

Chapter 10

SOCIAL COGNITION IN SCHIZOPHRENIA CHRONIC OUTPATIENTS

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ABSTRACT

Social cognition is one of the core impaired cognitive domains that characterize schizophrenia. At the same time it is one of the most relevant factors in the prediction of social functioning. However, although social cognition deficits are well established in the literature, most of the studies have focused on inpatients and less attention has been devoted to stable outpatients with many years since the illness onset. Social cognition includes four domains: emotion processing, Theory of Mind (ToM), social perception and social knowledge, and attributional bias (Green et al., 2008). Our goal was to compare a group of schizophrenic stable outpatients with a healthy control group in ToM, social knowledge and emotion processing (identification and discrimination of emotions). Fifteen outpatients and 15 healthy controls matched in age and education level were given the “Hinting task” to measure ToM, the “Schema component sequencing task-revised” to assess social knowledge, the “Face emotion identification” and “Face emotion discrimination” tests to assess emotion processing. Moreover both groups were compared in social functioning using the “Social Functioning Scale”. Results showed differences between the two groups in social knowledge and ToM but not in emotion identification and emotion discrimination.

Keywords: schizophrenia, social cognition, emotional processing, social perception, Theory of Mind.

1. INTRODUCTION

Schizophrenia is a severe mental disorder characterized, among other things, by the presence of a series of cognitive deficits that have received great attention in recent decades. Most studies have focused on nonsocial cognitive processes such as attention, memory and executive functioning. However, since the mid of the 90 decade research has largely shifted its focus towards the so called social cognition (Brüne, 2005).

Currently it is considered that social cognition is one of the core impaired cognitive domains that characterize schizophrenia (Savla, Vella, Armstrong, Penn, & Twamley, 2013). Social cognition has been defined as the sum of the cognitive processes required for social perception and social interaction (Brown, Tas, & Brüne, 2012). According to Striano and Reid (2009) and Green et al. (2008), social cognition involves our ability to predict, monitor, and interpret the behaviors and mental states of other people. Some of the most complete and most often used definitions of social cognition have been given by Ostrom (1984) and Brothers (1990). They define it as the mental operations needed in social interactions, which include processes involved in perceiving, interpreting and generating responses to the intentions, dispositions, and behaviors of others.

The Measurement and Treatment Research to Improve Cognition in Schizophrenia (MATRICS) project has focused on understanding the nature and extent of cognitive deficits in schizophrenia in order to promote the development of treatments that will hopefully improve this debilitating aspect of schizophrenia (Barch, 2005). MATRICS established seven cognitive domains where schizophrenic patients have deficits. These cognitive domains are: Speed of processing, working memory, attention/vigilance, verbal learning and memory, visual learning and memory, reasoning and problem solving, and social cognition (Green & Nuechterlein, 2004). The inclusion of social cognition between this set of domains involved the explicit recognition of the importance of social cognition as a specific area in which patients with schizophrenia have problems.

In summary the increasing attention devoted to social cognition in the last years can be explained by: The empirical evidence linking social cognition to social functioning (Brüne, 2005; Green & Nuechterlein, 1999; Green, Kern, Braff, & Mintz, 2000; Horan, Lee, & Green, 2013), its role as mediator between basic neurocognition and social cognition or social functioning (Brekke, Kay, Lee, & Green, 2005; Vauth, Rüsche, Wirtz, & Corrigan, 2004; Horan et al., 2013), the emergence of studies showing a neural substrate of social cognition (Adolphs, 2001; Insel & Fernald, 2004; Pinkham, Penn, Perkins, & Lieberman, 2003; Pinkham, 2013), and attention that is being given to the development of intervention programs for schizophrenic patients focused on social cognition (Andres, Brenner, Pfammatter, & Roder, 2001; Penn, Jones, & Munt, 2005; Fiszdon, 2013).

2. BACKGROUND

In the last 10 years social cognition has become a high-priority research topic because evidence has revealed that social cognition explains functioning and that deficits in social cognition have a direct impact on relapse rates (Brekke et al., 2005; Fett et al., 2011). Social cognition is a multicomponent concept including four key different domains: emotion processing, theory of mind, social perception and social knowledge, and attributional bias.

