Deficits in the ability to recognize one’s own affects and those of others: Associations with neurocognition, symptoms and sexual trauma among persons with schizophrenia spectrum disorders

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A B S T R A C T

While many with schizophrenia experience deficits in metacognition it is unclear whether those deficits are related to other features of illness. To explore this issue, the current study classified participants with schizophrenia as possessing a deficit in both awareness of their own emotions and those of others (n = 30), aware of their own emotions but unaware of the emotions of others (n = 50) and aware of their own emotions and of other’s emotions (n = 17). Groups were compared on assessments of neurocognitive function, symptoms, and history of sexual trauma. ANCOVA controlling for education found that the group unaware of their own emotions and those of others demonstrated poorer verbal memory, processing speed, executive function, less emotional discomfort and higher levels of disorganization symptoms relative to the other groups. The group aware of their own emotions but not those of others had a significantly higher report of childhood sexual abuse.

1. Introduction

Over the last 15 years, research has increasingly suggested that many with schizophrenia experience significant difficulties in thinking about thinking, understanding their own mental states as well as those of others and utilizing mental state information to solve problems (Corcoran, Mercer, & Frith, 1995; Frith, 2004; Hasson-Ohayon, Kravetz, Levy, & Roe, 2009). Referred to as Theory of Mind (Bell, Langdon, Siegert, & Ellis, 2010; Brüne, 2005), social cognition (Brüne & Brüne-Corrs, 2006; Vauth, Rusch, Wirtz, & Corrigan, 2004), mentalizing (Bateman & Fonagy, 2004) or the metacognitive system (Dimaggio & Lysaker, 2010; Lysaker et al., 2005; Semerari et al., 2003), it is of broad interest as a possible construct because of its potential to illuminate the processes which underlie dysfunction among persons with schizophrenia (Bell, Tsang, Greig, &...
One prominent aspect of difficulties understanding mental states pertains to the ability to recognize emotions, both in oneself and in others. Research using a range of paradigms has consistently shown difficulties ascribing the correct emotional state to a target on the basis of any number of verbal and non-verbal cues both alone and in conjunction with one another (Hofer et al., 2009; Kring & Moran, 2008; van't Wout et al., 2007) especially as those interactions become more complex (Baslet, Termini, & Herbener, 2009). For example, Derntl and colleagues (2009) have found that persons diagnosed with schizophrenia, when compared to controls without mental health concerns, had more problems correctly ascribing emotions to still faces and in inferring the emotion of a masked participant involved in a social interaction. Lysaker, Davis, and Tsai (2009) found that the misattribution of anger to another person was correlated with higher levels of suspiciousness coupled with lower self-esteem. Strauss, Jetha, Ross, Duke, and Allen (2010) found that persons with predominantly negative symptoms displayed significantly more severe difficulties naming emotions than both those with schizophrenia who did not have negative symptoms and controls without any significant mental health issues. Henry, Bailey, von Hippel, Rendell, and Lane (2010) also found that greater difficulties in identifying emotions were associated with more negative symptoms.

Difficulties recognizing emotions in others are mirrored by similar problems in identifying and naming one’s own emotions. van’t Wout and colleagues (2007) found that males diagnosed with schizophrenia demonstrated a specific pattern of alexithymia, that is, difficulty identifying and verbalizing emotions. van der Meer, van’t Wout, and Aleman (2009) also reported that patients with schizophrenia demonstrated significant difficulties identifying feelings and that these difficulties were linked to greater depression. These difficulties in understanding one’s own emotions are reflected in reduced emotional expression in the autobiographical narratives of those with schizophrenia (Kohler et al., 2008). Lysaker, Dimaggio, Buck, Carcione, and Nicollò (2007) reported that a significant proportion of a sample of patients with schizophrenia failed to demonstrate the capacity to distinguish different emotions from one another as reflected in personal narratives. Consistent with this, Neumann and colleagues (2007) suggested that disturbances in the recollection of autobiographical details interfere with attunement to emotional experience. Raffard et al. (2010) found persons with schizophrenia had difficulties accessing emotionally salient memories whilst Trémeau et al. (2009) showed that persons with schizophrenia had difficulties linking emotions with environmental events. These competences are crucial for emotional attunement and understanding. These difficulties are further reflected in reduced fronto-limbic interactions found amongst persons with schizophrenia in response to emotionally arousing photographs (Dichter, Bellion, Casp, & Belger, 2010), a pattern of responding linked to anhedonia.

