Further insight into self-face recognition in schizophrenia patients: Why ambiguity matters ☆

Catherine Bortolon [a, b, *], Delphine Capdevielle [b, c], Robin N. Salesse [d], Stephane Raffard [a, b]

[a] Epsylon Laboratory, EA 4556 Montpellier, France
[b] University Department of Adult Psychiatry, CHU Montpellier, Montpellier, France
[c] INSERM U-1061, Montpellier, France
[d] Movement to Health Laboratory, EuroMov, Montpellier-1 University, Montpellier, France

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ABSTRACT

Background: Although some studies reported specifically self-face processing deficits in patients with schizophrenia disorder (SZ), it remains unclear whether these deficits rather reflect a more global face processing deficit. Contradictory results are probably due to the different methodologies employed and the lack of control of other confounding factors. Moreover, no study has so far evaluated possible daily life self-face recognition difficulties in SZ. Therefore, our primary objective was to investigate self-face recognition in patients suffering from SZ compared to healthy controls (HC) using an "objective measure" (reaction time and accuracy) and a "subjective measure" (self-report of daily self-face recognition difficulties).
Method: Twenty-four patients with SZ and 23 HC performed a self-face recognition task and completed a questionnaire evaluating daily difficulties in self-face recognition. Recognition task material consisted in three different faces (the own, a famous and an unknown) being morphed in steps of 20%.
Results: Results showed that SZ were overall slower than HC regardless of the face identity, but less accurate only for the faces containing 60%—40% morphing. Moreover, SZ and HC reported a similar amount of daily problems with self/other face recognition. No significant correlations were found between objective and subjective measures ($p > 0.05$).
Limitations: The small sample size and relatively mild severity of psychopathology does not allow us to generalize our results.
Conclusions: These results suggest that: (1) patients with SZ are as capable of recognizing their own face as HC, although they are susceptible to ambiguity; (2) there are far less self recognition deficits in schizophrenia patients than previously postulated.

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1. Introduction

Schizophrenia is a heterogeneous psychiatry disorder that affects approximately 0.5% of the general population (Goldner, Hsu, Waraich, & Somers, 2002). Schizophrenia is characterized, among other symptoms, by social interaction deficits. In the last decades, researchers started to focus on the different factors implicated in social interaction deficits including face processing. Overall, studies suggest that schizophrenia patients are impaired in face recognition. Nevertheless, these deficits might be better explained by other confounding factors such as cognitive and sensorial deficits (Darke, Peterman, Park, Sundram, & Carter, 2013).

More recently, researchers have focused specifically on self-face processing deficits. Results are, however, contradictory. Some studies found that schizophrenia patients present a specific deficit in recognizing self faces compared to familiar and unknown faces (Irani et al., 2006; Jiu et al., 2014; Kircher, Seiferth, Plewnia, Baar, & Schwabe, 2007). Conversely, other studies did not find evidence supporting a specific self-face processing deficit (Heinisch, Wiens, Grundl, Juckel, & Brune, 2013; Lee, Kwon, Shin, Lee, & Park, 2007). The discrepancies between these results could be

explained by the different methodologies employed. While both Irani et al. (2006) and Kircher et al. (2007) used a familiarity judgment task, Lee et al. (2007) used a visual search task, and Heinisch et al. (2013) and Jia, Yang, Zhu, Liu, and Barnaby (2013) a morphing procedure. Moreover, the lack of control of other confounding factors, notably, cognitive deficits, also deserves some consideration when analyzing these discrepancies. First, Irani et al. (2006) did not mask the external features of the face, which might divert patients' attention from the relevant features of the face. Second, both Kircher et al. (2007; two first experiments) and Irani et al. (2006) did not control for stimulus habituation (Kircher et al., 2007). Third, the task used in the study by Lee et al. (2007) was heavily dependent of attention capacity (visual search task). Forth, the studies using a morphing procedure (Heinisch et al., 2013; Jia et al., 2013; Kircher et al., 2007) failed to control for several important factors: (1) they did not present results for the 100% self-face; and (2) they did not evaluate how patients deal with the ambiguity of the stimulus and the mismatch between their internal representation of the self face and the morphed self-face displayed. Fifth, Heinisch et al. (2013) make their conclusions based on reaction time data only. Nevertheless, it has been shown that slowing of reaction time is a general feature of schizophrenia (Schatz, 1998); therefore it may not be a good parameter to judge the existence of deficits in face processing. Finally, except for one study (Lee et al., 2007), none of these studies included a control task to verify whether the slow-down observed during the self-face recognition task was specific to faces or represented a more global deficit of processing speed.

