

# Social perception training in schizophrenia: A pilot study

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## ABSTRACT

Social cognition has been recognized as one of the key cognitive factors that is impaired in schizophrenia. The aim of this study was to investigate the possibility of improvements in social perception, which is a key component of social cognition, in chronically ill patients. Eighteen schizophrenic outpatients were randomly assigned to therapy and control groups. The patients in the therapy group followed the social perception subprogram of IPT. The patients' performance in social perception was assessed before the intervention, after the intervention and at the end of a six-month follow-up period, using a scale that was specifically developed to assess social perception (Social Perception Scale –SPS). The results indicate that it can differentiate between the group that followed the therapy program and the control group. Attention, psychopathology and social functioning were also evaluated. Although only a small group of patients participated in the study, the results are promising. They suggest improvements in the social perception abilities that were trained using the IPT program in the therapy group in comparison with the control group. The patients in the therapy group improved their ability to identify stimuli and to interpret and summarise information in a picture.

*Key words:* Social Cognition, Cognitive behavioural interventions, Integrated Psychological Therapy, Schizophrenia.

## RESUMEN

Uno de los factores cognitivos deteriorados en esquizofrénicos es la cognición social. El objetivo de este estudio ha sido investigar la mejora de la percepción social, uno de los componentes clave de la cognición social, en pacientes crónicos. Dieciocho pacientes externos con diagnóstico de esquizofrenia fueron aleatoriamente asignados al grupo control y al grupo que recibía la intervención. Los pacientes en el grupo de tratamiento recibieron entrenamiento en el subprograma de percepción social de la IPT. El desempeño de los pacientes en percepción social fue evaluado antes de la intervención, después de la intervención y tras un periodo de seis meses de seguimiento, utilizando una escala que había sido desarrollada específicamente para evaluar percepción social (*Social Perception Scale* -SPS). Los resultados indican que la escala puede diferenciar entre el grupo que ha recibido la intervención y el grupo control. También fueron evaluadas la atención, la psicopatología y el funcionamiento social. A pesar del pequeño número de pacientes los resultados son prometedores y sugieren mejoras en las habilidades de percepción social (identificación de estímulos, interpretación y resumen de la información de una fotografía) en los pacientes entrenados con el programa de la IPT respecto a los pacientes del grupo control.

*Palabras clave:* cognición social, intervención cognitivo-conductual, terapia psicológica integrada, esquizofrenia.

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The cognitive processes involved in how schizophrenic patients think about themselves, other people, social situations, and interactions (grouped under the term social cognition) contribute to symptomatology, psychosocial impairment, and recovery of patients (Kern, Green, Nuechterlein & Deng, 2004; Nuechterlein, Barch, Gold, Goldberg, Green & Heaton, 2004; Ostrom, 1984). Underlying this approach is the notion that schizophrenia is inherently an interpersonal disorder in which problems result from faulty construction of the social environment and one's place in it (Kern *et al.*, 2004).

It therefore seems reasonable to pay attention to social cognitive abilities when schizophrenic patients are trained in social skills (Bedell & Lennox, 1994) because individuals need to understand each and every situation in order to interact successfully with others. However, people do not react to reality just as it is, but as they build or interpret it. It is this construction of social reality, rather than objective input, that determines behaviour in a complex social world (Bless, Fiedler & Strack, 2004). The various difficulties that people with schizophrenia have in perceiving social stimuli and the social cognitive biases they hold (Peer, Rothmann, Penrod, Penn & Spaulding, 2004) lead to wrong interpretations and this may have severe consequences in the real world (Bless *et al.*, 2004). Hence, reality interpretation and the processes involved in it are important aspects that should be considered in therapy interventions.

Roder, Brenner, Hodel & Kienzle (1996) have developed an integrated therapy for schizophrenic patients (IPT) (Integriertes Psychologisches Therapieprogramm für Schizophrene Patienten) that provides sufficient empirical support for schizophrenia treatment (Roder, Brenner & Kienzle, 2002; Vallina & Lemos, 2001; Vallina & Lemos, 2003). The objective of IPT is to work as much on cognitive functioning as on social functioning in schizophrenic patients. It is a group intervention program with five subprograms: Cognitive Differentiation, Social Perception, Verbal Communication, Social Skills Training and Interpersonal Problem Solving. The social perception subprogram aims specifically at improving learning and interpretation of social situations, which is one of the key components of social cognition.

