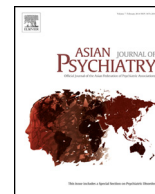




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## Review article

# Social cognitive interventions for people with schizophrenia: A systematic review

Bhing-Leet Tan<sup>a,b,\*</sup>, Sara-Ann Lee<sup>a</sup>, Jimmy Lee<sup>a,c</sup>

<sup>a</sup> Institute of Mental Health, 10 Buangkok View, Buangkok Green Medical Park, Singapore 539747, Singapore

<sup>b</sup> Singapore Institute of Technology, 10 Dover Drive, Singapore 138683, Singapore

<sup>c</sup> Office of Clinical Sciences, Duke-NUS Medical School, 8 College Road, Singapore 169857, Singapore

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### ABSTRACT

Social cognition is the mental process which underpins social interactions. Increasingly, it has been recognized to be impaired in people with schizophrenia, resulting in functional problems. Correspondingly, the past ten years have seen huge developments in the study of interventions to ameliorate social cognitive deficits among people with schizophrenia. In the present review, we systematically reviewed published studies on social cognitive interventions from 2005 to 2015. Of the 61 studies included in this review, 20 were on broad-based social cognitive interventions, which incorporated neurocognitive training, specialized learning technique or virtual reality social skills training. On the other hand, 31 studies on targeted interventions either focused on specific social cognitive domains, or a range of domains. Improvements in emotion processing and theory of mind were often reported, while social perception and attributional style were less frequently measured. Both broad-based and targeted interventions achieved gains in social functioning, albeit inconsistently. Lastly, nine studies on the use of oxytocin and one study on transcranial direct current stimulation reported positive preliminary results in higher-order cognition and facial affect recognition respectively. This review revealed that a wide range of social cognitive interventions is currently available and most have shown some promise in improving social cognition outcomes. However, there is a need to use a common battery of measurements for better comparisons across interventions. Future research should examine combination therapies and the sustainability of gains beyond the intervention period.

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\* Corresponding author at: Health and Social Sciences, Academic Programmes, Singapore Institute of Technology, 10 Dover Drive, Singapore 138683, Singapore.

E-mail addresses: [BhingLeet.Tan@singaporetech.edu.sg](mailto:BhingLeet.Tan@singaporetech.edu.sg),

[Bhing\\_leet\\_tan@imh.com.sg](mailto:Bhing_leet_tan@imh.com.sg) (B.-L. Tan), [Saraann\\_lee@imh.com.sg](mailto:Saraann_lee@imh.com.sg) (S.-A. Lee),

[Jimmy\\_lee@imh.com.sg](mailto:Jimmy_lee@imh.com.sg) (J. Lee).

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**1. Introduction**

Research on social cognition in schizophrenia has received increased attention over the past ten years, due to the growing body of evidence about the substantial impact of social cognitive deficits on social functioning (Green et al., 2015; Pinkham et al., 2014). Social cognition is defined as the mental operations that underpin perceiving, interpreting, and generating responses during social interactions; including the intentions, dispositions, and behaviors of others (Green et al., 2008). The Social Cognition Psychometric Evaluation (SCOPE) study identified four core domains of social cognition, namely emotion processing, social perception, theory of mind/mental state attribution, and attributional style/bias (Pinkham et al., 2014). Social cognition appears to be a multi-dimensional construct that is overlapping and yet distinct from social skills and neurocognition (Mancuso et al., 2011; van Hooren et al., 2008). It has been found to mediate a significant indirect relationship between neurocognition and functional outcomes (Martínez-Domínguez et al., 2015; Schmidt et al., 2011). Moreover, direct effects of social cognition on functional outcomes have been established in many studies (Cohen et al., 2006; Couture et al., 2006; Sterea, 2015). In addition, poor social cognition has been found to predict maladaptive social mixing behaviors and produce negative effect on community independence (Combs et al., 2011b; Couture et al., 2006).

In view of the significant impact of social cognitive deficits on daily functioning, many interventions have been developed over the past decade to ameliorate social cognitive deficits. Four reviews and one meta-analysis have been conducted to date, which demonstrate promising results of the effectiveness of such interventions on social cognitive deficits and functional outcomes (Choi et al., 2009; Horan et al., 2008; Kurtz and Richardson, 2012; Statucka and Walder, 2013; Wolwer et al., 2010). Interventions cited in these reviews utilized primarily therapist-led group

interventions, aided by computer software or photographs of people and social scenes. Their effects on general functional outcomes were examined. However, it is noted that recent social cognitive interventions have attempted to use new treatment modalities, such as virtual reality, online programs, medication and neurostimulation. Hence, this study attempts to review a variety of social cognitive interventions over the past decade as well as to delineate their outcomes on social functioning. Treatment approaches, mode of delivery and outcome measurements used are evaluated and discussed.

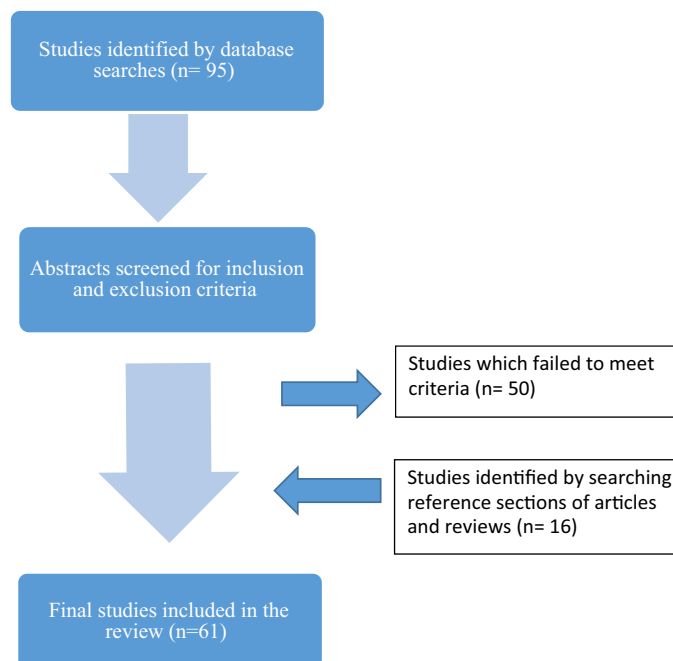
**2. Methods**

*2.1. Search strategy*

Articles included in the systematic review were identified through a computer-based search of ScienceDirect, PubMed, PsycINFO from January 2005 to August 2015, using combinations of these keywords: social cogn\*, cogn\*, neurocogn\*, training, rehabilitation, remediation, schizophrenia. Besides that, the reference sections of articles identified from database searches were studied for relevant citations. We selected literature from the past ten years, as comprehensive reviews had been done for earlier studies (Choi et al., 2009; Horan et al., 2008; Kurtz and Mueser, 2008; Pfammatter et al., 2006).

*2.2. Inclusion criteria*

For the purpose of this review, the studies must have the majority of participants diagnosed with schizophrenia and/or schizoaffective disorders, according to an established criterion-based diagnostic system before they were included. The interventions must consist of some type of social cognitive treatment, either as a standalone intervention or in combination with other



**Fig. 1.** Flow Chart of the Review Process.

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