

Decreased Self-Concept Clarity in People with Schizophrenia

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Abstract: Disturbances in the perception of self are thought to be central to the development of psychosis. Self-concept clarity (SCC) is the extent to which one's beliefs about oneself are internally consistent, stable, and clear. Participants with schizophrenia ($N = 54$) and healthy controls ($N = 32$) completed the Me Not-Me Decision Task (MNMDT), in which they decided whether 60 adjectives (30 pairs of antonyms) did or did not describe themselves. SCC is conceptualized as the number of consistent responses. Participants also completed the Self-Concept Clarity Scale (SCCS). Compared to healthy controls, participants with schizophrenia scored lower on the MNMDT and SCCS, and scores were negatively correlated with positive and negative symptoms. In a simultaneous regression, SCCS scores were uniquely associated with positive symptoms, whereas MNMDT scores were uniquely associated with negative symptoms. This suggests that people with schizophrenia have decreased self-concept clarity that is related to positive and negative symptoms.

Key Words: Schizophrenia, psychosis, self-concept clarity, positive symptoms, negative symptoms

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Interest in the processing of self-relevant information in people with schizophrenia has a long history in psychiatry (Parnas and Handest, 2003) and has increased in recent years (Park and Nasrallah, 2014). Much of this research has focused on anomalies of self-experience, which are disturbances in the subjective experience of self as the center of thought, action, or observer (Parnas et al., 2005). Phenomenologists have suggested that disturbances in the perception of self are among the first symptoms to develop in the schizophrenia prodrome (Møller and Husby, 2000), and these disturbances predict the development of psychosis over and above other clinical symptoms (Nelson et al., 2012). Moreover, disturbances in the perception of self may underlie both positive and negative symptoms of schizophrenia such as delusions, hallucinations, and anhedonia (Sass and Parnas, 2003). For example, people with disturbances in body perception may come to the conclusion that an external force is controlling their actions, and people with difficulties perceiving the origin of thoughts may attribute them to an external source, thus experiencing auditory hallucinations. Hence, the study of self-disturbances has the potential to inform our understanding of the production and maintenance of the symptoms of psychosis (Raballo and Parnas, 2012).

Contemporary theorists have taken several different approaches to understanding self-disturbances in psychosis including perspectives from phenomenology and dialogical psychology among others (see Lysaker and Lysaker, 2010 for a review and comparison). Both of these models suggest that a loss or alteration of the sense of self is a central component of psychosis. Working from a phenomenological approach, Sass and colleagues (e.g., Sass, 2003, 2014; Sass and Parnas, 2003) have referred to self-disturbances as ipseity disturbance, from the Latin “ipse” for self. They argue that ipseity disturbances can be described

as “diminished self-affection” and “hyperreflexivity.” Diminished self-affection refers to a lower cognitive-level decline in a feeling of existence or a living subject of awareness. Hyperreflexivity refers to a state of hyperconsciousness of the self. This non-volitional process results in self-disturbances because attention is drawn to experiences that would ordinarily be experienced implicitly as part of the self. Theorists have debated whether these disturbances are a basic defect or a sequela of a more basic disturbance. If ipseity disturbance is a basic disturbance, it may have its own consequences for higher-level cognitive processes related to the self that can be explained by the dialogical approach to understanding self-disturbances.

The dialogical psychology approach suggests that self-identity is multifaceted, with individuals having different “selves” in different situations, experiences, or moments (Hermans, 1996; Meehan and MacLachlan, 2008). The sense of self or identity develops out of “dialogues” among these self-concepts from a wide variety of specific situations. Thus, the sense of self is neither a disparate aggregation of selves nor a solitary concept underlying all distal selves. Rather, self-concept is the end product of these facets interacting with each other. Lysaker and colleagues have suggested that the disturbances in self-concept that are common among people with schizophrenia are a result of a deficit in maintaining these different dialogues (Lysaker and Lysaker, 2001, 2002). This often manifests as a lack of a coherent personal narrative (Lysaker et al., 2003). Similarly, this may result in low self-concept clarity.