The main goal of this pilot study was to investigate the effectiveness of the social perception subprogram of IPT in improving one of the social cognition components, social perception. Furthermore, as social cognition has been proposed as a mediator between neurocognitive deficits and functional outcome (Brekke, Kay, Lee & Green, 2005; Cohen, Forbes, Mann & Blanchard, 2006; Green, Kern, Braff & Mintz, 2000; Vauth, Rüschi, Wirtz & Corrigan, 2004) a secondary goal of the study was to test the possible link between cognition, social cognition, and functional outcome in schizophrenia.

Despite the fact that the patients we worked with, were characterized by a longer duration of illness than the patients in the groups in which the IPT program has been examined to date, nearly 6 years in the study of Brenner, Hodel, Kube & Roder (1987) and between 7 and 10 years in other studies (Brenner, Böker, Müller, Spichtig & Würzler, 1987; Hodel & Brenner, 1994; Vallina, Lemos, Roder, García, Otero, Alonso & Gutiérrez, 2001), we expected to find two main results: first, an improvement in the capacity to objectively perceive social situations in the group receiving the IPT social perception program; and second, a significant correlation between social perception and functional outcome. The latter is a result that is in line with the hypothesis of social

cognition as a mediator variable between cognition and functional outcome.

Research that evaluates therapy programs such as IPT do not specifically assess social perception. The instruments used in these studies usually only include measures of cognitive abilities, social functioning, and psychopathology (Lemos, Vallina, García, Gutierrez, Alonso & Ortega, 2004; Penadés, Boget, Catalán, Bernardo, Gastó & Salamero, 2003; Roder, Brenner & Müller *et al*, 2002; Roder, Studer & Brenner, 1987; Vallina *et al*, 2001) and do not include the specific basic cognitive social perception skills trained in the social perception subprogram. Because of this gap in the evaluation of social perception skills, we have developed a specific assessment instrument (the Social Perception Scale -SPS) to evaluate the social perception subprogram of IPT.

## METHOD

### *Participants*

Outpatients were recruited from the Aldaia Centre of Mental Health (Valencia, España), which participates in the Association for Mental Health Support (AASAM). The following selection criteria were applied: diagnosis of schizophrenia according to ICD-10 (OMS, 1992), no organic damage or abuse of alcohol or drugs, between 18 and 50 years of age, a score of over 4 on the vocabulary test of the WAIS-III (Wechsler, 1999), and an IQ of over 70 in the TONI-2 test (Brown, Sherbenou & Johnsen, 2001). All the patients were receiving pharmacological treatment, either typical (haloperidol, fluphenazine) or atypical antipsychotic treatment (clozapine, risperidone). Twenty-three subjects met the inclusion criteria and were randomly assigned to the therapy and control groups. Five patients later dropped out because they either found jobs or did not attend the sessions regularly enough (50% or less). Because of these drop outs, the final number of subjects in the therapy group was 10 and the final number of subjects in the control group was 8.

The sample demographic and clinical characteristics are shown in Table 1. There were no significant differences between the two groups in clinical or demographic data. Patients in the therapy group followed the “social perception” module of IPT.

### *Assessment Instruments*

According to Wykes (2000) approach, three levels are necessary to evaluate the effectiveness of any rehabilitation program: the neuropsychological, the clinical, and the functional. In accordance with this approach, in this study, neuropsychology was measured using the TASS test; psychopathology was measured using the BPRS; social functioning was measured using the DAS II; and the social perception abilities trained with the social perception program was measured using the SPS. These scales were applied on three different occasions: at the beginning of the treatment (pre), three months later when the Social Perception Program finished (post), and 6 months after the program finished (follow-up).

*Test of Sustained and Selective Attention (TASS)* (Batlle & Tomás, 1999). This test evaluates sustained and selective attention. It has different geometric figures, and

Table 1. Demographic and social characteristics of subjects.

