

Laia Mas-Expósito¹
Juan A. Amador-Campos²
Lluís Lalucat-Jo¹
Francisco Villegas-Miranda¹

Social cognition interventions for persons with schizophrenia: evidence and clinical practice guidelines

¹Centre d'Higiene Mental Les Corts
²Universidad de Barcelona

Although most of the research conducted up to now has shown that interventions in social cognition are effective in the rehabilitation of persons with schizophrenia, there are still no clinical practice recommendations on the topic. Their development could facilitate the clinical work, resource management and the care provided to persons with such a disorder. This article addresses this need and performs a systematic review of the identified high-quality scientific evidence and develops clinical practice recommendations. A total of 40 clinical trials and 1 meta-analysis evaluating the effects of social cognition interventions for persons with schizophrenia were selected for the present study. Taking into account the evidence available and its quality, the authors developed three clinical practice recommendations on the positive effects of these interventions. The analysis of the evidence of the quality of the studies shows that more randomized controlled trials with larger sample sizes and longer follow-ups are needed in order to establish more accurately the efficacy and effectiveness of social cognition interventions and therefore to favor the generalization of the results.

Keywords: Schizophrenia, Social cognition, Rehabilitation, Review, Clinical practice guideline

Actas Esp Psiquiatr 2016;44(1):30-43

Intervenciones en cognición social para personas con esquizofrenia: evidencias y recomendaciones para la práctica clínica

Aunque la mayoría de la investigación llevada a cabo hasta el momento ha mostrado que las intervenciones en cognición social son eficaces para la rehabilitación de las personas con esquizofrenia, todavía no se han establecido recomendaciones de práctica clínica. Su desarrollo podría facilitar el trabajo clínico, la gestión de recursos y la atención que reciben las personas con este trastorno. El presente trabajo aborda esta necesidad; se hace una revisión sistemática de las evidencias científicas de alta calidad identificadas y se formulan recomendaciones de práctica clínica a partir de estas evidencias. Se han seleccionado para el presente estudio un total de 40 ensayos clínicos y 1 metanálisis que tratan sobre los efectos de las intervenciones en cognición social en personas con esquizofrenia. Teniendo en cuenta la evidencia disponible, y su calidad, se desarrollan tres recomendaciones de práctica clínica relacionadas con los efectos positivos de este tipo de intervenciones. El análisis de las evidencias de calidad de los estudios ha puesto de manifiesto que son necesarios más ensayos controlados y aleatorizados, con mayores muestras y seguimientos más largos, para establecer, de manera más precisa, la eficacia y efectividad de las intervenciones en cognición social y, por tanto, favorecer la generalización de resultados.

Palabras clave: Esquizofrenia, Cognición social, Rehabilitación, Revisión, Recomendaciones de práctica clínica

Correspondence:
Lluís Lalucat-Jo
Centre d'Higiene Mental Les Corts
Calle Numancia 103-105 bajos
08029 Barcelona (Spain)
E-mail: lluis.lalucat@chmcorts.com

INTRODUCTION

During recent years, there has been increasing interest regarding cognition deficits in persons with schizophrenia¹ and, especially, about the presence of social cognition deficits. This term refers to the mental operations associated with perception, interpretation and understanding of the social context, relations between oneself and the others, and the flexible use of mental representations for guiding social behavior.² Deficits in social cognition are a constant characteristic of the disorder that remain over time^{3,4} and are resistant to drug treatment.^{5,6} These deficits may be clear even before the person is diagnosed and may be present in adolescents with high genetic risk of developing the disorder.^{7,8}

Research in social cognition has mainly focused on the domains included by the National Institute of Mental Health (NIMH):⁹ a) theory of mind, b) social perception, c) social knowledge, d) attributional style, and e) emotional processing. The presence of deficits in these fields seems to significantly interfere with the functioning of the person beyond the deficits in the basic cognitive functions.¹⁰ Deficits in social cognition seem to have a direct impact on the relapses and re-hospitalizations,¹¹ and accounts for a greater percentage of the variance than that explained by neurocognitive functioning. Specifically, deficits in social cognition account for 20% to 60% of the variance in relation to the general functioning.^{12,13}

The perspective of desinstitutionalization¹⁴ has stressed the need why the care of persons with severe mental disorders, for example, schizophrenia, is driven by their needs. Considering improvements in social cognition as a need of persons with schizophrenia, there has been going interest about the development of interventions aimed at rehabilitation of social cognition deficits and especially in those areas that are important for social functioning and that can be generalized to daily life.¹⁵ Kurtz and Richardson¹⁶ performed a meta-analytic review of the efficacy of these interventions. They combined the data of 19 studies, resulting in the creation of a single database of 692 persons with schizophrenia. The results showed that interventions aimed at rehabilitation of social cognition of persons with schizophrenia are effective in some of the domains established by the NIMH (emotion recognition and theory of mind), in the improvement of general symptoms and in the community and institutional functioning. This confirms the beneficial effects of these interventions in the clinical and psychosocial functioning of this population. Fiszdon and Reddy¹⁷ conducted a review of the literature in this regards and identified 50 studies that analyzed the effects on social cognition for persons with psychosis. They indicated that in accordance with the research performed up to that time, it could be concluded that structured training in social

cognition had positive effects in some of its domains. The authors also stressed the need to continue studying the effects of these interventions as they consider this field to be a relatively new research area.

As a result of the growing interest in this setting, this study has aimed to update the literature on it. Furthermore, clinical practice recommendations, based on the high quality scientific evidence available, have been developed on the effects of these interventions in the study population. As far as we know, these recommendations do not exist at present. The elaboration of evidence-based clinical practice recommendations is important. Their use could facilitate clinical decision making, optimize the use of the available health care resources, and improve the quality of the cares aimed at the rehabilitation of this population, adjusting the interventions to their needs. Finally, they could help to improve the functioning of the person and his/her quality of life, including autonomy and empowerment.