Self-concept clarity (SCC) refers to “the extent to which one's beliefs about one attributes are clear, confidently held, internally consistent, stable, and cognitively accessible” (Stinson et al., 2008, p. 1541). For example, people with low SCC may feel that their beliefs about themselves change frequently, or that different aspects of their personalities often conflict with one another. Previous research in people with schizophrenia has found that SCC is negatively correlated with depression and anxiety symptoms (Bigler et al., 2001) and internalized stigma (Hasson-Ohayon et al., 2014). However, previous work has yielded mixed results about whether SCC is associated with positive symptoms, finding that SCC is negatively correlated with positive symptoms at baseline, but positively associated with an increase in positive symptoms at follow-up (Noyman-Vekslar et al., 2013; Weinberg et al., 2012). Similarly, these studies found that SCC was negatively correlated with negative symptoms. Other work has found that self-concept clarity is negatively associated with psychotic-like experiences such as magical ideation and perceptual aberrations in a subclinical population (Cicero et al., 2013) and people with high levels of schizotypy (Cicero et al., 2015a), especially in people with high levels of other risk factors.

The current research aims to extend this previous work in three important ways. First, the current research will examine whether people with schizophrenia have lower SCC than healthy controls, which has not been examined in previous work. Second, all previous work on SCC in schizophrenia has used a single self-report measure of SCC, the Self-Concept Clarity Scale. In the current work, we use a behavioral measure of self-concept clarity, the Me Not-Me Decision Task which is designed to measure self-concept clarity without the limitations of self-report measures. Finally, the current work will examine whether SCC is associated with both positive and negative symptoms in people with schizophrenia. We aimed to clarify the relation between SCC and positive symptoms, given the inconsistencies in previous research, and to replicate previous findings that SCC is associated with negative symptoms. We expected to find that both positive and negative symptoms of

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schizophrenia would be negatively correlated with both measures of self-concept clarity.

METHOD

Participants

Participants were 54 people with schizophrenia ($n = 43$) or schizoaffective disorder ($n = 11$) and 32 non-psychiatric controls. Participants in the schizophrenia group were inpatients in a state hospital with a largely forensic population. Healthy controls were recruited with a university-wide staff email and advertisements on Craigslist. Participants with any lifetime history of any Axis I mental disorder were excluded from the healthy control group. As can be seen in Table 1, participants were matched on gender and age. Several participants had missing data on parental education and were excluded pairwise. Although the schizophrenia group had lower parental education, it was not a statistically significant difference due to decreased sample size related to missing data. Following tradition in schizophrenia research, we did not attempt to match on their own levels of education (Meehl, 1971; Miller and Chapman, 2001). Matching on their own levels of education would either create a schizophrenia group with higher than average levels of education or a comparison group with lower than average levels of education. All participants received \$30 for participating in the study.

Because the samples were not adequately matched on ethnicity, the analyses were supplemented with a separate sample from a different study (Lodi-Smith and Roberts, 2010). This sample was drawn from the Health and Aging Study of Central Illinois (HASCI) and was matched on age, gender, and ethnicity, but not on participant education or parental education.

Measures

Self-Concept Clarity (SCC)

The first measure of SCC was the Self-Concept Clarity Scale (SCCS; Campbell, 1990). The SCCS is a 12-item scale on which participants rate statements on a scale from 1 *Strongly Agree* to 5 *Strongly Disagree* (e.g., My beliefs about myself often conflict with one another). The SCCS has been found to be correlated with other measures of self-concept clarity (Campbell et al., 1996).