Emotional processing refers broadly to aspects of perceiving and using emotion. Emotion perception has been the most extensively studied social cognitive process and refers to the ability to infer emotional information from facial expressions, vocal inflections, or combination of both (Horan, Kern, Green, & Penn, 2008). Tasks to assess emotional processing include the recognition of both basic and complex emotions. Among the tasks to measure basic emotions is the classic Pictures of Facial Affect (Ekman & Friesen, 1976), consisting of 110 photographs of faces expressing different emotions. The goal of the task is to identify which is the emotion of the face in the picture: happy, sad, angry, afraid, surprised, disgusted, or neutral. Two tests developed from the work of Ekman and Friesen (1976) are the Face Emotion Identification Test (FEIT) (Kerr & Neale, 1993) and Face Emotion Discrimination Test (Kerr & Neale, 1993). The Cambridge Mindreading Face-Voice Battery-Adult version (CAM) (Golan, Baron-Cohen, & Hill, 2006) and the Reading the Mind in the Eyes Test (Baron-Cohen, Wheelwright, Spong, Scachill, & Lawson, 2001) can be used to evaluate complex emotions.

The findings in the area of emotional processing indicate that schizophrenics have a marked deficit in facial and vocal affect recognition (Baudouin, Martin, Tiberghien, Verlut, & Frank, 2002; Penn et al., 2000). These deficits are not related to age, gender, level of medication, or dosage of neuroleptics (Jaramillo, Fuentes, & Ruiz, 2009). In general, these deficits in facial affect recognition occur in both recognition and discrimination task (Penn, Combs, & Mohamed, 2001; Schneider, et al., 2006).

Theory of mind (ToM) is a name proposed by Premack and Woodruff (1978) for the component of social cognition that refers to the ability to understand that others have mental states that differ from one's own and the capacity to make correct inferences about the content of those mental states. Processes typically associated with ToM involve the ability to understand false beliefs, hints, intentions, humor deceptions, metaphor, and irony (Horan et al., 2008). The tests used in the study and measurement of ToM are usually cartoons that are read to each participant individually. Two of the instruments used in studies with patients with schizophrenia are the Faux Pas (Baron-Cohen, O'Riordan, Stone, Jones, & Plaisted, 1999) and the Hinting Task (Corcoran, Mercer, & Frith, 1995; Gil, Fernández-Modamio, & Arrieta, 2012).

The Hinting Task assesses the ability to infer the intentions behind speech. The test comprises 10 short stories that reflect the interaction between two characters. Each story ends with one of the characters "dropping a hint" and the participant has to explain what the character is trying to communicate. Several studies have shown that patients with schizophrenia present a diminution of their ability to infer the mental states of others and themselves (Brüne, 2003, 2005). Other authors suggest that it is necessary to have a non-impaired ToM to develop persecutory delusions (Bentall & Udachina, 2013; Drury, Robinson, & Birchwood, 1998; Watson, Blennerhassett, & Charlton, 2000).

Social perception refers to a person's ability to judge social cues from contextual information and communicative gestures that typically characterize social situations and guide social interactions. Social perception can also refer to one's perception of relationships between people, in addition to perception of cues that are generated by a single person. Social knowledge or Social schema is linked to social perception and refers to the ability to identify the components that characterize a social situation. The identification of the social signs requires the knowledge of what is typical in a social situation. It is the social schema that indicates the appropriate course of action, what is our role and the role of others in a social situation, and what rules to follow and the goal of that situation (Green & Horan, 2010; Ruiz-Ruiz, García-Ferrer, & Fuentes-Durá, 2006). Two tests can be used in the evaluation of social perception and social knowledge, the Schema Component Sequencing Task (SCRT) (Corrigan & Addis, 1995), or the Situational Feature Recognition Test (SFRT) (Corrigan, Buican, & Toomey, 1996).

Penn, Ritchie, Francis, Combs, and Martin (2002) state that people with schizophrenia do not use the context when processing social stimuli. They also spend more time in the less relevant features (Phillips & David, 1998), they have difficulty in grasping abstract type information (Nuechterlein & Dawson, 1984), and information that is not familiar to them (Ruiz-Ruiz et al., 2006). All this contributes to a poor perception of socially relevant stimuli and therefore of social knowledge.

Finally, attributional bias refers to how individuals characteristically explain the causes for positive and negative events in their lives (Horan et al., 2008). It has been observed that patients evaluate others more negatively and believe that others make negative assessments about them (Chadwick & Trover, 1997). In general, they tend to focus on a biased selection of the hostile or threatening aspects of others (Fenigstein, 1997). Attributional style is peculiar in paranoid symptomatology. People with delusions of persecution often show a tendency to attribute their poor performance to other (external personal attributions) rather than to the situation (situational external attributions). It is called "self-serving bias" when the person takes credit for positive outcomes and deny responsibility for negative (Kaney & Bentall, 1989) and "personalization bias" when the person attribute to others the negative outcomes rather than to the situation (Bentall, Corcoran, Howard, Blackwood, & Kinderman, 2001; Penn, Sanna, & Roberts, 2008). An instrument developed to study the attributional style in patients with schizophrenia is "The Ambiguous Intentions Hostility Questionnaire (AIHQ)" (Combs, Penn, Wicher, & Waldheter, 2007).