MATERIALS AND METHODS

In November 2014, a computerized search of the literature in PubMed was conducted to identify clinical trials and meta-analyses on psychological interventions in specific or comprehensive social cognition for persons with schizophrenia. The following terms were used: "schizophrenia," "social cognition," "theory of mind," "affect recognition," "emotional processing," "attributional bias" and "attributional style." In April 2015, the search was repeated and two new clinical trials were identified. The search included works published in English, Spanish and French. No other inclusion criteria were considered. Table 1 presents the search strategy and inclusion criteria of the studies.

The references of the identified articles were reviewed and manual searches of the gray literature were made (text books, PhD theses, scientific communications in congresses and repositories of clinical practice guidelines). The following information was extracted from each one of the articles selected: author, year, country, context, subjects, type of intervention and results. After, its quality was evaluated in accordance with the Scottish Intercollegiate Guidelines Network (SIGN) system,¹⁸ described in Table 2. The quality of the studies was evaluated independently by LME and JAAC. Disagreements between evaluators were solved by discussion and consensus.

Considering the information extracted from each article, clinical practice recommendations were then developed on the effects of the interventions in social cognition for persons with schizophrenia in accordance with the already mentioned SIGN system.¹⁸

Table 1	Search strategy for studies on the effects of the interventions on social cognition for persons with schizophrenia
Terms	"schizophrenia," "social cognition," "theory of mind," "affect recognition," "emotional processing," "attributional bias" and "attributional style"
Date	November 2014 and April 2015
Inclusion criteria	Study type: Clinical trials and Meta-analysis Intervention type: psychological Languages: Spanish, English and French

Eleven more references were identified in the manual search. Finally, 40 clinical trials and 1 meta-analysis were selected.

Table 3 shows the principal characteristics of the works identified. A total of 40 clinical trials and 1 systemic review mostly published (72.5%) between the years 2011 and 2014 are included. The clinical trials were mainly conducted in Europe (45%) and the United States of America (USA) (37.5%). Twenty six of them (65%) are controlled and randomized trials and 14 (35%) are quasi-experimental studies. Most of the clinical trials identified were conducted within the outpatient context (62.5%) and the rest in the hospital context (30%) or in both (7.5%). Twenty-six (65%) of the 40 clinical trials evaluate the efficacy of the intervention with pre-post measures. The rest, 14 (35%) also provide measurements in follow-up, with a range of 1 week to 6 months after the treatment. As a whole, 95% of the studies show improvements associated with interventions in social cognition. In 15 clinical trials (37.5%), positive effects of the intervention analyzed are observed in social cognition domains, in 19 (47.5%), effects in social cognition and other result variables as, for example, functionality, psychiatric

RESULTS

A total of 490 references were identified through the computerized search, 30 of which met the inclusion criteria.

Table 2	Levels of evidence and grades of recommendations of the Scottish Intercollegiate Guidelines Network (SIGN), modified to include the diagnostic tests studies
Levels of evidence	
1++	High quality meta-analyses, systemic reviews of clinical trials or high quality clinical trials with very low risk of bias.
1+	Well-conducted meta-analyses, systematic reviews of clinical trials or well-conducted clinical trials with a low risk of bias.
1-	Meta-analyses, systemic reviews of clinical trials or clinical trials with a high risk of bias.
2++	High quality systematic reviews of cohort or case control studies. Cohort or case control studies with a very low risk and high likelihood of establishing a causal relationship.
2+	Well-conducted case control or cohort studies with a low risk of bias and with a moderate likelihood of establishing a causal relationship.
2-	Case control or cohort studies with high risk of bias and significant risk that the relationship is not causal.
3	Non-analytic studies, such as case reports and case series.
4	Expert's opinion.
Grades of recommendations	
A	At least one meta-analysis, systematic review, or clinical trials rated as 1++ and directly applicable to the target population of the guide; or a volume of scientific evidence consisting of studies rated as 1+ having great consistency between them.
B	A body of evidence including studies rated as 2++, directly applicable to the target population of the guide and that demonstrate great consistency of the results; or evidence extrapolated from studies rated as 1++ or 1+.
C	A body of scientific evidence made up of studies rated as 2+ directly applicable to the target population of the guide and that show great consistence between the results; or scientific evidence extrapolated from studies rated as 2++.
D	Scientific evidence level 3 or 4; or scientific evidence extrapolated from studies rated as 2+.

Table 3 Summary of the evidence of the effect of the interventions on social cognition for persons with schizophrenia*

Year	Author**	Country	Context	Subjects	Experimental Intervention	Control Intervention	Follow-up	Result variables	Design	Quality
2005	Penn	USA	In-patient	Acute chronic patients; adults	SCIT (n=7)	None	Pre and post measurements	Significant improvements in theory of mind	Quasi-experimental study	2-
2006	Choi	Korea	Out-patient	Stable chronic patients; adults	SCET plus usual treatment (n=17)	Usual treatment (n=17)	2, 4 and 6 months after treatment	Experimental intervention improvement in social understanding	Controlled and randomized trial	1-
2007	Combs	USA	In-patient	Acute chronic patients; adults	SCIT (n=18)	Coping skills group (n=10)	Pre and post measurements	SCIT improvement in emotions and social perception, theory of mind, attributional style, social relations and aggressivity episodes	Quasi-experimental study	2-
2007	Penn	USA	In-patient	Acute patients; adults	SCIT (n=17)	None	Pre and post measurements	SCIT is associated to improvements in emotion perception, theory of mind and reduction of tendency to attribute hostile attentions to the others	Quasi-experimental study	2-
2008	Combs	USA	In-patient	Acute chronic patients; adults	AS (n=20)	Contingent economic reinforcement (n=20) Massive practice (n=20)	Measurement pre, during intervention, post and at one week of follow-up	AS superior to control interventions in emotion perception and recognition	Controlled and randomized trial	1-
2009	Combs	USA	In-patient	Acute chronic patients; adults	SCIT (n=18)	Control group of psychiatric patients community controls (n=18)	6 months	SCIT improvement in emotion perception	Quasi-experimental study	2-
2009	Gil-Sanz	Spain	Out-patient	Stable chronic patients; adults	SCIT (n=7)	Usual activities of rehabilitation programs (n=7)	Pre and post measurements	SCIT improvement in social perception and interpretation	Controlled and randomized trial	1-
2009	Horan	USA	Out-patient	Stable chronic patients; adults	SCSTP (n=15)	Program of skills and self-management of relapse prevention (n=16)	Pre and post measurements	SCSTP improvement in facial emotion perception	Controlled and randomized trial	1-