A second measure of self-concept clarity was the Me Not-Me Decision Task (MNMDT; Campbell et al., 1996) in which participants are asked to decide whether 60 adjectives describe themselves or do not describe themselves as quickly and accurately as possible. Among these 60 adjectives are 30 pairs of opposites (e.g., beautifully, nice-mean). The dependent variable is the number of consistent responses (e.g., responding “me” to shy and “not me” to outgoing) made in the task out of 30 pairs.

Diagnosis

Diagnoses were made with the Structured Clinical Interview for the DSM-IV (SCID; First et al., 1998) by the first, second, and third authors, who were all advanced graduate students in a clinical psychology

PhD program at the time of the study. Previous work has shown that the SCID has high test-retest and inter-rater reliability (Zanarini and Frankenburg, 2001; Zanarini et al., 2000).

Positive Symptoms

The first measure of positive symptoms was the Cardiff Anomalous Perceptions Scale (CAPS; Bell et al., 2006). The CAPS contains 32 items that measure anomalous perceptual experiences (e.g., do you ever find that sounds are distorted in strange or unusual ways?). Participants answer “yes” or “no” to each question. For each affirmative answer, they answer three follow-up questions about how distressing, distracting, and frequent the experience was on scales of 1 to 5. Thus, subscale scores were calculated for distress, distraction, and frequency. In previous research, the CAPS has been found to be correlated with other measures of unusual perceptual experiences and to be higher in psychotic populations than in non-psychotic populations (Bell et al., 2006).

A second measure of positive symptoms was the 21-item Peters Delusion Inventory (PDI; Peters et al., 2004), which includes *yes-no* questions regarding delusion-like experiences (e.g., Have your thoughts ever been so vivid that you were worried other people would hear them?). For each affirmative answer, participants are asked three follow-up questions. Participants are asked how distressing the belief is, how strongly it is believed to be true, and how preoccupying it is on scales from 1 to 5. Subscale scores are calculated for three proposed dimensions of delusional experience: Delusional Preoccupation, Delusional Distress, and Delusional Conviction.

Negative Symptoms

Negative symptoms were measured with the Revised Social Anhedonia Scale (RSAS; Eckbald et al., 1982) and the Physical Anhedonia Scale (PhysAnh; Chapman et al., 1976). The RSAS is a 40-item true-false questionnaire designed to measure lack of relationships and lack of pleasure from relationships. The PhysAnh is a 61-item true/false questionnaire designed to measure a lack of pleasure from or interest in physical sensations. In the current research, the RSAS and PhysAnh both had internal reliabilities of $\alpha = 0.83$.

Mental Status

Participants completed the Mini-Mental Status Exam (MMSE). The MMSE is one of the most commonly used screening measures for cognitive impairment and dementia (Hodges, 1994; Manning et al., 2007). MMSE scores have been found to have high inter-rater reliability (Tombaugh and McIntyre, 1992), internal consistency, and well-established normative data (Tombaugh et al., 1996). In the current research, the MMSE was used to screen for and exclude participants with dementia. No participants were excluded for scores on the MMSE.

Procedure

As part of a larger study, all participants were first administered the MMSE and the SCID. Then participants completed the SCCS followed by the PDI, the MNMDT, the CAPS, the RSAS, and the

TABLE 1. Demographic Information of the Schizophrenia and Control Group

Variable	Schizophrenia Group ($n = 54$)	Control Group ($n = 32$)	Comparison
Sex (% male)	87.3%	90.9%	$\chi^2 (2) = 3.83, p = 0.145$
Ethnicity (% Caucasian)	49.1%	93.9%	$\chi^2 (6) = 14.21, p = 0.027$
Mean (SD) age (yr)	41.46 (11.55)	43.00 (9.63)	$t (84) = 0.63, p = 0.528$
Mean (SD) education (yr)	12.61 (7.83)	16.11 (1.76)	$t (74) = 2.28, p = 0.025$
Mean (SD) parental education	11.82 (1.75)	12.70 (2.07)	$t (64) = 1.87, p = 0.067$