One question raised by these findings concerns the correlates (and possible antecedents or consequences) of deficits in affect recognition. Are there phenomena linked to schizophrenia which may be associated with greater deficits in awareness of one’s own emotions, the emotions of others, and their interaction? Following this, the current study sought to examine the association between several correlates of metacognitive function: neurocognition, negative and disorganized symptoms, emotional distress and history of childhood sexual trauma.

The first possible set of correlates of metacognitive difficulties we explored was neurocognitive dysfunction. Specifically, one possibility is that with the decrements of neurocognitive function that occur in schizophrenia, it may become more difficult to perform a range of metacognitive tasks including being aware of what one is feeling and what others are feeling. In other words, greater problems in the storage and processing of information in memory and in the ability to think flexibly about abstract ideas results in the greater difficulties in thinking about and recognizing emotions. Evidence supporting this includes findings that deficits in memory function and executive function are linked to impairments in autobiographical memory (D’Argembeau et al., 2008; Raffard et al., 2009, 2010), poor levels of self-reflectivity within personal narratives (Lysaker et al., 2005, 2008) as well as deficits in ToM tasks that call for affect recognition (Bell, Bryson, & Lysaker, 1997; Shur, Shamay-Tsoory, & Levkowitz, 2008). McGlade et al. (2008) reported a measure of recognizing emotions was correlated with verbal and performance IQ, and verbal and spatial working memory. Strauss and colleagues (2008) have similarly suggested that poorer emotional recognition is linked to deficits in visual processing. In a meta-analysis, Bora, Yücel, and Pantelis (2009) reported a wide range of ToM measures, including affect recognition, were linked with general intellectual function only among remitted patients. Alexithymia in schizophrenia also proved to be related to poorer cognitive functioning (Henry et al., 2010).

The second possible correlate we explored comprised negative and disorganization symptoms. With the development of negative and disorganization symptoms, it may become more difficult to discern in a nuanced manner what one is feeling and what others are feeling (Salvatore, Dimaggio, Popolo, & Lysaker, 2008), which is, for example, demonstrated by the finding that schizophrenic patients with many negative symptoms are more alexithymic (Knam, Langlois-Thery, Dollfus, & Petit, 1997). Further support for this possibility includes findings that poorer performance on two measures of affect recognition was linked to greater levels of disorganization symptoms both concurrently and 6 months in the future (Lysaker et al., in press). In this same study, assessments of affect recognition were related to negative symptoms but only concurrently. Strauss et al. (2010) have also suggested that deficit or primary negative symptoms may be predictive of greater difficulties with affect recognition. Shamay-Tsoory et al., in two separate studies (2007a, 2007b), have also reported that severity of negative symptoms was related to reduction in empathy and to poorer performance on the affective elements of ToM tasks among persons with schizophrenia. Consistent with these findings, Abdel-Hamid et al. (2009) found that failure in cognitive mental state attribution was closely linked with the degree of disorganization.

A third possible antecedent to deficits in metacognition we planned to investigate was childhood trauma. As suggested by a range of authors (Gumley, 2010; Liotti & Gumley, 2009; Lysaker & Gumley, 2010), for many with traumatic histories,
reflectivity can raise deeply painful emotional implications of affectively charged details contained within autobiographical memories. Furthermore, awareness of other’s mental states can be experienced as vulnerability to further abuse (e.g. as a context for exploitation). Thus in disorders such as borderline personality disorder or post-traumatic stress disorders, it has been suggested that dysfunction in emotional recognition and in the general metacognitive system is linked to adverse experiences, in particular history of (sexual) trauma (Liotti & Prunetti, 2010). Evidence supporting this includes the findings that early trauma and deprivation are associated with poorer performance on ToM tasks administered years later (Colvert et al., 2008; Pears & Fisher, 2005; Yagmurlu, Berument, & Celimli, 2005). Given that a wealth of studies has shown that adverse experiences in childhood, including sexual trauma, are highly prevalent in schizophrenia (c.f. Read, van Os, Morrison, & Ross, 2005), we intuitively that a traumatized subgroup exists among persons with psychosis who experience these kinds of decrements in metacognitive function. In this study, we chose to investigate sexual trauma given the lack of ambiguity regarding when it has occurred, its clearly traumatic nature, high prevalence among persons with schizophrenia and links with social dysfunction (Lysaker, Outcalt, & Ringer, 2010; Read et al., 2005).