Characteristics	Treatment group	Control group
Number of subjects	10	8
Age (mean/sd)	40.40 (7.49)	37.75 (8.21)
Sex:		
Male	8	4
Female	2	4
Education:		
Illiterate	1	0
Primary school not completed	4	4
Primary school	3	2
Secondary school	2	2
Occupational situation:		
Pensioner	10	8
Housing situation:		
Alone	1	0
Sheltered home	2	1
With parents	5	6
With brothers/sisters	2	1
Marital status:		
Single	10	7
Divorced	0	1
Diagnostics:		
Hebephrenic	3	1
Undifferentiated	1	1
Paranoid	5	5
Residual	1	1
Duration illness (mean years)	21.30 (6.96)	15.38 (6.23)

the task consists of marking some of them with a cross. The patient has to mark “the yellow circles and all the squares of any colour”. The time allocated for the task that we used (A) was 8 minutes.

*Brief Psychiatric Rating Scale (BPRS)* (Lukoff, Nuechterlein & Ventura, 1986).

This is a clinical scale that is designed to assess severity of symptoms. It contains 24 Likert type items (1 is equivalent to no symptoms and 7 to extreme gravity) grouped in 5 subscales (see Table 2).

*Disability Assessment Schedule (DAS II)* (Montero, Bonet, Puche & Gómez Beneyto, 1988). This is a measure of functional outcome. The test is conducted through an interview between the expert and the patient or someone who knows the patient. Evaluation is made on a 9-point scale of gravity, ranging from ‘non-dysfunctional’ (0) to ‘completely dysfunctional most of the time’ (8). We used the first part of the interview (General Behaviour), the second part (Social Roll Execution), and the fifth part (Global Assessment). Four items of the second part were excluded due to the characteristics of the sample (see Table 2). The adaptation made by Montero *et al.* was used.

*Social Perception Scale (SPS)* (García, Fuentes, Gallach, Ruiz & Roder, 2003). This instrument was designed to specifically assess the three main goals of the Social Perception Program of IPT: stimuli identification, interpretation of images, and title assignment.

Four photographs and four response sheets were used to assess patients on the three aspects which that the program focuses on. The photographs were selected from the 40 slides included in the IPT program which had not been used during the training (numbers: 02, 05, 06 and 07). Two of them were chosen because of their high cognitive complexity, and the other two were chosen for their high emotional content.

The SPS was administered as follows. After giving a photograph to the patient and inviting him/her to observe it, the following questions are asked: 1) what things/

details/stimuli can you see in the photograph? (Patients had two minutes to answer this item); 2) What is happening in the photograph?; 3) What title can summarize the most relevant aspects in the photograph?

The answers to each question were written on a response sheet. The number of correctly identified stimuli in the four photographs was added up to obtain the total score for the first question.

In the assessment of the second and third questions, the objective was to see if patients referred to three key aspects of the photograph: the situational context; the actor/s; and the action or interaction among them. If they did, one point was given for each aspect mentioned. A total direct score was obtained for each question by adding the scores for each photograph. The total scores obtained for the four photographs for all three questions were then transformed into ratios taking into account that the maximum direct score in question one was 67, and 12 in questions two and three.

### *Procedure*

Two groups were formed at random: a standard care control group and an experimental therapy group which received the IPT “social perception” module of IPT. Both groups were evaluated for the different dependent variables on three occasions: pre-treatment (T1), post-treatment (T2), and later follow-up (T3) (6 months after the intervention). A trained psychologist, who was blind to treatment condition, conducted assessments in BPRS and DAS II. Two different psychologists, who were trained in IPT, conducted assessments in TASS and SPS. The degree of agreement of these two psychologists in the evaluation of a patient’s responses to the different items in SPS was calculated for each item. The Pearson coefficients that were obtained ranged between 0.96 and 1.00. During the training period, both groups received the treatments usually offered at the centre.