Table 3		Continuation									
Year	Author**	Country	Context	Subjects	Experimental Intervention	Control Intervention	Follow-up	Result variables	Design	Quality	
2009	Roberts	USA	Out-patient	Stable patients; adults	SCIT plus usual treatment (n=20)	Usual treatment (n=11)	Pre and post measurements	Experimental intervention improvement in social emotion perception and skills	Quasi-experimental study	2-	
2010	Aghotor	Germany	In-patient	Acute chronic patients; adults	MCT (n=16)	Newspaper reading group (n=14)	Pre and post measurements	MCT improvement in positive symptoms and it decreases the tendency to make premature conclusions	Controlled and randomized trial	1-	
2010	Mazza	Italy	Out-patient	Stable patients; adults	ETMIT (n=16)	Training in problem solving (n=17)	Pre and post measurements	ETMIT improvement in recognition of emotions, theory of mind and social functioning	Controlled and randomized trial	1-	
2010	Roberts	USA	Out-patient	Stable chronic patients; adults	SCIT (n=50)	None	Pre and post measurements	SCIT is associated to improvements in emotion perception and theory of mind	Quasi-experimental study	2-	
2011a	Moritz	Germany	Out-patient In-patient	Patients in acute or stable condition; adults	MCT (n=18)	Usual treatment (n=18)	Pre and post measurements	MCT improvement in the stress produced by delusions, is improvement in memory and social quality of life. It decreases the tendency to make premature conclusions	Controlled and randomized trial	1-	
2011b	Moritz	Germany	Out-patient In-patient	Patients in acute or stable condition; adults	MCT (n=24)	CogPack (n=24)	Pre and post measurements	MCT improvement in the symptoms of delusions and less tendency to make premature conclusions	Controlled and randomized trial	1-	

Table 3		Continuation									
Year	Author**	Country	Context	Subjects	Experimental Intervention	Control Intervention	Follow-up	Result variables	Design	Quality	
2011	Veltro	Italy	Out-patient	Stable chronic Stable patients; adults	CER (n=12)	Training in problem solving (n=12)	Pre and post measurements, and at 6 and 12 months.	Both interventions effective in psychopathological symptoms decrease and improves social functioning. CER improvement in theory of mind and recognition of emotions. Training in problem solving improvement in planning and memory	Controlled and randomized trial	1-	
2011	Wölwer	Germany	In-patient	Chronic patients, and with incipient schizophrenia, acute; adults	TAR (n=20)	CRT (n=18)	Pre and post measurements	TAR superior to CRT recognition of emotions, theory of mind and social competence	Controlled and randomized trial	1-	
2012	Bechi	Italy	Out-patient	Stable chronic patients; adults	VSCT (n=27)	IPT (n=24)	Measurements pre and at 3 months of follow-up	VSCT improvement in theory of mind	Controlled and randomized trial	1-	
2012	Hooker	USA	Out-patient	Chronic stable patients; adults	ACT plus SCT (n=11)	Computer gains (n=11)	Pre and post measurements	Experimental intervention improvement in emotion perception	Controlled and randomized trial	1-	
2012	Naughton	Ireland	In-patient	Acute patients; adults	MCT (n=11)	Usual treatment (n=8)	Pre and post measurements	EMC improvement in functional mental skills and global functioning	Quasi-experimental study	2-	
2012	Sachs	Austria	Out-patient In-patient	Acute or stable patients; adults	TAR (n=20)	Usual treatment (n=18)	Pre and post measurements	TAR improvement in recognition of emotions, social relationships, quality of life, executive functioning and negative symptoms	Controlled and randomized trial	1-	

Table 3		Continuation									
Year	Author**	Country	Context	Subjects	Experimental Intervention	Control Intervention	Follow-up	Result variables	Design	Quality	
2012	Tas	Turkey	Out-patient	Stable chronic patients; adults	F-SCIT (n=19)	Social stimulation (n=26)	Before allotment and 16 weeks after	F-SCIT improvement in quality of life, social functioning and social cognition	Controlled and randomized trial	1-	
2013	Balzan	Australia	Out-patient	Stable chronic patients; adults	One session of MCT (n=14)	Usual treatment (n=14)	Pre and post measurements	EMC improvement in delusional severity and conviction, awareness of the deficit and cognitive biases	Quasi-experimental study	2-	
2013	Bechi	Italy	Out-patient	Chronic stable patients; adults	TMI (n=19)	Newspaper reading group (n=11)	Measurements pre and at 3 months	TMI improvement in theory of mind	Controlled and randomized trial	1-	
2013	Gohar	Egypt	Out-patient	Chronic patients and in initial stable phases; adults	SCSTP (n=22)	Training in the management of the disease (n=20)	Measurements pre and at 8 weeks after the training	SCSTP improvement in emotional intelligence and in recognition and management of emotions	Controlled and randomized trial	1-	
2013	Lindenmayer	USA	In-patient	Chronic patients and in acute phase; adults	CEPI plus cognitive rehabilitation (n=32)	Cognitive rehabilitation (n=27)	Pre and post measurements	Experimental intervention improvement in recognition and discrimination of emotions, social functioning and neurocognition	Controlled and randomized trial	1-	
2013	Marsh	Australia	Out-patient In-patient	Stable patients or in acute phase; adults	MSRTSCI (n=14)	None	Pre and post measurements	MSRTSCI is associated to improvements in theory of mind, inferences of complex mental states and social understanding	Quasi-experimental study	2-	
2013	Moritz	Germany	Out-patient In-patient	Stable patients or in acute phase; adults	MCT (n=76)	CogPack (n=74)	Measurement pre and at 4 and 6 weeks	EMC improvements in decrease of delusions and of positive symptoms in general.	Controlled and randomized trial	1+	
2013	Parker	Australia	Out-patient	Stable chronic patients; adults	SCIT (n=7)	None	Pre and post measurements	SCIT was not associated to improvements in the result variables	Quasi-experimental study	2-	

