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Social cognition impairments in Asperger syndrome and schizophrenia

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ABSTRACT

Social cognition impairments are well described in both autism spectrum disorders, including Asperger syndrome (AS), and in schizophrenia spectrum disorders. However, little is known about whether there are differences between the two groups of disorders regarding this ability. The aim of this study was to compare social cognition abilities in AS and schizophrenia. Fifty-three individuals (26 men, 27 women) with a clinical diagnosis of AS, 36 (22 men, 14 women) with a clinical diagnosis of schizophrenic psychosis, and 50 non-clinical controls (19 men, 31 women) participated in the study. Clinical diagnoses were confirmed either by Structured Clinical Interview on DSM-IV diagnosis or the Diagnostic Interview for Social and Communication Disorders. Verbal ability was assessed using the Vocabulary subtest of the WAIS-III. Two social cognition instruments were used: Reading the Mind in the Eyes Test (Eyes Test) and the Animations Task. On the Eyes Test, patients with schizophrenia showed poorer results compared to non-clinical controls; however, no other group differences were seen. Both clinical groups scored significantly lower than the comparison group on the Animations Task. The AS group performed somewhat better than the schizophrenia group. Some differences were accounted for by gender effects. Implicit social cognition impairments appear to be at least as severe in schizophrenia as they are in AS. Possible gender differences have to be taken into account in future research on this topic.

1. Introduction

Autism spectrum disorders (ASDs) and schizophrenia are separate syndromes in terms of defining symptom criteria, age of onset, and course. However, both syndromes are of neurodevelopmental origin (Fatemi and Folsom, 2009; Coleman and Gillberg, 2011), have a genetic basis which partly overlaps (McCarthy et al., 2009; Craddock and Owen, 2010; Owen et al., 2011), and show marked impairments in the area of social cognition (Abdi and Sharma, 2004). Although related to neurocognition, social cognition is considered a separate cognitive domain (Sergi et al., 2007; Pickup, 2008). Social cognition can be defined as "the mental operations underlying social interactions, which include the human ability to perceive the intentions and dispositions of others and the cognitive processes that subserve behaviour in response to others" (Brothers, 1990). It is a central human cognitive ability, essential for understanding social information (Frith and Frith, 2007). Social cognition is an umbrella term including functions such as theory of mind, attributional style, and social perception. Theory of mind (ToM) is a social cognitive faculty that involves the ability to attribute independent mental states to oneself and others in order to explain and predict behaviour. Attributional style is described as an individual's characteristic way of explaining events (Pinkham et al., 2003; Penn et al., 2008). Social perception comprises abilities crucial for social cognition such as emotion perception, including facial affect recognition, and social cue recognition.

Impairment in social cognition is among the core features of ASDs. ASDs, classified as pervasive developmental disorders (PDD) in the DSM-IV-TR (APA, 2000), are relatively common social communication disorders that affect approximately 0.6–1.6% of the general population (Baird et al., 2006; Fernell and Gillberg, 2010). ASDs share a core triad of characteristics: 1) qualitative impairments in reciprocal social interactions, 2) qualitative impairments in verbal and non-verbal communication, and 3) restricted social imagination with repetitive and stereotyped patterns of interests and behaviour. The DSM-IV includes autistic disorder (AD) (pervasive deficits in all three domains), Asperger syndrome (AS) (pervasive deficits in social interaction and behaviours in the presence of superficially normal expressive verbal development) and pervasive developmental disorder not otherwise specified (PDD-NOS) (not meeting full criteria for either AD or AS, but with pervasive deficit in social interaction) (APA, 2000). Extensive research on different aspects of social cognition disabilities in ASD, in particular ToM and social perception, has shown predominantly reduced performance (Klin, 2000; Tager-Flusberg, 2007; Pisula, 2010), even though some recent studies question this assumption (Wright et al., 2008; Williams and Happe, 2010), and the real life impairments can be difficult to fully capture in experimental tasks.

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During the last decade, there has been an increasing focus on social cognitive deficits also in schizophrenia and closely related disorders. Numerous studies have shown that people with schizophrenia perform poorly on tests of social cognition (Couture et al., 2006; Sprong et al., 2007; Green et al., 2008). Moreover, it has been shown that social cognitive impairment is a major factor contributing to low functional outcome among patients with schizophrenia (Bell et al., 2009; Couture et al., 2011; Fett et al., 2011).

Although social cognition is currently of great research interest in both ASD and schizophrenia, only a few prior studies have made direct comparisons between the two conditions. One recent study comparing ToM in the two disorders, demonstrated worse performance in individuals with AS (Ozguven et al., 2010). However, in this study, schizophrenia patients with a high level of negative symptoms showed as marked ToM impairments as the AS group. A few small-scale studies on adults have revealed no differences between schizophrenia and "high-functioning" ASD on social cognition tasks (Craig et al., 2004; Murphy, 2006; Couture et al., 2010). One study on children showed poor ToM abilities in both ASD and schizophrenia (Pilowsky et al., 2000). In contrast, in a study on facial affect recognition in children and young adults, those with ASD performed significantly worse than those with schizophrenia (Bolte and Poustka, 2003). A small comparative study indicated a shared abnormality between the two disorders in utilising facial information (Sasson et al., 2007). Neural activation during social cognitive demands was compared in an fMRI study, showing a similar pattern between ASD and paranoid schizophrenia, but not between ASD and non-paranoid schizophrenia (Pinkham et al., 2008). None of the comparative studies have taken potential gender effects into account.