The control group did not receive any specific social cognition training. Both groups had the same total number of intervention hours. The therapy group was divided into two groups for the psychological intervention program. Treatment lasted for three months. Each therapy group met twice a week. The first five sessions and the last one lasted for 30 minutes because only one slide was used in each session. The remaining sessions lasted 60 minutes each since two slides were used in each session. There were 21 sessions in total. Slides with low cognitive complexity and low emotional content were used in the first sessions. Later, slides with more cognitive complexity were added and, from time to time, slides with more emotional content were included. The total number of slides used was 36.

### *Statistical analysis*

Data were initially screened for the assumptions of normality, linearity, and homogeneity. Group differences before, after, and in the follow-up assessment sessions between the experimental and control group were calculated using univariate one-way analysis of variance (ANOVA). Evolution over the three measurement sessions was

examined in both groups by a repeated measures analysis of variance (ANOVA). Effect sizes (defined by the difference of the baseline with the measurement points after treatment and after follow-up divided by the standard deviation of the whole sample at baseline) were calculated for each group (Kazdin, 2001; Smith & Glass, 1977). Finally, the correlations between results obtained in the TASS, SPS and DAS II at baseline were calculated.

## RESULTS

*Group differences:* Table 2 provides a summary of means and significant statistical results associated with the primary outcome measures before (T1) and after (T2) intervention, and at follow-up (T3). At baseline the analyses do not indicate any significant difference in any of the measures. This suggests that there were no differences between the two groups before intervention.

After treatment the analyses suggest that although there were no differences in any of the scores between the two groups in TASS, BPRS, and DAS II, they differ in

*Table 2.* Comparison of results between the two groups (one-way ANOVA) and effect sizes ( $\eta^2$ ) in the three assessment sessions for SPS, TASS, BPRS, and DAS II.

	Before Intervention			After Intervention			Follow-up		
	F	<i>p</i>	$\eta^2$	F	<i>p</i>	$\eta^2$	F	<i>p</i>	$\eta^2$
<b>SPS</b>									
Identified stimuli	.10	.759	.01	8.05	.012	.34	5.12	.038	.24
Interpretations	1.22	.287	.07	7.69	.014	.33	8.49	.010	.35
Title	3.74	.071	.19	41.78	.001	.72	15.38	.001	.49
<b>TASS</b>									
Direct Score	.09	.766	.01	.02	.904	.01	.26	.618	.02
Hits	.10	.755	.01	.01	.911	.01	.13	.721	.01
Omission	3.04	.102	.17	.52	.479	.03	.19	.894	.01
Errors	.35	.564	.02	.19	.673	.01	1.59	.225	.09
<b>BPRS</b>									
Anxiety / Depression	.27	.612	.02	1.56	.230	.09	.01	.979	.01
Thought disorders	1.07	.316	.06	1.90	.187	.11	1.35	.263	.08
Anergia	.43	.524	.03	.01	.918	.01	.10	.754	.01
Activation	1.28	.275	.07	1.46	.245	.08	.56	.467	.03
Hostility	3.41	.083	.18	.49	.493	.03	2.84	.111	.15
Total Score	1.91	.185	.12	1.61	.223	.09	1.07	.316	.06
<b>DAS II</b>									
Self -Care	1.13	.310	.09	1.74	.206	.10	1.48	.242	.09
Leisure time	.02	.900	.01	1.01	.329	.06	1.62	.221	.09
Slowness	1.28	.282	.10	0.01	.977	.01	3.04	.100	.16
Communication	.03	.861	.01	1.46	.244	.08	2.32	.147	.13
Participation in household	.09	.773	.01	.17	.689	.01	1.08	.315	.06
Social Contacts	2.18	.168	.17	3.69	.073	.19	2.66	.122	.14
Performance at work	1.69	.220	.13	3.33	.087	.17	1.28	.275	.07
Interest in getting a job	.44	.519	.04	2.55	.130	.14	4.40	.052	.22
General Interest	.40	.538	.04	.01	.944	.01	.01	.985	.01
Emergency or crisis behavior	.21	.654	.02	.01	.955	.01	.41	.531	.03
Social Adjustment Total Score	.35	.567	.03	1.08	.315	.06	.58	.459	.04

the three scores of the social perception scale: identified stimuli ( $F= 8.05, p= 0.012$ ); interpretations ( $F= 7.79, p= 0.014$ ); and title ( $F= 41.78, p< 0.001$ ). These results may point to an improvement in the perception and interpretation of social situations in the therapy group.