TABLE 2. Correlations among Self-Concept Clarity Variables and Symptoms

	Schizophrenia Group		Healthy Control Group		Comparison of Strength of Correlation	
	SCCS	MNMDT	SCCS	MNMDT	SCCS	MNMDT
Self-concept clarity						
1. MNMDT	0.27*		0.51*		-0.204	
Positive symptoms						
2. PDI-Total	-0.35*	-0.36*	-0.20	-0.16	-0.112	0.339
3. PDI-Distress	-0.43*	-0.30*	-0.35*	-0.13	-1.253	0.445
4. PDI-Preoccupation	-0.44*	-0.31*	-0.33**	-0.22	-1.618	0.120
5. PDI-Conviction	-0.36*	-0.30*	-0.21	-0.15	-0.979	0.194
6. CAPS-Total	-0.40*	-0.36*	-0.09	0.13	-2.163*	-1.253
7. CAPS-Distress	-0.37*	-0.19	-0.10	0.05	-2.218*	-0.265
8. CAPS-Distracton	-0.38*	-0.20**	-0.10	0.08	-2.258*	-0.215
9. CAPS-Frequency	-0.38*	-0.29*	-0.09	0.10	-2.475*	-0.920
Negative symptoms						
10. Revised Social Anhedonia Scale	-0.20	-0.40*	0.12	-0.33**	-1.352	-0.867
11. Physical Anhedonia Scale	-0.30*	-0.52*	0.16	-0.08	-0.900	2.167*

* $p < 0.05$, ** $p < 0.10$. Comparison of strength of correlations are t scores with 81 df .

PhysAnh. The supplemental sample was drawn from the Health and Aging Study of Central Illinois (HASCI; see Lodi-Smith and Roberts, 2010 for more information about the procedure). These participants completed the SCCS, but none of the other measures.

RESULTS

Group Comparisons for Self-Concept Clarity

Participants with schizophrenia had lower self-concept clarity than the healthy control group as measured with the Self-Concept Clarity Scale ($M = 40.63$, $SD = 7.89$ vs. $M = 44.48$, $SD = 7.44$; $t(86) = -2.26$, $p = 0.03$; $d = 0.49$), and the Me Not-Me Decision Task consistency score ($M = 17.62$, $SD = 3.73$ vs. $M = 22.21$, $SD = 2.69$; $t(83) = -6.13$, $p < 0.001$; $d = 1.35$). However, there was not a significant difference between the schizophrenia sample and the matched sample from the HASCI study on SCCS scores ($M = 42.46$, $SD = 9.56$, $t(107) = 1.089$, $p = 0.279$). To examine whether the significant difference observed in original sample was a result of unmatched groups, we examined whether the SCCS or MNMDT scores were related to any of the demographic characteristics of the sample in the schizophrenia group. There was not a significant difference in the schizophrenia group between ethnicities for SCCS scores ($F(2, 52) = 1.275$, $p = 0.288$) or MNMDT scores ($F(2, 49) = 2.042$, $p = 0.141$). There was not a significant difference between gender in SCCS scores ($t(53) = 0.64$, $p = 0.522$) or MNMDT scores ($t(46) = 0.17$, $p = 0.864$).

Likewise, there was not a significant correlation between SCCS scores and age (spearman's $\rho = -0.06$, $p = 0.71$), self-education (spearman's $\rho = 0.17$, $p = 0.24$), or parental education (spearman's $\rho = 0.12$, $p = 0.47$). Similarly, there was not a significant correlation

between MNMDT scores and age (spearman's $\rho = -0.03$, $p = 0.86$), self-education (spearman's $\rho = 0.28$, $p = 0.06$), or parental education (spearman's $\rho = -0.01$, $p = 0.99$). In the healthy control group, there were also no significant relations between SCCS or MNMDT scores and any demographic variables. This suggests that the differences observed in SCC in the original sample may not be a result of an inadequate match. Taken together, these results provide equivocal support for the hypothesis that patients with schizophrenia have lower self-concept clarity than do controls. There were no statistically significant differences between people diagnosed with schizophrenia and people diagnosed with schizoaffective disorder for SCCS ($M = 40.05$, $SD = 7.88$, $M = 43.00$, $SD = 7.85$, $t(53) = 1.11$, $p = 0.27$, $d = 0.38$) or MNMDT scores ($M = 17.61$, $SD = 3.61$, $M = 17.64$, $SD = 4.34$, $t(53) = 0.21$, $p = 0.98$, $d = 0.01$).