Social functioning impairment is also a hallmark characteristic of schizophrenia that has important implications for the development, course and outcome of this illness (Couture, Penn, & Roberts, 2006). Problems in social functioning represent a domain different from negative and positive symptoms (Lenzenweger & Dworkin, 1996). These social deficits, although present in other clinical groups (e.g. bipolar disorder), are more pronounced in patients with schizophrenia (Bellack, Morrison, Wixted, & Mueser, 1990) and are evident in children and adolescents who develop the disease later (Hans, Marcus, Henson, & Auerbach, 1992). Antipsychotic drugs are more effective against the positive symptoms than against social impairment. Moreover, social deficits frequently worsen during the course of the disease and likely contribute to relapse (Pinkham et al., 2003), and they are probably the most powerful predictors of prognosis in patients (Mueser, Bellack, Morrison, & Wixted, 1990; Tien & Eaton, 1992). A frequently used instrument to assess social functioning is the Social Functioning Scale (SFS) (Birchwood, Smith, Cochrane, Wetton, & Copetake, 1990). This scale consists of 79 items divided into 7 subscales: social engagement/withdrawal, interpersonal behavior, independence-competence, independence-performance, recreation, prosocial activities, and employment.

Several studies and meta-analyses have shown deficits in the different domains of social cognition across the different phases of the illness (Hedge's *g* effect sizes range from .50 to 1.00) (Green et al., 2012; Savla et al., 2013). However the profile of social cognition deficits in chronically stable outpatients still remains incomplete. Recent review studies focused in social cognition show that illness mean duration in the schizophrenic samples is twelve or fewer years.

The aim of this study is to compare a chronically stable outpatient sample of schizophrenic patients with a healthy control group in the social cognition domains of emotion processing, ToM and social knowledge. Additionally, scores in these domains were related with social functioning.

3. METHOD

3.1. Participants

The study included 15 outpatients with the diagnosis of schizophrenia and 15 healthy controls. All patients were attending a Center for Rehabilitation and Social Integration in Castellón (Spain), and met the DSM-IV-TR criteria for schizophrenia according to the Structured Clinical Interview for DSM-IV Axis I Disorder (SCID-1). They were clinically stable, with an IQ above 85, no organic cerebral disease and no substance abuse or dependence. Antipsychotic medication type and dose was stable in the previous three months for all outpatients. They were evaluated in three areas: symptomatology, intellectual functioning, and social functioning, using the Brief Psychiatric Rating Scale (BPRS), the reduced version of the WAIS-III (Fuentes-Durá, Romero-Peris, Dasí-Vivó, & Ruiz-Ruiz, 2010), and the Social Functioning Scale.

Healthy control participants were recruited via advertisements in the community and were screened for exclusion criteria: history of psychotic or affective disorder, IQ below 85, substance abuse or dependence, and organic cerebral disease. Control participants were matched with regard to age, gender, and education to patient participants. Demographic and clinical characteristics of all participants are summarized in Table 1. Procedures were explained to all participants and gave written informed consent prior to participation.

Table 1. Demographic and clinical characteristics of outpatient and healthy controls.

	Patients (n=15)	Controls (n=15)	t / χ^2	P
	Mean (SD)	Mean (SD)		
Age (years)	38.07 (7.54)	38.60 (8.75)	0.18	0.859
Years of Education	10.67 (2.23)	9.67 (2.53)	-1.15	0.260
IQ	87.53 (11.17)	100.67 (11.26)	3.21	0.003
Female/Male ratio	3/12	5/10	0.68	0.409
Illness onset (years)	16.13 (8.76)			
BPRS	39.67 (10.14)			

3.2. Social cognition and social functioning measures

Emotional processing was assessed with two tests: (1) The Face Emotion Identification Test (FEIT) (Kerr & Neale, 1993), in which subjects view 19 digital pictures of faces and select which emotion is expressed (happy, sad, angry, afraid, surprised, disgusted or neutral); and (2) The Face Emotion Discrimination test (FEDT) (Kerr & Neale, 1993) that comprises 30 pairs of digital pictures of faces, and the subject has to decide if the two faces express the same or a different emotion. In the two tests, items are presented using a computer for 15 seconds. ToM was assessed with the Hinting Task. This test contains ten short stories about a social interaction between two characters that are read aloud to subjects. Participants are required to make inferences about the intent behind a hint dropped by one of the characters.