The final possible correlate we chose to examine was emotional distress. A range of literature which has examined metacognitive functioning in persons with personality disorders (Bateman & Fonagy, 2004; Choi-Kain & Gunderson, 2008; Dimaggio, Semerari, Carcione, Nicolò, & Procacci, 2007) suggests that heightened levels of emotional arousal disrupt metacognitive functioning, including the ability to recognize the feelings of self and others, and their interaction. Evidence supporting this includes findings that patients with both unipolar and bipolar mood disorders experience significant deficits in a range of ToM, that these deficits persist during symptom remission, and that they may present a risk for relapse (Bora et al., 2005; Kanba, Yamada, & Inoue, 2010; Wang, Wang, Chen, Zhu, & Wang, 2008). In a review of the literature, Rocca, Heuvel, Caetano, and Lafer (2009) suggested that difficulties recognizing emotional expression in faces is present in adults and adolescents with depression and bipolar disorder. Uekermann, Abdel-Hamid, Lehmkämper, Vollmoller, and Daum (2008) has reported deficits in the detection of affect prosody among depressed patients while LeMoulit, Jormann, Sherdoll, Wright, and Gotlib (2009) reported deficits in the identification of emotional facial expression among persons with a history of major depression whose symptoms had remitted. Of note, among persons with schizophrenia, however, there is some evidence that higher levels of self-awareness are in fact linked with greater emotional distress, including greater shame and depression (Lysaker & Buck, 2007). Studies on alexithymia in schizophrenia demonstrated that patients’ problems in verbalizing and identifying emotions are typically accompanied by the experience of higher levels of emotional arousal. Compared to controls without mental illness, patients with schizophrenia are more easily aroused by emotion-inducing events (van’t Wout et al., 2007).

Of note, one key limitation of the research on the correlates of affect recognition is that it has tended to focus on the correlates of either awareness of one’s own emotions or awareness of others emotions. Specifically, this neglects the possibility that certain phenomena may be linked to different patterns in failure of affect recognition (depending upon whether it is one’s own vs. another’s affects). Perhaps deficits in awareness of both one’s own affects and those of others have different correlates than deficits only in a lack of awareness of other’s affects. This is consistent with the finding of Bosco et al. (2009) who reported that patterns of Theory of Mind deficits are not a monolithic function, but that some aspects may be more preserved than others.

Therefore, this study sought to explore this issue by focusing on the correlates of three affective recognition profiles. Specifically, we planned to dichotomize a sample of adults on the basis of whether they appeared able or not able to recognize their own feelings and the feelings of others, and we anticipated that this would result in the creation of three metacognitive profiles: an impairment in both self awareness of one’s own emotions and awareness of other’s emotions; an impairment in awareness of the emotions of others alone; and an intact awareness of both one’s own emotions and the emotions of others. We hypothesized we would not find a group unaware of their own affect but able to gauge others in light of work suggesting that some model of one’s own internal states is needed to begin to generate inferences about the mental states of others (Liotti & Prunetti, 2010). We predicted that participants with different emotional recognition profiles would differ from one another in terms of neurocognitive function, severity of symptoms, and sexual trauma history. Following the literature review above, we first considered the hypothesis that the group unaware of both their own feelings and those of others would have the greater levels of neurocognitive deficits and more severe levels of disorganization and negative symptoms than either of the other two groups, while the group with deficits only in awareness of others emotions would have greater levels of neurocognitive deficits and symptoms than the group aware of both their own emotions and those of others. Second, we hypothesized that the groups with either one or two deficits would report a greater frequency of sexual trauma than the group aware of both their own feelings and those of others. Third, we predicted that the group with deficits only in awareness of other people’s feelings would demonstrate greater levels of distress as manifested by higher levels of emotional discomfort and greater frequency of episodes of affective expression of psychopathology indicated by a diagnosis of schizoaffective disorder. This prediction was based on literature noted above suggesting that persons with depressive disorders perform poorly on assessments of awareness of others thoughts and emotions. Of note, while we did not make predictions regarding positive symptoms, we included analyses of those scores for the purposes of transparency.
2. Methods