Continuation										
Year	Author**	Country	Context	Subjects	Experimental Intervention	Control Intervention	Follow-up	Result variables	Design	Quality
2013	Rocha	Portugal	Out-patient	Stable chronic patients; adults	MSCT (n=19)	Usual treatment (n=16)	Pre and post measurements	MSCT improvement in theory of mind, social perception, tendency to make premature conclusions, recognition of emotions and social functioning	Quasi-experimental study	2-
2013	Sacks	USA	Out-patient	Stable chronic patients; adults	CNAT plus CSCT (n=19)	None	Pre and post measurements	Experimental intervention associated to improvements in cognition, perception and management of emotions, self-referential memory biases and positive symptoms	Quasi-experimental study	2-
2013	Wang	China	Out-patient	Stable patients; adults	SCT plus usual treatment (n=22)	Usual treatment (n=17)	Measurements pre and at 6 months of the treatment	Experimental intervention in improvement in emotions, theory of mind, attributional style and social functioning	Controlled and randomized trial	1-
2014	Brikki	France	Out-patient In-patient	Stable chronic patients or in acute phase; adults	MCT (n=25)	Support therapy (n=25)	Pre and post measurements	MCT improvement in positive symptoms	Controlled and randomized trial	1-
2014	Cacciotti	Australia	Out-patient	Stable patients in the first three years of treatment; adolescents and adults	Oxytocin nasal spray plus SCT (n=27)	Placebo plus SCT (n=25)	Pre and post measurements and at 3 months	Experimental intervention is not superior to the controls	Controlled and randomized trial	1-
2014	Davis	USA	Out-patient	Stable patients; adults	Oxytocin nasal spray plus SCT (n=13)	Placebo plus SCT (n=14)	Pre and post measurements	Experimental intervention improvement in empathy	Controlled and randomized trial	1-

Continuation										
Year	Author**	Country	Context	Subjects	Experimental Intervention	Control Intervention	Follow-up	Result variables	Design	Quality
2014	Favrod	Switzerland	Out-patient	Stable patients; adults	MCT plus usual treatment (n=26)	Usual treatment (n=26)	Pre and post measurements and at 6 months	Experimental intervention improvement in positive symptoms	Controlled and randomized trial	1-
2014	Erawati	Indonesia	In-patient	Acute patients adults	Individual MCT plus standard treatment (n=26)	Standard treatment (n=26)	Pre and post measurements	Experimental intervention improvement in severity of delusions and metacognitive capacity	Quasi-experimental study	2-
2014	Gil-Sanz	Spain	Out-patient	Stable chronic patients; adults	SCT (n=20)	Cognitive training (n=24)	Pre and post measurements	SCT improvement in emotions and theory of mind	Controlled and randomized trial	1-
2014	Kuokkanen	Finland	In-patient	Acute patients Adults	MCT (n=10)	Usual treatment (n=10)	Pre and post measurements and at 3 and 6 months	MCT decreases suspiciousness at 3 months	Controlled and randomized trial	1-
2014	Nahum	USA	Out-patient	Chronic patients and in initial phases of the disorder; stable; adults	SocialVile (n=17)	Group of persons without mental disorder (n=17)	Pre and post measurements	Experimental group improves in processing speed, working memory, general domains of social cognition, social and global functioning and motivation	Quasi-experimental study	2-
2014	Roberts	USA	Out-patient	Stable chronic patients; adults	SCIT plus treatment (n=33)	Usual treatment (n=33)	Pre and post measurements and at 3 months	Experimental intervention improvement in attributional bias, social functioning and negative symptoms	Controlled and randomized trial	1+
Meta-analysis	Kurtz	USA	Out-patient In-patient (n=692)	According to the studies	Training or behavior programs designed to improve social cognition	Passive or active control interventions	Pre and post measurements	Experimental interventions improvements in recognition of emotions, theory of mind, general symptoms and global functioning	Meta-analysis	1++

Table 3	Continuation									
Year	Author**	Country	Context	Subjects	Experimental Intervention	Control Intervention	Follow-up	Result variables	Design	Quality
<p>*The study references are included at the end of the reference list of the manuscript, ordered according to the year of publication, except for the meta-analysis of Kurtz.</p> <p>**Only the first author of the work is indicated</p> <p>n = number of subjects in the experimental or control groups; SCIT: Social Cognition and Interaction Training; SCEI: Social Cognition Enhancement Training; AS: Attentional Shaping; SCSTP: Social Cognitive Skills Training Program; MCT: Metacognition training; ETMIT: Emotion and Theory of Mind Imitation Training; CER: Cognitive-Emotional Rehabilitation; TAR: Training on Affect Recognition; CRT: cognitive rehabilitation training VSCT: Video-based Social Cognitive Training; IPT: Integrated Psychological Therapy; ACT: Auditory-based Cognitive Training; SCT: Social Cognition Training; F-SCIT: Family-assisted Social Cognition and Interaction Training; TMI: Theory of Mind Intervention; CEPI: Computerized Emotion Perception Intervention; MSRTSCT: Mental-State Reasoning Training for Social Cognitive Impairment; MSCT: Metacognitive and Social Cognition Training; CSCT: Computerized Social Cognition Training</p> <p>1++ = High quality meta-analyses, systemic reviews of clinical trials or high quality clinical trials with very low risk of bias. 1+ = Meta-analysis, systematic reviews of clinical trials with high risk of bias. 1- = Meta-analysis, systematic reviews of clinical trials or clinical trials with high risk of bias and significant risk that the relationship is not causal.</p>										

symptoms and cognitive functions (information processing, memory or executive functions were found. In 4 (10%), effects are observed only in psychiatric symptoms. In 2 studies (5%) no improvement was observed in the result variables (see Figure 1). The range of their methodological quality was found between 2- and 1+ (2-: 14, 35%; 1-: 24, 40%; 1+: 2, 5%). Furthermore, a meta-analysis¹⁶ conducted in the USA with a methodological quality of 1++ (a total of 692 persons with schizophrenia), this adding 19 studies, was identified.

Following this, an analysis was made of the identified scientific evidence and that, according to the SIGN system,¹⁸ has sufficient quality to perform the development of clinical practice recommendation.