Correlations between Self-Concept Clarity and Symptoms

As can be seen in Table 2, the MNMDT scores and SCCS scores were negatively correlated with all measures of positive symptoms including PDI and CAPS scores. MNMDT scores were negatively correlated with both physical and social anhedonia. SCCS scores were negatively correlated with social but not physical anhedonia. In contrast, neither MNMDT nor SCCS scores were significantly correlated with PDI and CAPS scores in healthy controls.

To examine the independent contribution of SCCS and MNMDT scores in explaining variance in positive and negative symptoms, we simultaneously regressed SCCS and MNMDT on positive and negative symptom scores in a series of regressions. As can be seen in Table 3, SCCS scores were negatively associated with the PDI, CAPS,

TABLE 3. Standardized Parameter Estimates (Betas) for a Simultaneous Regression in the Schizophrenia Group

	PDI-PDI	PDI-Distress	PDI-Preoccupation	PDI-Conviction	CAPS-CAPS	CAPS-Distress	CAPS-Distracton	CAPS-Frequency	SocAnh	PhysAnh
MNMDT	-0.24**	-0.15	-0.18	-0.18	-0.27	-0.13	-0.14	-0.18	-0.47**	-0.34*
SCCS	-0.33*	-0.44**	-0.47***	-0.38**	-0.28*	-0.35*	-0.38*	-0.37*	-0.09	-0.04

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

and all of their subscales, whereas MNMDT scores were not significantly associated with them. In contrast, MNMDT scores were negatively associated with the SocAnh and PhysAnh, whereas SCCS scores were not significantly associated with SocAnh and PhysAnh. These results suggest that self-reported SCC may be relatively more important in explaining positive symptoms whereas less directly measured SCC may be more important in explaining negative symptoms.

DISCUSSION

The current research is the first study to provide evidence that people with schizophrenia have lower self-concept clarity than healthy controls. However, this finding did not replicate in the matched sample from the HASCI study. The matched sample from the HASCI study had a lower SCCS mean than did the healthy control group in the original sample (42.46 vs. 44.48, respectively). The mean from the HASCI sample is similar to the mean from other studies using community samples (Campbell et al., 1996). However, one major difference between our sample and the HASCI is that we screened for and excluded participants with a history of any DSM IV Axis I disorder. One recent study that screened for depression found a mean of 43.49 (Diehl and Hay, 2011), higher than the mean in the HASCI. Given that SCC has been linked to different types of psychopathology including depression and anxiety (Butzer and Kuiper, 2006; van Dijk et al., 2014), social anxiety (Stopa et al., 2010), and psychopathology being common in the general population (Kessler et al., 2005), the reason there is a significant difference in the original but not the HASCI sample may be due to psychopathology, and resulting lower SCC, in the HASCI sample. Future research could examine whether people with schizophrenia have lower SCC than psychiatric comparison groups such as major depression, generalized anxiety disorder, or bipolar disorder to determine whether low SCC is specific to schizophrenia or related to psychopathology more broadly.

In addition to providing some evidence that people with schizophrenia have lower self-concept clarity than healthy controls, the current research found that self-concept clarity is negatively correlated with both positive and negative symptoms of schizophrenia. Moreover, the current research was the first study to use a measure other than a self-report questionnaire to assess self-concept clarity in people with schizophrenia.