2.1. Participants

Participants were 101 adults with SCID (Spitzer, Williams, Gibbon, & First, 1994) confirmed diagnoses of schizophrenia (n = 67) or schizoaffective disorder (n = 34) enrolled in a study of the effects of cognitive behavior therapy on work outcomes in schizophrenia. All were in a post acute phase of illness defined by no changes in medication, hospitalization or housing within the last 30 days. Other exclusion criteria were active substance dependence or a chart diagnosis of mental retardation. All were recruited from either a local VA Medical Center (n = 70) or Community Mental Health Center (n = 31). The mean years of age and education were 46.26 (sd = 9.66) and 12.54 (sd = 2.26) respectively. The median number of lifetime psychiatric hospitalizations was five, the first occurring on average at age 27.03 (sd = 10.04). Eighty-six were male and 15 female. Fifty-nine were African American, 41 Caucasian and one Latino. All participants received treatment during the 6 month period between initial and follow-up assessment which included taking antipsychotic medication.

2.2. Instruments

2.2.1. Indiana psychiatric illness interview (IIPI; Lysaker, Clements, Plascak-Hallberg, Knipscheer, & Wright, 2002)

The IIPI is a semi-structured interview developed to assess how individuals understand their experience with mental illness. Trained research assistants conducted the interview that typically lasted between 30 and 60 min. Responses were audio taped and later transcribed. The interview is conceptually divided into five sections. First, rapport is established and participants are asked to tell the story of their lives, beginning with their earliest memory. Second, participants are asked if they think they have a mental illness and, if so, what their experiences have been with this mental illness. This is followed by questions about how the participants perceive their condition, and whether or not this condition has affected different facets of their life. Third, participants are asked if and how their condition controls their life and, alternately, how they control their condition. Fourth, they are asked how their condition affects and is affected by others. Finally, participants are asked about what they expect to remain the same regarding their condition, and what will be different for them in the future. The IIPI differs from other psychiatric interviews in that only minimal content is introduced for the participant to comment on and thus results in a self-report that can be analyzed in terms of the metacognitive capacities that appear spontaneously. In other words, explicit metacognitive tasks are not posed for the participant to solve. Instead, an opportunity for metacognition naturally arises when participants talk in an extended fashion about their life story and thereby allows for raters to detect the degree to which complex metacognitive processes are present or absent.

2.2.2. The metacognition assessment scale (MAS; Semerari et al., 2003)

The MAS is a rating scale that assesses metacognitive abilities. It was originally designed to detect growth within psychotherapy transcripts and, in consultation with the authors, has been abbreviated and adapted for the study of IIPI transcripts (Lysaker et al., 2005). For the purposes of this study, we were interested in one MAS subscale: Self-reflectivity. Self-reflectivity refers to the ability to know one’s own mind or to think about oneself in an increasingly complex manner. Persons with relatively low levels of self-reflectivity may struggle to recognize their thoughts as their own, to distinguish cognitive operations or to be able to recognize their own emotional states. Persons with higher levels of self-reflectivity by contrast are likely to be able to distinguish emotional states, recognize the fallibility of their thinking and to link together complex ideas of who they are as a unique person across various episodes in their life.

Individuals are assumed to possess self-reflective capacities which vary along a continuum. Accordingly, the self-reflectivity subscale is broken down into a series of nine steps which are arranged in order of increasing complexity. Thus, once a step is not attained, no higher steps on that scale should be able to be obtained and the participants score is equal to the number of that highest step attained. For example, if a rater judges that a participant does not recognize one’s emotions, for instance (step four out of a total of nine), then it should not be possible to obtain the next step, which is to recognize the fallibility of one’s thinking (step five out of a total of nine) and a score of ‘3’ is awarded. For the purposes of this study, we focused on whether subjects were aware of their own emotional states which would be reflected by scores of ‘4’ or greater. Consistent with our earlier use with a different sample, good reliability was found with an intraclass correlation of 0.86 (p < .05) for the “self-reflectivity” subscale. Regarding validity, other studies have linked self-reflectivity both with general awareness of illness as well as other objective and projective tests of self awareness (Lysaker et al., 2005, 2008; Lysaker, Dimaggio, Carcione, et al., 2010).