The aim of the present study was to compare social cognition abilities in adults with AS and adults with schizophrenia, comparing the results of these groups to those of an age matched non-clinical group. Our purpose was to include both men and women, so as to allow analysis of possible gender influences on the results obtained. Our intention was to select instruments assessing different components of social cognition, and with low demands on verbal memory. In order to control for the possible influence of verbal ability on the results, such a measure was included.

Although numerous instruments have been developed, there is no consensus on the assessment of the different components of social cognition. Traditional ToM measures, usually consisting of social vignettes followed by questions, rely heavily on verbal memory, which may, especially in patients with schizophrenia, influence results. In addition, standard ToM tasks based on social stories do not capture "on-line" spontaneous ToM as it occurs in daily life (Klin, 2000; Frith, 2004). We sought to address these concerns by using the Animations Task, which is designed to assess implicit aspects of ToM, without requiring high demands on verbal memory. The task was originally developed for ASD research (Abell et al., 2000; Castelli et al., 2000, 2002), but has also been applied in studies on schizophrenia in its original version (Russell et al., 2006; Horan et al., 2009; Koelkebeck et al., 2010), as well as in a modified adaptation (Bell et al., 2010). In order to add a complementary task on social perception, a facial affect recognition task, the Reading the Mind in the Eyes Test (Baron-Cohen et al., 2001a), was included. Originally, the instrument was described as an advanced ToM measure, sensitive to "mind reading" ability in adults with normal intelligence. However, according to the general definitions of social cognition concepts, we consider it a measure of facial affect recognition (social perception) rather than a measure of ToM.

2. Method

2.1. Participants

A total of 139 individuals with clinical diagnoses of either AS ($n=53$) or schizophrenic psychosis ($n=36$) or no known neurodevelopmental/neuropsychiatric clinical diagnosis ($n=50$) were included in the study. Demographic characteristics for the three study groups are presented in Table 1. The recruitment procedures for the two clinical groups have been described in detail in two previous papers (Lugnegård et al., 2011; Unenge Hallerbäck, 2012). All participants provided informed consent and were seen personally in an outpatient setting. The study was approved by the Medical Ethical Review Board at Uppsala.

2.1.1. Asperger syndrome group (AS)

The 53 individuals (26 males, 27 females) with a clinical diagnosis of AS were recruited from two different outpatient clinics in Värmland, providing services for people with neurodevelopmental/neuropsychiatric disorders including AS and other ASDs. Clinical diagnoses had originally been assessed by psychiatrists and/or psychologists working in neurodevelopmental assessment teams, and diagnoses were based on DSM criteria. For the majority of participants (45 out of 53), an assessment with the Eleventh version of the Diagnostic Interview for Social and Communication Disorders (DISCO-11) (Wing et al., 2002) with a parent was performed within the present study. The diagnosis of AS was confirmed in all of the 45 DISCO-11-assessed cases. However, 20 of these 45 had some ($n=12$) or considerable ($n=8$) symptoms before age 3 years, and were discussed for a diagnosis of AD. However, given that symptom criteria for AS were met in all cases, the clinical AS diagnosis was also considered to be confirmed in these cases. None of the DISCO-11-assessed cases fulfilled criteria of PDD-NOS, and individuals with an original clinical diagnosis of PDD-NOS were never included in the study.

Originally, 54 individuals were included; however, assessment results essential for this study were not available for one participant. Clinical characteristics of the AS group are shown in Table 2.

2.1.2. Schizophrenic psychosis group (SCH)

The 36 individuals (22 males, 14 females) with a clinical diagnosis of schizophrenic psychosis (schizophrenia, schizoaffective disorder or schizophreniform disorder) were recruited from the only psychiatric outpatient clinic in the county of Värmland ($n=33$) or one of the psychiatric outpatient clinics in Gothenburg ($n=3$). By administering the Structured Clinical Interview for DSM-IV diagnosis (SCID-I) (First and Gibbon, 2004), a diagnosis of schizophrenic psychosis was confirmed in 31 of the 36 patients. Five patients met criteria for Psychotic disorder Not Otherwise Specified instead; all five of these had a history of several, schizophrenia-like psychotic episodes requiring inpatient treatment; however, a distinction between schizoaffective disorder and schizophrenia was not possible due to uncertain information on mood symptoms, neither was a distinction between schizophrenia and schizophreniform disorder possible due to uncertain information on the duration of episodes. Due to the SCID-I-based symptom information, and due to their original clinical diagnosis, these five patients with psychotic disorder NOS were still retained for participation in the study. Clinical characteristics of the SCH group are shown in Table 3.

Originally, 46 patients with a clinical diagnosis of schizophrenic psychosis had been included in the study. However, for two patients no psychotic disorder could be confirmed by the SCID-I, two other patients were instead shown to have bipolar I disorder, one patient had only substance-induced psychotic disorder, and for five individuals the social cognition measures were not possible to assess due to participation withdrawal from this part of the study.

Table 1
Demographic and clinical characteristics of all participants.

Characteristic	SCH $n=36$	AS $n=53$	NCC $n=50$	Statistics	p
Mean age, years (s.d)	28.8 (4.1)	27.3 (4.1)	28.8 (9.3)	$F=0.934$	.396
Male:female	22: 14	26: 27	19: 31	$x^2=4.503$	.105
Mean WAIS Vocabulary, scaled score[a] (s.d.)	9.4 (2.2)	10.4 (2.3)	9.9 (2.1)	$F=2.176$	.118

[a] Data missing for four SCH and four AS participants.