The identified meta-analysis¹⁶ showed that the interventions aimed at rehabilitation of the social cognition of this population were in general effective in some of the domains defined by the NIMH (facial emotion recognition and theory of mind), in the decrease of general symptoms and in the improvement of community and institutional functioning. This is a meta-analysis with high quality classified with an evidence level of 1++ (see Table 3) and directly applicable to the target population. All this allows for the elaboration of the following clinical practice recommendation:

- A) Interventions in social cognition are recommendable to improve affect recognition, theory of mind, the total psychiatric symptoms and community and institutional functioning of patients with schizophrenia in out-patient and in-patient contexts.

Considering the specific interventions, there is evidence that favors Metacognitive Training (MCT)¹⁹ and Social Cognition and Interaction Training (SCIT)²⁰ in persons with schizophrenia. Mortiz et al.¹⁹ studied the efficacy

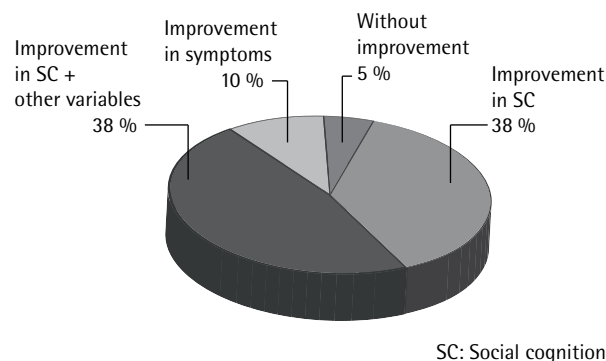


Figure 1 Psychological interventions in social cognition. Percent of studies that find improvements, or not, in different result variables

of the first intervention in a group of 150 patients with schizophrenia in a hospital and community context through a controlled and randomized trial. They observed that in the short and middle term, the intervention was effective in reducing delusions and positive symptoms in general compared with a cognitive rehabilitation program (evidence level 1+). Roberts et al.²⁰ conducted a controlled and randomized trial on the efficacy of SCIT compared with the usual treatment. The results showed that intervention in social cognition was superior to the usual treatment in relation with a social cognition measure (attributional style), negative symptoms and social functioning (evidence level 1+). Both studies^{19,20} are clinical trials having little risk of biases and permit the elaboration of the following recommendations:

- B) Meta-cognitive training (MCT) is recommended for patients with schizophrenia in out-patient and in-patient contexts to reduce delusions and positive symptoms in general.
- C) SCIT is recommended for patients with schizophrenia in out-patient context to improve attributional biases, social functioning and to reduce negative symptoms.

DISCUSSION

The results of studies on interventions in social cognition for persons with schizophrenia are summarized in this work. Forty one works (40 clinical trials and 1 meta-analysis) met the inclusion criteria. The results of our search of the literature were compared with the works of Kurtz and Richardson¹⁶ and Fiszdon and Reddy.¹⁷ Our study includes twice the references of the work of Kurtz and Richardson and approximately 20 new ones since the publication of the second work.

Considering the levels of evidence and SIGN system grades of recommendations,¹⁸ some clinical practice recommendations on the effects of the interventions in social cognition in persons with schizophrenia are proposed. Especially important are the studies identified on the efficacy of MCT¹⁹ and SCIT,²⁰ both published later than the two above-mentioned reviews^{16,17} and both of which have high scientific evidence (1+, Table 3). It should be noted that the availability of such a grade of scientific evidence allowed for the elaboration of two of the three clinical practice recommendations of the present work.

Some aspects need to be considered to compare our study with the previous ones.^{16,17} On the contrary to the study of Kurtz and Richardson,¹⁶ in our study, meta-analytic procedures were not used but rather the SIGN methodology was followed.¹⁸ The Fiszdon and Reddy study¹⁷ made a review of the literature without applying analytic methods. On

the contrary to the studies mentioned, in our work, only specific or comprehensive interventions were taken into account, especially designed for the rehabilitation of the deficits in social cognition of persons with schizophrenia. More extensive interventions that could affect such deficits but based on more extensive psychosocial strategies, such as the Integrated Psychological Therapy²¹ or Cognitive Enhancement Therapy,²² were not considered. In this way, it is hoped to control the effects of the components of other interventions such as training in social skills or neuropsychological rehabilitation, generally included in more extensive psychosocial interventions. There are more recent reviews in this regards. However, as far as we understand, these did not make a comprehensive review on the subject but rather focused on specific interventions.²³

Most of the studies have obtained positive effects associated to the interventions in social cognition. However, a more detailed examination of the summary of the evidence identified shows that only a small proportion of the studies can be considered evidence having high quality (Tables 2 and 3). It should be noted that most of the studies were performed with small-sized samples and did not include middle and long term follow-up. Furthermore, most are not controlled and randomized trials, considered as the gold standard of clinical investigation.²⁴ All the above could interfere in the evaluation of the efficacy and efficiency of the interventions in social cognition for persons with schizophrenia and consequently in the generalization of the results. Thus, in future studies, it is necessary to performed controlled and randomized trials, with larger samples and longer follow-ups.

Considering the available evidence and its quality, three clinical practice recommendations have been developed. To the best of our knowledge, there are no clinical practice recommendations for the management of schizophrenia dealing with this subject specifically.²⁵⁻²⁸ Interventions in social cognition are recommended for patients with schizophrenia in outpatient and in-patient contexts to improve affect recognition, theory of mind, the total of the psychiatric symptoms and community and institutional functioning (level A). This clinical practice recommendation is based on a high quality meta-analysis which is also the first study analyzing the predictors in this field, which is considered a key step towards feasible and effective social cognitive interventions.¹⁶ The work of Kurtz and Richardson¹⁶ incorporated intervention data on social cognition with those of more extensive psychosocial interventions. That is, the work collected a type of intervention that is not analyzed in our work. The proportion of broad psychosocial interventions included in the meta-analysis was less than 20%. Thus most of the results are based on the sample type of intervention selected in our study. Therefore, our clinical practice recommendations should be considered reliable. The rest of the clinical practice recommendations consider the effects of the SCITs¹⁹ and the MCT.²⁰

When referring to the efficacy of the interventions in social cognition, it can be stated that some of the variables of results collected in the studies have a more direct relation with the daily performance of the persons with schizophrenia, as they have greater ecological validity (for example, functionality variables) than other variables as those of psychiatric symptoms or basic cognition, for example.