2.2.3. Bell–Lysaker emotional recognition task (BLERT; Bell et al., 1997; Bryson, Bell, Lysaker, Greig, & Kaplan, 1997)

The BLEKT is a traditional measure of affect recognition. Participants are presented with videotaped segments and asked to correctly identify two positive, four negative and one neutral affect presented by an actor on a video tape. Scores are available for the number of correctly identified affects, ranging from 0 to 21. For the purposes of this study, following prior work we used a score of “17” or greater as indicating intact ability to recognize the affects of others. This value was chosen as it reflects an over 80% correct rate and is consistent with the mean of 17.32 (sd = 2.70) reported in a community sample by Fiszdon and Johannesen (2010) In the Fiszdon sample and in ours, a score of 17 also reflects a distance of one standard
deviation from the mean of participants with schizophrenia spectrum disorders. Categorical stability of measurement over 5 months (Kappa = .93) and discriminant validity among community, substance abuse, and schizophrenia samples has been demonstrated elsewhere (Bell et al., 1997).

2.2.4. Positive and negative syndrome scale (PANSS; Kay, Fizszbein, & Opler, 1987)

The PANSS is a 30 item rating scale completed by clinically trained research staff at the conclusion of chart review and a semi-structured interview. For the purposes of this study, four of the five PANSS factor analytically derived components are utilized: Positive, Negative, Disorganized and Emotional discomfort (Bell, Lysaker, Beam-Goulet, Milstein, & Lindenmayer, 1994). Assessment of inter-rater reliability for this study was found to be high to excellent with intraclass correlations for blind raters observing the same interview ranging from .84 to .93.

2.2.5. Wisconsin card sorting test (WCST; Heaton, Chelune, Talley, Kay, & Curtiss, 1993)

The WCST is a test of cognitive flexibility sensitive to frontal lobe impairment. The WCST assesses “set-shifting”, i.e., the ability to alter one’s response pattern following changes in reinforcement contingencies. For the WCST, participants sort cards that vary according to shape, color and number of objects depicted. Subjects are told to match cards to “key” cards but are not told the matching principle which changes after 10 correct responses. This study utilized the score reflecting the total number of categories correct, which can range from “0” to “6” and which reflects the participant’s ability to grasp, hold and shift set when necessary.

2.2.6. Wechsler adult intelligence scale III (WAIS-III; Weschler, 1997)

Digit symbol substitution test is a test of processing speed. Performance on this test has been found to be reduced in persons with schizophrenia and the degree of decrement has been linked with greater levels of functional impairment. For the purposes of this study we utilized the age-corrected standard score.

2.2.7. Hopkins verbal learning test (HVLT; Brandt, 1991)

The HVLT is an auditory verbal memory test designed to measure working memory, recognition memory, and learning potential. It consists of three trials of free recall of a 12-item, semantically categorized list, and a recognition test. The present study used the t score reflecting overall recall: total items across all three recall trials.

2.2.8. The Conners continuous performance test II (CPT-II; Conners, 2002; Riccio, Reynolds, Lowe, & Moore, 2002)

The CPT-II is a psychological test which measures sustained and selective attention and impulsivity. It is a computerized test which calls for responses to all letters presented on the screen except for the target letter. Unlike many other CPT paradigms, the Conners’ CPT-II varies its inter-stimulus intervals, has a large number of targets, and requires continuous responding with occasional inhibition of response. For the purposes of this study we examined “d’”, a t score which reflects sensitivity and discrimination over time with higher scores indicating better performance.

2.2.9. Trauma assessment for adults – brief revised version (TAA; Cusak, Frueh, & Brady, 2004)

The TAA is a 12-item self report questionnaire that has been used successfully to screen for traumatic experiences with populations including those with severe mental illness. It contains items related to multiple forms of trauma. For the purposes of this study, we were primarily concerned with one item which addresses the experience of childhood sexual abuse: “Did you ever have sexual contact with anyone who was at least 5 years older than you before you reached the age of 13?” The TAA has been used with persons with severe mental illness and has been linked with impairments in health during adulthood.