In the follow-up phase, results were similar to those obtained at post-intervention. There were only significant differences in the three SPS scores: identified stimuli ( $F= 5.12, p= 0.038$ ), interpretations ( $F= 8.49, p< 0.010$ ), and title ( $F= 15.38, p< 0.001$ ).

Taken together, these results indicate that there were no differences between the groups in psychopathology, attention, and the social functioning measures on the three occasions. However, they did differ in their social perception capacity after treatment and after the follow-up period.

Table 3. Effect sizes for each group.

	Control T1-T2	group T1-T3	Therapy T1-T2	group T1-T3
<b>SPS</b>				
Identified stimuli	0,13	0,58	1,39	2,02
Interpretations	-0,24	-0,40	1,94	2,04
Title	-0,53	-0,20	3,05	2,61
<b>TASS</b>				
Direct Score	0,10	0,29	0,04	0,05
Hits	0,12	0,15	-0,11	-0,11
Omission	-0,34	-0,68	0,14	0,10
Errors	-0,14	0,14	-0,46	-0,52
<b>zBPRS</b>				
Anxiety/ Depression	0,26	-0,31	-0,03	-0,25
Thought disorders	-0,56	-0,57	-0,49	-0,57
Anergia	-1,09	-0,98	-0,69	-0,63
Activation	-0,68	-0,88	-0,17	-0,37
Hostility	-0,73	-0,81	-0,09	-0,28
Total Score	-0,73	-0,89	-0,39	-0,55
<b>DAS II</b>				
Self -Care	0,12	-0,12	-0,06	-0,32
Leisure time	-0,80	-0,47	-0,82	-0,68
Slowness	-0,40	0,03	-0,26	-0,43
Communication	0,00	-0,06	-0,75	-0,82
Participation in household	-0,53	-0,33	-0,14	-0,41
Social Contacts	-0,16	-0,21	0,02	0,00
Performance at work	0,11	0,22	0,03	0,18
Interest in getting a job	0,33	0,58	-0,17	-0,24
General Interest	0,11	-0,26	-0,03	-0,36
Emergency or crisis behavior	0,04	-0,28	-0,27	-0,42
Social Adjustment Total Score	-0,12	-0,24	-0,38	-0,53

T1: before intervention; T2: after intervention; T3: follow-up.

-: In SPS and in TASS scores indicates a worst performance from T1 to T2 or from T1 to T3. In BPRS and DAS II indicates a increase in symptoms.

+: In SPS and in TASS scores means better performance from T1 to T2 or from T1 to T3. In BPRS and DAS II indicates a reduction in symptoms.

*Pre-Post intervention and follow-up changes:* The evolution over the three measurement sessions was analysed for every set of variables for both groups. The repeated measures analysis of variance did not indicate significant differences in the psychopathology, attention, or social functioning measures in either group. At the same time, in the control group, there were no significant changes between assessment points in the SPS scores. However, the results of the SPS scores were different in the therapy group. The analyses indicated significant differences in every SPS score on each assessment occasion: identified stimuli ( $F= 30.79$ ;  $p= 0.001$ ), interpretations ( $F= 15.73$ ;  $p= 0.001$ ), and title ( $F= 35.73$ ,  $p< 0.001$ ). Subsequent Bonferoni post hoc comparisons could imply that patients in the experimental group had an improvement in the three SPS scores after the treatment and that this improvement was maintained six months later.

It might be concluded from these results that the IPT program had a significant positive effect on the perception and correct interpretation of social situations in these patients, measured through SPS.

*Effect sizes:* The effect sizes compared at baseline with post treatment and at follow-up are presented in Table 3. Overall, the greatest effects were obtained on SPS measurements. All the effects showed improvement and, also reached the level of large effect size.