CONCLUSIONS

Deficits in social cognition are characteristic of the persons with schizophrenia and appear to have clear repercussions on their daily functioning. There is sufficient high quality evidence to develop clinical practice recommendations on the effects of the interventions in social cognition in the study population and more specifically in regards to more specific interventions such as the SCITs¹⁹ and the MCT.²⁰ In spite of this, new studies using controlled randomized trials with a low risk of bias are needed. In this way, higher levels of confidence will exist when this type of interventions are recommended and provided for persons with schizophrenia. When the intervention is designed, it is necessary to consider the context and target population as well as to analyze the possible barriers, assure that the mental health care professionals have an adequate level of competences to perform the intervention and that they are duly supervised.²⁶ The final objective is to improve the prognosis of persons with schizophrenia through rehabilitation of the markers of better functionality, such as the field of cognition and especially social cognition.

CONFLICT OF INTERESTS

The authors declare that they have no possible conflicts of interest related with the article.

REFERENCES

- Napal O, Ojeda N, Sánchez P, Elizagárate E, Peña J, Ezcurra J, et al. The course of the schizophrenia and its impact on cognition: a review of literature. *Actas Esp Psiquiatr*. 2012;40(4):198-220.
- Brothers L. The neural basis of primate social communication. *Motiv Emot*. 1990;14:81-91.
- Penn DL, Corrigan PW, Bentall RP, Racenstein JM, Newman L. Social cognition in schizophrenia. *Psychol Bull*. 1997;121:114-32.
- Addington J, Saeedi H, Addington D. Influence of social perception and social knowledge on cognitive and social functioning in early psychosis. *Br J Psychiatry*. 2006;189:373-8.
- Mueser KT, Doonan R, Penn DL, et al. Emotion recognition and social competence in chronic schizophrenia. *J Abnorm Psychol*. 1996;105:271-5.
- Salem JE, Kring AM, Kerr SL. More evidence for generalized poor performance in facial emotion perception in schizophrenia. *J Abnorm Psychol*. 1996;105:480-3.
- Gibson CM, Penn DL, Prinstein MJ, Perkins DO, Belger A. Social skill and social cognition in adolescents at genetic risk for psychosis. *Schizophr Res*. 2010;122:179-84.
- Schiffman J, Lam CW, Jiwatram T, Ekstrom M, Sorenson H, Mednick S. Perspective-taking deficits in people with schizophrenia spectrum disorders: a prospective investigation. *Psychol Med*. 2004;34:1581-6.
- Green MF, Penn DL, Bentall R, Carpenter WT, Gaebel W, Gur RC, et al. Social cognition in schizophrenia: an NIMH workshop on definitions, assessment, and research opportunities. *Schizophr Bull*. 2008;34(6):1211-20.
- Couture SM, Penn DL, Roberts DL. The functional significance of social cognition in schizophrenia: a review. *Schizophr Bull*. 2006;32:S44-S63.
- Pinkham AE, Penn DL, Perkins DO, Lieberman J. Implications for the neural basis of social cognition for the study of schizophrenia. *Am J Psychiatry*. 2003;160(5):815-24.
- Nakagami E, Xie B, Hoe M, Brekke JS. Intrinsic motivation, neurocognition and psychosocial functioning in schizophrenia: testing mediator and moderator effects. *Schizophr Res*. 2008;105(1-3):95-104.
- Brüne M, Abdel-Hamid M, Lehmkämpfer C, Sonntag C. Mental state attribution, neurocognitive functioning, and psychopathology: what predicts poor social competence in schizophrenia best? *Schizophr Res*. 2007;92(1-3):151-9.
- Zúñiga A, Navarro JB, Lago P, Olivas F, Muray E, Crespo M. Evaluation of needs among patients with severe mental illness. A community study. *Actas Esp Psiquiatr*. 2013;41(2):115-21.
- Brown EC, Tas C, Brüne M. Potential therapeutic avenues to tackle social cognition problems in schizophrenia. *Expert Rev Neurother*. 2012;12(1):71-81.
- Kurtz MM, Richardson CL. Social cognitive training for schizophrenia: a meta-analytic investigation of controlled research. *Schizophr Bull*. 2012;38(5):1092-104.
- Fiszdon JM, Reddy LF. Review of social cognitive treatments for psychosis. *Clin Psychol Rev*. 2012;32(8):724-40.
- National Health Service (NHS). SIGN 50 A guideline developer's handbook. Revised edition. Edinburgh (United Kingdom): Scottish Intercollegiate Guidelines Network (SIGN); 2008.
- Moritz S, Veckenstedt R, Bohn F, Hottenrott B, Scheu F, Randjbar S, et al. Complementary group Metacognitive Training (MCT) reduces delusional ideation in schizophrenia. *Schizophr Res*. 2013;151(1-3):61-9.
- Roberts DL, Combs DR, Willoughby M, Mintz J, Gibson C, Rupp B, et al. A randomized, controlled trial of Social Cognition and Interaction Training (SCIT) for outpatients with schizophrenia spectrum disorders. *Br J Clin Psychol*. 2014;53(3):281-98.
- Roder V, Mueller DR, Mueser KT, Brenner HD. Integrated psychological therapy (IPT) for schizophrenia: is it effective? *Schizophr Bull*. 2006;32:81-93.
- Hogarty GE, Flesher S, Ulrich R, Carter M, Greenwald D, Pogue-Geile M, et al. Cognitive enhancement therapy for schizophrenia: effects of a 2-year randomized trial on cognition and behavior. *Arch Gen Psychiatry*. 2004;61(9):866-76.
- Eack SM. Cognitive remediation: a new generation of psychosocial interventions for people with schizophrenia. *Soc Work*. 2012;57(3):235-46.
- Cobos-Carbó A, Augustovski F. CONSORT 2010 Declaration: updated guideline for reporting parallel group randomised trials. *Med Clin (Barc)*. 2011;137(5):213-5.
- National Collaborating Centre for Mental Health. Psychosis and schizophrenia in children and young people. London (UK): National Institute for Health and Clinical Excellence (NICE); 2013.
- National Collaborating Centre for Mental Health. Schizophrenia: core interventions in the treatment and management of

schizophrenia in adults in primary and secondary care. London (UK): National Institute for Health and Clinical Excellence (NICE); 2014.