2.3. Procedures

Following written informed consent, the SCID was administered by a clinical psychologist. Baseline assessments were conducted that included the IPII, BLERT, PANSS, WCST, WAIS-III digit symbol subtest, HVLT, CPT-II and the TAA. The IPII and PANSS interviews were conducted separately with the IPII always conducted first. Interviewers were research assistants with at least a Bachelors degree in a psychological field. Ratings were made blind to performance on all testing. The IPIIs were transcribed at the conclusion of the study and MAS ratings were later obtained from raters who were blind to all other test scores and who did not transcribe the interview, nor were present while it took place.

2.4. Data analysis

Prior to formal data analysis, data were checked for psychometric properties. Formal planned data analysis occurred in four phases. First, we planned to determine the frequency of which persons had the following four potential profiles: unawareness of one’s own affects (MAS < 4) and unawareness of other’s affects (BLERT < 17); unawareness of one’s own affects (MAS < 4) and awareness of other’s affects (BLERT ≥ 17); awareness of one’s own affects (MAS ≥ 4) and unawareness of other’s affects (BLERT < 17) and awareness of one’s own affects (MAS ≥ 4) and awareness of other’s affects (BLERT ≥ 17). Second, we planned to compare these groups on demographic variables in order to rule out the potential need for inclusion
of covariates in the analysis. Third, we planned to compare groups using multivariate and univariate procedures on neurocognitive function covarying for any relevant demographic variables and to include linear contrasts to look for linear relationships among the variables. Fourth, we planned to compare symptoms levels, also covarying for any relevant demographic variables and including linear contrasts to look for linear relationships among the variables. Fifth we planned to conduct two chi square analyses were planned to explore whether groups differed from one another in terms of the frequency of report of childhood sexual trauma history and diagnosis of schizophrenia versus schizoaffective disorder.

3. Results

Means and standard deviation for the MAS Self-reflectivity scale and the BLERT total correct were 4.14 (1.30) and 12.16 (4.16) respectively. The two scores were significantly correlated \( r = .35, p < .001 \). The categorization of participants according to our a priori scheme regarding whether they could or could not discern their own emotions and the emotions of others produced the following groups: “self unaware/other unaware” \( n = 30 \); “self aware/other unaware” \( n = 50 \); “self unaware/other aware” \( n = 4 \); and “self aware/other aware” \( n = 17 \). Because there were so few in the “self unaware/other aware” group these were excluded from further analyses for a lack of power.

We next examined the demographic characteristics of the three groups. This revealed no differences in age or gender distribution. A group difference was found however for education with the self aware/other aware group having a higher level of education than the other two groups 13.76 (2.22) vs. 12.07 (2.41) and 12.40 (2.22) respectively \( F(2, 95) = 3.33, p < .05 \). Given that groups differed on education when we compared the neurocognitive test performance of the groups, we chose to conduct a MANCOVA covarying for education. Given that the overall multivariate test was significant, this was followed by individual ANCOVA. As revealed in Table 1, poorer performance on tests of verbal memory, processing speed, and executive functioning were found in the self unaware/other unaware group. The self aware/other aware group also had better performance on the test of processing speed than the self aware/other unaware group. A test of linear contrasts revealed significant linear trends \( p < .025 \) for tests of verbal memory, processing speed, and executive functioning.

In parallel, the symptom levels of groups were compared using a MANCOVA covarying for education. As the overall multivariate statistic was significant, individual ANCOVA were conducted and as reported in Table 2 the self unaware/other unaware group had greater levels of disorganization symptoms, lower levels of emotional discomfort than either group, and

<table>
<thead>
<tr>
<th>Table 1</th>
<th>ANCOVA comparing mean and standard deviations of neurocognitive test scores among participants with three metacognitive profiles controlling for education.1</th>
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<tbody>
<tr>
<td>Group 1 self unaware/other unaware (n = 30)</td>
<td>Group 2 self aware/other unaware (n = 50)</td>
</tr>
<tr>
<td>WCST</td>
<td>2.47 (2.40)</td>
</tr>
<tr>
<td>HVLT</td>
<td>27.60 (7.21)</td>
</tr>
<tr>
<td>Digit symbol</td>
<td>4.93 (1.72)</td>
</tr>
<tr>
<td>CPT</td>
<td>49.19 (9.75)</td>
</tr>
</tbody>
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1 MANCOVA Wilks’ Lambda \( F(8, 178) = 4.71, p < .0001 \).