Self-face recognition tasks provide a direct measure of patients' ability to recognize their own face. Nevertheless, no study has, so far, measured how patients suffering from schizophrenia perceive their daily self-face recognition difficulties. Laroi, D'Argembeau, Bredart, and van der Linden (2007) developed a questionnaire assessing self-face recognition failures in everyday life, namely, Self-face Recognition Questionnaire (SFRQ). This questionnaire evaluates several types of self-face recognition difficulties including: (1) misidentification of one's own face as being that of someone else; (2) failure of recognition of one's own face, and (3) perception of one's own face as being different from the internalized representation. They showed that individuals with higher scores on schizotypal personality presented more daily life difficulties in recognizing their own face compared to those with lower scores. Moreover, they showed that self-face recognition difficulties were correlated with disorganized schizotypal dimension.

In sum, the current literature provides contradictory results regarding self-face recognition deficits in patients with schizophrenia in laboratory setting and daily life. Therefore, our primary objective was to investigate self-face recognition in patients suffering from schizophrenia disorder compared to healthy controls using an "objective measure" (reaction time and accuracy) and a "subjective measure" (self-report of daily self-face recognition difficulties). More specifically, we aimed to investigate how patients suffering from schizophrenia deal with: (1) perceptual ambiguity and (2) the mismatch between their "self-face" mental representation and the image displayed when their own face was morphed with someone else's face. A secondary aim of the present study was to investigate the correlations between the "subjective measures" and the "objective measures" of self-face recognition and patients' symptomatology including positive and negative symptoms, and insight.

Regarding the "objective measure", we hypothesized that patients suffering from schizophrenia would be overall slower than healthy controls, but not less accurate. More specifically, we expected that patients suffering from schizophrenia would perform worse than controls only under perceptual ambiguity, that is, when they have to decide the identity of a face containing 60% of the person and 40% of another one. In agreement, previous studies have shown that perceptual ambiguity might impair patients' performance on categorization of facial expression (de Gelder et al., 2005). With respect to the "subjective measure", we hypothesized that patients with schizophrenia would score higher than healthy controls suggesting more everyday life difficulties in recognizing their own face.

2. Materials and method

2.1. Participants

In total, 24 schizophrenia patients who fulfill the DSM-IV diagnostic criteria for schizophrenia, currently receiving inpatient or outpatient care were included. Inclusion criteria were being between 18 and 60 years of age, having a diagnosis of schizophrenia and being capable of reading, understanding and speaking French. Exclusion criteria were substance abuse other than cannabis or alcohol, co-morbid neurological disorder, history of severe brain trauma or current electro-convulsivotherapy. Twenty three healthy subjects were recruited in Montpellier area. The control group was screened for current psychiatric illness using the Mini-International Neuropsychiatric Interview (Sheehan et al., 1998) and participants were excluded if they met criteria for any current axis I disorder of the DSM-IV-TR or if they were first-degree relatives of subjects with schizophrenia. The control participants were matched on age, sex and education level with schizophrenia patients.

All participants provided written consent. The study received approval by the local ethics committee for medical research.

2.2. Measures

This research protocol is part of the European STREP project AlterEgo (FP7-ICT-2011-9 "Cognitive Systems and Robotics" # 600610). This protocol implicated several evaluations, however, only some of them will be presented here. More specifically, it implicated a social motor coordination task, evaluations of neuro-cognitive functions such as cognitive flexibility, inhibition, working memory, evaluations of social cognition among other measures.

2.2.1. Cognitive and clinical measures

Premorbid intelligence was estimated using the fNART (Mackinnon & Mulligan, 2005). Mean chlorpromazine equivalents dosage was computed. Severity of schizophrenic symptoms was evaluated using the Positive and Negative Syndrome Scale (PANSS; (Kay, Fiszbein, & Opler, 1987)). Insight was measured with the PANSS item (G12).

2.2.2. Self-face recognition questionnaire (SFRQ; (Laroi et al., 2007))

The SFRQ consists of six items evaluating recognition failures or anomalies concerning oneself. Two items concern mis-identifications, two recognition failures and two concern perception of unusual aspects. If participants answer "Yes" to an item, they had to subsequently answer three additional questions regarding the frequency, whether the image was clear and the degree of stress/tiredness. Finally, a score for other-recognition was also calculated from this questionnaire.

2.3. Stimuli

Frontal view pictures of each participant's face with a neutral expression were taken the day before the experiment using an 8