27. Working Group of the Clinical Practice Guideline for Schizophrenia and Incipient Psychotic Disorder, Mental Health Forum, coordination. Clinical practice guideline for schizophrenia and incipient psychotic disorder. Madrid (Spain): Quality Plan for the National Health System of the Ministry of Health and Consumer Affairs, Catalan Agency for Health Technology Assessment and Research; 2009.
28. Scottish Intercollegiate Guidelines Network (SIGN). Management of schizophrenia. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network (SIGN); 2013.

REFERENCES OF THE STUDIES SELECTED TO ANALYZE THE EFFECTS OF THE INTERVENTIONS IN SOCIAL COGNITION FOR PERSONS WITH SCHIZOPHRENIA

- Penn D, Roberts DL, Munt ED, Silverstein E, Jones N, Sheitman B. A pilot study of social cognition and interaction training (SCIT) for schizophrenia. *Schizophr Res.* 2005;80(2-3):357-9.
- Choi KH, Kwon JH. Social cognition enhancement training for schizophrenia: a preliminary randomized controlled trial. *Community Ment Health J.* 2006;42(2):177-87.
- Combs DR, Adams SD, Penn DL, Roberts D, Tiegreen J, Stem P. Social Cognition and Interaction Training (SCIT) for inpatients with schizophrenia spectrum disorders: preliminary findings. *Schizophr Res.* 2007;91(1-3):112-6.
- Penn DL, Roberts DL, Combs D, Sterne A. Best practices: The development of the Social Cognition and Interaction Training program for schizophrenia spectrum disorders. *Psychiatr Serv.* 2007;58(4):449-51.
- Combs DR, Tosheva A, Penn DL, Basso MR, Wanner JL, Laib K. Attentional-shaping as a means to improve emotion perception deficits in schizophrenia. *Schizophr Res.* 2008;105(1-3):68-77.
- Combs DR, Elerson K, Penn DL, Tiegreen JA, Nelson A, Ledet SN, et al. Stability and generalization of Social Cognition and Interaction Training (SCIT) for schizophrenia: six-month follow-up results. *Schizophr Res.* 2009;112(1-3):196-7.
- Gil Sanz D, Diego Lorenzo M, Bengochea Seco R, Arrieta Rodríguez M, Lastra Martínez I, Sánchez Calleja R, et al. Efficacy of a social cognition training program for schizophrenic patients: a pilot study. *Span J Psychol.* 2009;12(1):184-91.
- Horan WP, Kern RS, Shokat-Fadai K, Sergi MJ, Wynn JK, Green MF. Social cognitive skills training in schizophrenia: an initial efficacy study of stabilized outpatients. *Schizophr Res.* 2009;107(1):47-54.
- Roberts DL, Penn DL. Social cognition and interaction training (SCIT) for outpatients with schizophrenia: a preliminary study. *Psychiatry Res.* 2009 Apr 30;166(2-3):141-7.
- Aghotor J, Pfueller U, Moritz S, Weisbrod M, Roesch-Ely D. Metacognitive training for patients with schizophrenia (MCT): feasibility and preliminary evidence for its efficacy. *J Behav Ther Exp Psychiatry.* 2010;41(3):207-11.
- Mazza M, Lucci G, Pacitti F, Pino MC, Mariano M, Casacchia M, Roncone R. Could schizophrenic subjects improve their social cognition abilities only with observation and imitation of social situations? *Neuropsychol Rehabil.* 2010;20(5):675-703.
- Roberts DL, Penn DL, Labate D, Margolis SA, Sterne A. Transportability and feasibility of Social Cognition And Interaction Training (SCIT) in community settings. *Behav Cogn Psychother.* 2010;38(1):35-47.
- Moritz S, Kerstan A, Veckenstedt R, Randjbar S, Vitzthum F, Schmidt C, et al. Further evidence for the efficacy of a metacognitive group training in schizophrenia. *Behav Res Ther.* 2011a;49(3):151-7.
- Moritz S, Veckenstedt R, Randjbar S, Vitzthum F, Woodward TS. Antipsychotic treatment beyond antipsychotics: metacognitive intervention for schizophrenia patients improves delusional symptoms. *Psychol Med.* 2011b;41(9):1823-32.
- Veltro F, Mazza M, Vendittelli N, Alberti M, Casacchia M, Roncone R. A comparison of the effectiveness of problem solving training and of cognitive-emotional rehabilitation on neurocognition, social cognition and social functioning in people with schizophrenia. *Clin Pract Epidemiol Ment Health.* 2011;7:123-32.
- Bechi M, Riccaboni R, Ali S, Fresi F, Buonocore M, Bosia M, et al. Theory of mind and emotion processing training for patients with schizophrenia: preliminary findings. *Psychiatry Res.* 2012;198(3):371-7.
- Hooker CI, Bruce L, Fisher M, Verosky SC, Miyakawa A, Vinogradov S. Neural activity during emotion recognition after combined cognitive plus social cognitive training in schizophrenia. *Schizophr Res.* 2012;139(1-3):53-9.
- Naughton M, Nulty A, Abidin Z, Davoren M, O'Dwyer S, Kennedy HG. Effects of group metacognitive training (MCT) on mental capacity and functioning in patients with psychosis in a secure forensic psychiatric hospital: a prospective-cohort waiting list controlled study. *BMC Res Notes.* 2012;5:302.
- Sachs G, Winklbaur B, Jagsch R, Lasser I, Kryspin-Exner I, Frommann N, et al. Training of affect recognition (TAR) in schizophrenia--impact on functional outcome. *Schizophr Res.* 2012;138(2-3):262-7. doi: 10.1016/j.schres.2012.03.005.
- Tas C, Danaci AE, Cubukcuoglu Z, Brüne M. Impact of family involvement on social cognition training in clinically stable outpatients with schizophrenia - a randomized pilot study. *Psychiatry Res.* 2012;195(1-2):32-8. doi: 10.1016/j.psychres.2011.07.031.
- Balzan RP, Delfabbro PH, Galletly CA, Woodward TS. Metacognitive training for patients with schizophrenia: Preliminary evidence for a targeted, single-module programme. *Aust N Z J Psychiatry.* 2013 Oct 24.
- Wölwer W, Frommann N. Social-cognitive remediation in schizophrenia: generalization of effects of the Training of Affect Recognition (TAR). *Schizophr Bull.* 2011;37 Suppl 2:S63-70. doi: 10.1093/schbul/sbr071.
- Bechi M, Spangaro M, Bosia M, Zanoletti A, Fresi F, Buonocore M, et al. Theory of Mind intervention for outpatients with schizophrenia. *Neuropsychol Rehabil.* 2013;23(3):383-400. doi: 10.1080/09602011.2012.762751.
- Gohar SM, Hamdi E, El Ray LA, Horan WP, Green MF. Adapting and evaluating a social cognitive remediation program for schizophrenia in Arabic. *Schizophr Res.* 2013;148(1-3):12-7. doi: 10.1016/j.schres.2013.05.008.
- Lindenmayer JP, McGurk SR, Khan A, Kaushik S, Thanju A, Hoffman L, et al. Improving social cognition in schizophrenia: a pilot intervention combining computerized social cognition training with cognitive remediation. *Schizophr Bull.* 2013;39(3):507-17. doi: 10.1093/schbul/sbs120.
- Marsh P, Langdon R, McGuire J, Harris A, Polito V, Coltheart M. An open clinical trial assessing a novel training program for social cognitive impairment in schizophrenia. *Australas Psychiatry.* 2013;21(2):122-6. doi: 10.1177/1039856213475683.
- Moritz S, Veckenstedt R, Bohn F, Hottenrott B, Scheu F, Randjbar S, et al. Complementary group Metacognitive Training (MCT) reduces delusional ideation in schizophrenia. *Schizophr Res.* 2013;151(1-3):61-9. doi: 10.1016/j.schres.2013.10.007.
- Parker S, Foley S, Walker P, Dark F. Improving the social