<table>
<thead>
<tr>
<th>Table 2</th>
<th>ANCOVA comparing Mean and standard deviations of symptoms, covarying for education and Chi Square comparing the frequency of report of childhood sexual abuse and diagnosis of schizoaffective disorder vs. schizophrenia among participants with three metacognitive profiles.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 self unaware/other unaware (n = 30)</td>
<td>Group 2 self aware/other unaware (n = 50)</td>
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<tr>
<td>PANSS</td>
<td></td>
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<tr>
<td>Positive</td>
<td>14.57 (4.24)</td>
</tr>
<tr>
<td>Negative</td>
<td>21.63 (4.85)</td>
</tr>
<tr>
<td>Disorganized</td>
<td>21.30 (4.66)</td>
</tr>
<tr>
<td>Emotional discomfort</td>
<td>10.17 (3.45)</td>
</tr>
</tbody>
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\[ X^2 \]

Report of childhood

| Sexual trauma | Yes | 03 | 20 | 02 | 10.94** |
| No | 27 | 30 | 15 |

Diagnosis

| Schizophrenia | 26 | 30 | 09 | 7.88 |
| Schizoaffective disorder | 04 | 20 | 08 |

MANCOVA Wilks’ Lambda \( F(8, 178) = 5.60, p < .0001 \).

1 P < 0.05.

** P < 0.01.
greater levels of negative symptoms than the self aware/other aware group. A test of linear contrasts revealed significant linear trends ($p < .025$) for negative, disorganized and emotional discomfort symptoms.

Finally, chi square analyses revealed that the self aware/other unaware group had a significantly more frequent report of childhood sexual abuse than either of the other two groups, while the self unaware/other unaware group had a lower frequency incidence of schizoaffective disorder than either of the other two groups. Frequencies per group are reported in Table 2.

4. Discussion

In this study we sought to explore two questions. First, we asked whether we might find three different profiles distinguishing persons with differing abilities to detect their own emotions and those of others. Here initial predictions were confirmed. The majority of subjects (96%) were grouped into three profiles: deficits in both awareness of one's own emotions and the recognition of other people's affects, a deficit only in awareness of others' emotions and intact awareness of one's own emotions and an intact awareness of both one's own and the other's emotions.

Our second goal was to explore whether these different profiles had different patterns of neurocognitive function, symptoms, trauma history and diagnosis of schizoaffective disorder. First, consistent with our expectations, we found the group with impairment in the ability to recognize their own emotions and those of other people demonstrated the greatest impairments in verbal memory, processing speed and executive function relative to the other groups. They had higher levels of disorganization symptoms, lower levels of emotional discomfort and were less likely to be assigned a diagnosis of schizoaffective disorder than the other groups. While the neurocognitive and symptom scores of the group aware of their own emotions but not others did not differ when compared with the group aware of their own emotions and those of others, linear contrasts suggested a linear relationship among variables such that with increasing deficits in neurocognition and symptoms, there were increasing levels of metacognitive deficits. In contrast, the group aware of their own emotions and not those of others had a significantly higher report of childhood sexual abuse. Only the group unaware of their own emotions and those of others and the group aware of both differed in terms of negative symptoms (with the latter having lower levels of negative symptoms).

Taken as a whole, results are thus consistent with previous literature (e.g. Bosco et al., 2009), which has suggested that there are relative semi-independent metacognitive capacities and advance the literature by suggesting that these may have somewhat different relationships with other aspects of function. In this study, for instance, we were able to distinguish two profiles of persons with difficulties with being aware of their own emotions: one with and one without significant difficulties recognizing emotions in other people. Furthermore, each had unique correlates; the former with deficits in specific forms of neurocognition and the latter with higher frequency of childhood sexual abuse.

