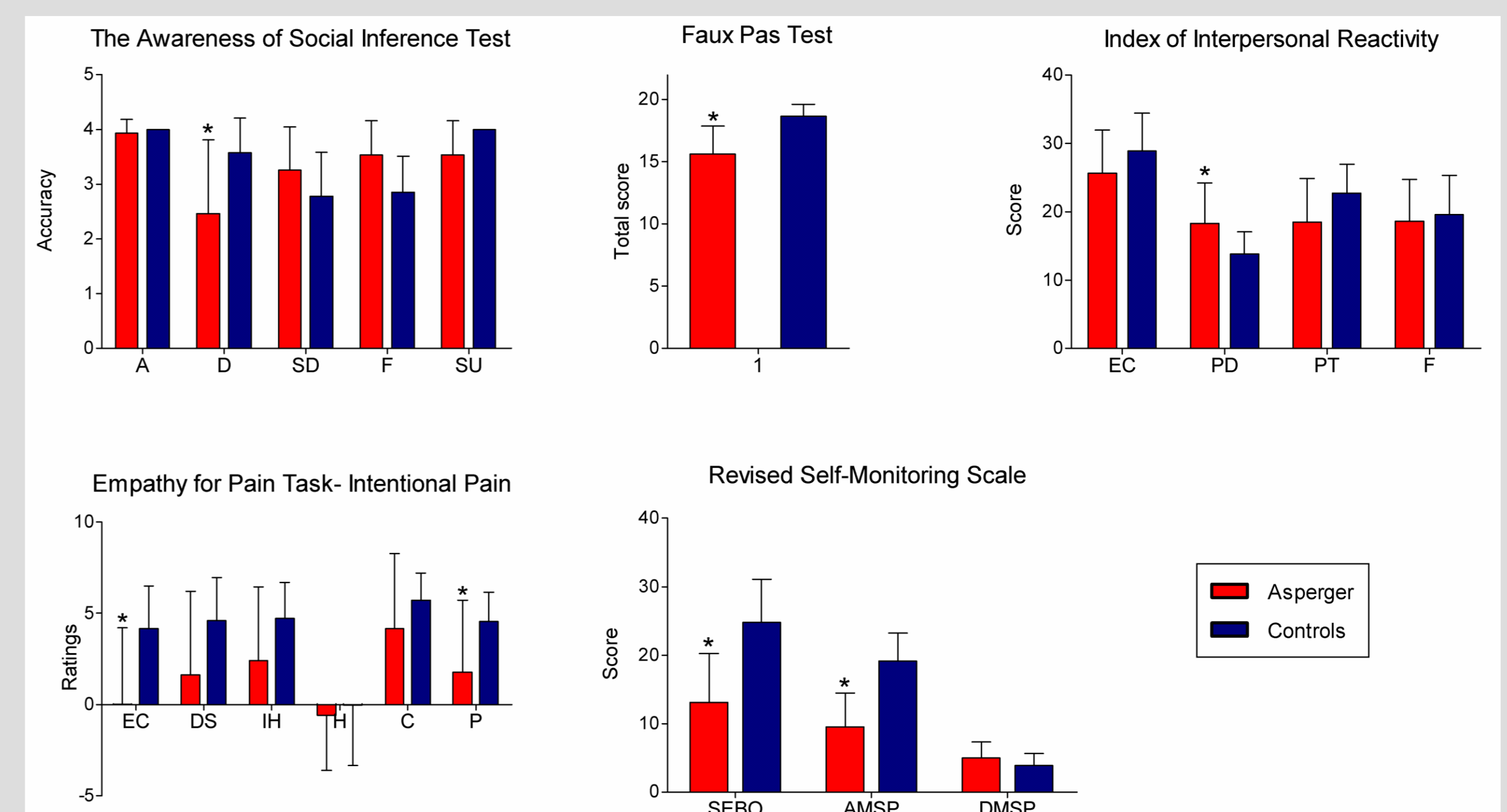


Figure 1. Significant differences between groups in social cognition tasks.

A larger proportion of the social cognition measures compared to the EF measures exceeded the maximum range of the z-scores calculated based on the control group performance. In the AS group subnormal performance was higher than supra-normal. We examined the correlation between the EF measures with the greatest variability, and the total scores on the social cognition tasks that were significantly different between groups. No significant correlations were observed.

CONCLUSIONS

Our study documents multiple social cognition deficits as fundamental features of the AS diagnosis. Our results showed that AAS present a pattern of social cognition deficits characterized by impairments, the implicit encoding and the integration of contextual information in order to access to the social meaning. However, when social information is explicitly presented and the situation can be solved with abstract rules, the individuals with AS usually perform as well as controls. We also found that individual profiles of AAS showed subnormal performance in social cognition measures. These deficits were not explained by abnormalities in EF.

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METHODS

Participants

Fifteen adults diagnosed with AS and 15 matched healthy controls completed a battery of EF social cognition tasks. All AAS had an estimated IQ above 94 ($SD \leq 7.42$). Patients met the diagnostic and statistical manual of mental disorders (DSM-IV) criteria for AS (American Psychiatric Association, 1994).

EF assessment

Verbal and design fluency tests
Trail Making Test
Hayling Test

Flanker Test
Set shifting Task
Dot Counting Task
1-Back

Social cognition tasks

Recognition of emotional states

The awareness of social inference test (TASIT)

Theory of mind

Reading the mind in the eyes test
Faux Pas test

Empathy

Empathy for pain task (EPT)
Interpersonal Reactivity Index (IRI)(Davis, 1983)



Moral judgment task



Social norms questionnaire (SNQ)
Revised self-monitoring scale (RSMS)

Intent	Outcome	
	Neutral	Negative
Neutral	Grace thinks the powder is sugar. It is sugar. Her friend is fine.	Grace thinks the powder is sugar. It is toxic. Her friend dies.
Negative	Grace thinks the powder is toxic. It is sugar. Her friend is fine.	Grace thinks the powder is toxic. It is toxic. Her friend dies.

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