Social knowledge was assessed with the Schema Component Sequencing Task-Revised (SCST-R). In this task participants have to arrange sequences of component actions corresponding to specific social situations. Functional outcome was assessed using the Spanish version of the Social Functioning Scale (SFS) (Vázquez & Jiménez, 2000). This measure covers 7 domains of psychosocial functioning and community adjustment: Social Withdrawal, Social Activities, Relationships, Independence (Competence), Recreational Activities, Employment, and Independence (Performance)

3.3. Results

Table 2 displays descriptive statistics. To determine if there were significant differences between patients, controls t-tests were performed. Results show that patients scored lower than healthy controls in ToM and social functioning, meanwhile the difference in social schema approached significance. No significant differences between the two groups were found in emotion identification and emotion discrimination tasks. Correlations between the four social cognition measures and social functioning in the patients group are shown in Table 3.

Table 2. Sample scores (mean and standard deviation) and group differences on social cognition tests.

	Patients (n=15)	Controls (n=15)	<i>t</i>	<i>P</i>
	Mean (SD)	Mean (SD)		
Emotion identification	13.67 (2.66)	13.33 (2.44)	-0.36	0.723
Emotion discrimination	25.80 (2.04)	25.33 (3.15)	-0.48	0.634
ToM	12.87 (4.12)	20.00 (0.00)	6.70	0.001
Social knowledge	42.93 (12.23)	50.80 (13.15)	1.70	0.101
Social functioning	99.40 (9.52)	115.71 (4.05)	6.10	0.001

Table 3. Linear correlations between social cognition measures and social functioning in the patient group.

	Emotion identification	Emotion discrimination	ToM	Social knowledge
Emotion discrimination	0.59 (*)			
ToM	0.28	0.35		
Social knowledge	0.68 (**)	0.45 (p<0.10)	0.34	
Social functioning	-0.28	-0.37	0.01	-0.09

(*) p<.05 (**) p<.01

4. CONCLUSIONS

The comparisons of chronically stable schizophrenic outpatients (mean duration of illness: 16.13 years) and healthy controls in the social cognition subdomains of emotion processing, ToM and social knowledge, showed differences in ToM. And the difference approached significance in social knowledge. Both groups scored at the same level in the two tests that measured emotion processing. This may be because the emotional processing tasks that have been used in this research, identification and discrimination of emotions, measure the most basic emotions: happiness, sadness, anger, disgust, surprise and fear. There are tests that assess emotional processing using more complex tasks, with more emotions and with varying degrees of emotional intensity expressed in the faces.

It is important to note that although these patients have never participated in a program to improve social cognition, they go regularly to a rehabilitation center where they participate in activity programs such as daily living and leisure time. Some of these activities try to integrate the patient in the society. Therefore, we hypothesize that there are patients with a social cognitive profile with less deficits, in line with the review of the literature described in the introduction which stated that an important factor to predict possible emotional processing deficits is the patient's profile (e.g. illness onset or illness phase) (Addington & Addington, 1998; Baudouin et al., 2002; Borod, Martin, Alpert, Brozgold, & Welkowitz, 1993; Edwards, Pattison, Jackson, & Wales, 2001).

The group of people with schizophrenia has a poorer performance than the control group in ToM. These results support Frith's theory (1992) about the genesis of the cognitive difficulties of people with schizophrenia. The theory states that the dysfunction in the ability to

ascribe mental states to others is a specific trait of the schizophrenia disorder. One more point tested in the study has to do with the relation between the deficit of emotion processing and performance on tasks of social schemas, assuming that low performance on tasks of emotional processing correlate with low performance in social schemas. The correlation matrix has confirmed this hypothesis. It should also be noted that performance of the control group was better in social knowledge and social schemas.

In summary, people with diagnoses of schizophrenia show a clear deficit in social cognition, although differences could be identified depending on sample characteristics like chronicity, attendance to social resources or family context.

5. FUTURE RESEARCH DIRECTIONS

A limitation in our study is the small sample size. Our immediate goal is to continue collecting data to allow us make a replication of the results obtained in this investigation. We have measured basic emotions and it could be interesting to extend the study of emotional processing to more complex emotions, like the ones measured by the Reading the Mind in the Eyes Test (Baron-Cohen et al., 2001).

From a more general point of view, our goal is to extend the study of social and cognitive deficits in patients with schizophrenia across several more lines, e.g. different schizophrenic patient subtypes, the quantification of the effects of the pharmacological treatments on cognition, and the study of the psychometric characteristics of the tests used to assess social cognition in Spanish population, because most of the existing ones are merely translations from the originals constructed for English or German contexts. Finally, it can be very useful for practitioners, to develop training guidelines to provide consistency in the application of treatments.

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