While the correlational nature of these results precludes drawing conclusions regarding causality, results may suggest some speculations which could be investigated in future work. For one it is possible that a decline in memory, processing speed and executive function represents one route to a relatively more global kind of metacognitive compromise which includes a profile in which affect recognition is impaired for both self and other. Possibly, as persons lose the ability to contextualize events, to process rapid changes in social situations, and to flexibly change set, it becomes more and more difficult to affix appropriate labels to different and shifting internal affective experiences and to recognize the changing emotional states of others. It may also be that what was detected by the neurocognitive test scores was a decline in more general cognitive function which then undermines metacognitive function.

Another thought is that metacognitive problems in understanding one's own and others' emotional states impairs access to emotionally salient memories and by extension, the expression of emotional states reflected in the predominance of non-affective psychosis in this group. By contrast, perhaps early traumatic experiences are a separate route to a different profile of metacognitive compromise, one characterized by unique deficits in the ability to recognize affects in others. Consistent with literature on trauma and metacognition noted above, early trauma may lead to a state in which the mental states of others are experienced as threatening, and thus as a consequence of avoidance of others' mental states perhaps only a limited ability to discern them emerges. Importantly, these are speculations that await future research. Rival hypotheses cannot be ruled out including the possibility that deficits in affect recognition lead to neurocognitive deficits, or that other factors not assessed here account for the observed relationships.

Of note, there were unexpected findings. Levels of emotional distress and a diagnosis of schizoaffective disorder were found equally among persons without any decrements in the ability to recognize emotions as well as among persons with the ability to recognize their own emotions but not those of others. This may suggest that among some persons, a protective factor exists, for example, attachment style reflected in greater openness to positive and negative emotions (Liotti & Gumley, 2009), which assures that levels of emotional pain do not impair utilization of metacognition. Furthermore, there were no differences found between groups in our measure of attention. Moreover, unlike Shannon et al. (in press), our study could not establish a link between childhood trauma and memory deficit. This may suggest that basic processes in attention play less of a role in these forms of metacognition. As with all negative findings, more work is necessary before any conclusions should be drawn regarding their significance.

Importantly, there are several limitations to the study. Generalization of findings is limited by sample composition and our relatively modest sample size. Participants were mostly men in their 40's, all of whom were involved in treatment. It
may well be that a different relationship exists over time among and between different measures of affect recognition for younger persons with schizophrenia, in a first episode sample, in a predominantly female sample, in persons who decline treatment and who are more or less adherent with antipsychotic medications. All measures were also obtained concurrently and we did not include assessments of function over time. Thus, more research is necessary which involves the collection of data at multiple time points and with larger and broader samples. We also employed only two assessments of affect recognition and examined affect recognition as a global phenomenon. It may be that certain affects such as fear and anger are more difficult to process and there may be patterns of deficit not only with regard to self and other but also with regard to specific emotions and specific situations. Work is thus needed which examines more facets of affect recognition, and more specific affects. Whilst we investigated the recognition of affect, we did not measure how these groups regulate affective experiences arising in fairly trying experiences. There is evidence that the sealing over or avoidance of emotionally salient interpersonal experiences is associated with lower levels of metacognition (MacBeth, Gumley, Schwannauer, & Fisher, in press). Finally, we did not include a control group of persons without psychosis and thus do not know the extent to which what we have found is specific to persons with serious mental illness. In studies now underway, we are gathering similar metacognitive data from persons with serious medical conditions but without psychosis. We also plan studies to explore whether different kinds of metacognitive profiles have different links with function over time.

With replication, however, our findings may have several clinical implications. First, it may be important for clinicians and rehabilitation specialists to assess for strengths and weaknesses in different metacognitive capacities, understanding that unawareness of one’s own emotions may be linked or not linked to unawareness of others’ emotions. In other words, it may be essential to note that difficulties in one domain indicate impairments in others or that relatively intact abilities in one domain suggest intact abilities in others. Accordingly, interventions may need to be developed which match a person’s metacognitive capacities, and thus not present them with tasks which they are not capable of and which would likely merely be frustrating. As such, our findings have important implications for psychological treatments such as Cognitive Therapy. The link between self-reflectivity and affective distress may illustrate, as others have (Lysaker, Yanos, & Roe, 2009), the importance of assisting persons to cope with pain and loss as they may gain greater awareness of both their internal states and external challenges.

References