- cognitive deficits of schizophrenia: a community trial of Social Cognition and Interaction Training (SCIT). *Australas Psychiatry*. 2013;21(4):346-51. doi: 10.1177/1039856213486305.
- Rocha NB, Queirós C. Metacognitive and social cognition training (MSCT) in schizophrenia: a preliminary efficacy study. *Schizophr Res*. 2013;150(1):64-8. doi: 10.1016/j.schres.2013.07.057.
 - Sacks S, Fisher M, Garrett C, Alexander P, Holland C, Rose D, et al. Combining computerized social cognitive training with neuroplasticity-based auditory training in schizophrenia. *Clin Schizophr Relat Psychoses*. 2013;7(2):78-86A. doi: 10.3371/CSRP.SAFI.012513.
 - Wang Y, Roberts DL, Xu B, Cao R, Yan M, Jiang Q. Social cognition and interaction training for patients with stable schizophrenia in Chinese community settings. *Psychiatry Res*. 2013;210(3):751-5. doi: 10.1016/j.psychres.2013.08.038.
 - Briki M, Monnin J, Haffen E, Sechter D, Favrod J, Netillard C, et al. Metacognitive training for schizophrenia: A multicentre randomised controlled trial. *Schizophr Res*. 2014;157(1-3):99-106. doi: 10.1016/j.schres.2014.06.005.
 - Cacciotti-Saija C, Langdon R, Ward PB, Hickie IB, Scott EM, Naismith SL, et al. A Double-blind Randomized Controlled Trial of Oxytocin Nasal Spray and Social Cognition Training for Young People With Early Psychosis. *Schizophr Bull*. 2014. pii: sbu094.
 - Davis MC, Green MF, Lee J, Horan WP, Senturk D, Clarke AD, et al. Oxytocin-augmented social cognitive skills training in schizophrenia. *Neuropsychopharmacology*. 2014;39(9):2070-7. doi: 10.1038/npp.2014.68.
 - Favrod J, Rexhaj S, Bardy S, Ferrari P, Hayoz C, Moritz S, et al. Sustained antipsychotic effect of metacognitive training in psychosis: A randomized-controlled study. *Eur Psychiatry*. 2014;29(5):275-81. doi: 10.1016/j.eurpsy.2013.08.003.
 - Erawati E, Keliat BA, Helena N, Hamid A. The influence of metacognitive training on delusion severity and metacognitive ability in schizophrenia. *J Psychiatr Ment Health Nurs*. 2014. doi: 10.1111/jpm.12130.
 - Gil-Sanz D, Fernández-Modamio M, Bengochea-Seco R, Arrieta-Rodríguez M, Pérez-Fuentes G. Efficacy of the Social Cognition Training Program in a sample of schizophrenic outpatients. *Clin Schizophr Relat Psychoses*. 2014;4:1-27.
 - Kuokkanen R, Lappalainen R, Repo-Tiihonen E, Tiihonen J. Metacognitive group training for forensic and dangerous non-forensic patients with schizophrenia: A randomised controlled feasibility trial. *Crim Behav Ment Health*. 2014. doi: 10.1002/cbm.1905.
 - Nahum M, Fisher M, Loewy R, Poelke G, Ventura J, Nuechterlein KH, et al. A novel, online social cognitive training program for young adults with schizophrenia: A pilot study. *Schizophr Res Cogn*. 2014 Mar 1;1(1):e11-e19.
 - Roberts DL, Combs DR, Willoughby M, Mintz J, Gibson C, Rupp B, et al. A randomized, controlled trial of Social Cognition and Interaction Training (SCIT) for outpatients with schizophrenia spectrum disorders. *Br J Clin Psychol*. 2014. doi: 10.1111/bjc.12044.
 - Kurtz MM, Richardson CL. Social cognitive training for schizophrenia: a meta-analytic investigation of controlled research. *Schizophr Bull*. 2012;38(5):1092-104. doi: 10.1093/schbul/sbr036.