Pearson correlation coefficients were used to test the relationship between neurocognition performance and functional outcome with social cognition as a mediator variable. The analysis used data obtained from the 18 patients for the three scales before intervention. TASS can be considered as a basic neurocognition variable because it measures attention; the data in SPS was the mediator in this framework; and DAS II was taken as a measure of functional outcome.

There were no significant correlations between attention and social perception or between attention and functional outcome except in one case. The TASS direct score had a significant correlation with DAS II slowness score ( $r= -.47$ ,  $p< .05$ ). The results indicated two more significant correlations; the correlation between SPS title and DAS II self-care ( $r= -.47$ ,  $p< .05$ ) and the correlation between SPS interpretations and DAS interest in getting a job ( $r= -.52$ ,  $p< .05$ ).

## DISCUSSION

The results indicate that the social perception abilities of patients participating in the program improved in the areas trained. Although the sample size was small, we might conclude that this program contributes to the acquisition of the social perception cognitive skills exercised in the module of the IPT. Patients seemed to have learned to gather more information from an image (identify more stimuli), to make more adequate interpretations of it, and to summarize the most important information of the image (with a title). This improvement in the capacity of apprehension and interpretation of social situations was maintained through the follow-up phase.

Due to the lack of a specific instrument to measure social perception, we developed a scale (SPS) to measure the specifically targeted abilities trained with the social perception

program of IPT. The SPS does not measure social functioning or social skills; its goal is to measure the cognitive variables/abilities that are fundamental in social perception. We have found that the SPS is sensitive to the differences shown after treatment between the therapy group and the control group. The fact that so few questions produced significant difference between the two groups is promising in a psychometric sense. Therefore, we think that we are developing an instrument that can help the therapist to decide when a patient is prepared for the next IPT program. Nonetheless, the development of the instrument is underway and an appropriate study of reliability and validity remains to be done.

Two things could explain the results obtained in attention, social functioning or psychopathology: the fact that the intervention only included the social perception program, and the small sample size. It can be assumed that the social perception program does not improve attention abilities as we have evaluated them. In fact, another IPT program, the Cognitive Differentiation program, is oriented to improving attention processes, especially selective, focused, and sustained attention. The intervention did not reduce symptoms in schizophrenic patients. Significant improvements in psychopathological parameters and social role-functioning were not expected for two reasons: it was a short intervention, which was focused only on social perception, and patients were of long illness duration.

Our results are similar to those obtained by Kraemer (1991). After applying the Cognitive Differentiation, Social Perception, and Interpersonal Problem Solving programs, he found differences in cognitive functioning but non-significant improvements in psychopathology. Therefore it may be suggested that investigations that find differences in psychopathology and social functioning are those that use the complete IPT (like Brenner et al., 1987) or at least four of its five subprograms (Lemos *et al*, 2004; Roder *et al*, 2002; Vallina *et al*, 2001).

In summary, it can be stated that even when only the social perception module of the IPT is applied, chronic schizophrenics may improve their capacity to perceive and to interpret social reality. The results of our study have highlighted the importance of specifically assessing the course of each of the components of an intervention program. This information would help the therapist to evaluate whether a patient should undergo a program, or skip it and go on to the next one. However, to carry on with this task specific instruments should be developed in order to provide the necessary information.

We have started to develop one of these instruments, the SPS, although further research is necessary to have an instrument with good psychometric properties. Furthermore, it must clearly be established whether patients really improve in overall social cognition, and not just in the task they have been trained in, this can be done using other tests such as the *Face Emotion Identification Test* (Kerr & Neale, 1993).

Finally, the correlation analysis has indicated that social perception measured through SPS appears to be related to social functioning measured through DAS II. However, social perception is not related to attention, which is the only variable of non-social cognition which was evaluated. This suggests that our data does not show the expected link between non-social cognition and functional outcome through social cognition as a mediator variable. There are three reasons could explain these results:

first, we have measured only one cognitive variable (attention) and we have not measured other variables such as memory or executive functioning; Second, we have measured social cognition only through SPS; and Third, the sample size was small.

Barriers to treatment and rehabilitation through the study of causal pathway models between neurocognition, social cognition and functional outcome must continue to be identified and addressed. These models would provide an image of the course of the illness and its rehabilitation process.

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