Although this was the first study to show that people with schizophrenia have lower SCC than healthy controls using the SCCS and MNMDT, other research has approached the question of self-concept disturbances in schizophrenia in several different ways. One common approach is phenomenological, where researchers attempt to understand and describe the first-person experiences of people with psychosis. This research typically involves semi-structured interviews such as the Examination of Anomalous Self-Experiences (EASE; Parnas et al., 2005) or a self-disorders section of the Bonn Scale for the Assessment of Basic Symptoms (BSABS; Vollmer-Larsen et al., 2007). A second approach involves cognitive measures of self-disturbances such as deficits in self-agency (Frith et al., 2000), awareness of action (Haggard et al., 2003), or source monitoring (Brébion et al., 2002). These basic deficits may manifest themselves as a lack of insight into illness (e.g., Baier, 2010) or a lack of coherence or in personal narratives (Lysaker et al., 2002, 2003). Moreover, these deficits may also manifest as low self-concept clarity. Future research could further examine the nomological network of self-concept disturbances in people with schizophrenia by including the SCCS and MNMDT along with cognitive measures of anomalous self-experiences and phenomenological interviews.

Future research could examine whether self-concept clarity plays a causal role in the development of positive and negative symptoms of schizophrenia. Research editorials have called for more research treating self-concept disturbances as an independent variable (Sass, 2014). Future research could experimentally decrease self-concept

clarity to see if it results in an increase in psychotic-like experiences either as an analogue study in healthy participants or in people with schizophrenia. For example, research on the Meaning Maintenance Model has manipulated self-concept by having participants write essays highlighting distinct aspects of their personalities (i.e., arguing against a clear self-concept) and found that participants are then more likely to attribute meaning to otherwise innocuous stimuli (Proulx and Heine, 2009). A similar process could explain the relations between self-concept clarity and delusional beliefs, which can be conceptualized as aberrant attributions of meaning to stimuli. Similarly, another area for future research is to examine whether SCC really is a higher-order cognitive function than these more basic self-disturbances such as deficits in self-agency or source monitoring, hyperreflexivity, or diminished self-affection. Future research could manipulate one or more of these basic self-disturbances and test whether it results in a decrease in self-concept clarity.

In addition to experimentally manipulating SCC, future research could examine the longitudinal associations between SCC and positive and negative symptoms in schizophrenia. For example, research could follow people in the prodromal phase for first episode of psychosis to examine whether SCC fluctuates with positive and negative symptomatology. This could help to establish the temporal sequence of the correlation. This research could use ecological momentary assessment to examine whether SCC fluctuates day-to-day with symptoms, or could measure SCC and symptoms on a weekly or monthly basis to see if they fluctuate together. If low SCC causes symptoms, then research would find an exacerbation of symptoms following reductions in SCC.

The results of the current research finding that SCC is associated with negative and positive symptoms of schizophrenia is consistent with previous work showing that SCC is associated with other types of psychopathology, including depression and anxiety (Butzer and Kuiper, 2006; Treadgold, 1999). This suggests that SCC may be related to distress more broadly and may be a risk factor for other psychological disorders as well. At the same time, a number of studies have found that self-concept disturbances are specific to psychosis in schizophrenia, rather than other psychotic disorders (Haug et al., 2012; Nelson et al., 2013; Raballo and Parnas, 2011). Future research could examine whether aspects of self-concept clarity are specific to schizophrenia or are related to psychopathology more generally.

Although not statistically significantly different, the two measures of SCC were more strongly correlated in the healthy control group than in the schizophrenia group. This could suggest that people with schizophrenia have less insight into their self-concepts than do healthy controls, which is consistent with a long line of research suggesting that lack of insight into illness is related to dysfunctions in processing self-relevant information (e.g., Bedford and David, 2014). However, previous research has reported a correlation of 0.31 in a community sample (Stinson et al., 2008), which is closer to the correlation in the schizophrenia sample than the correlation in the healthy control sample.

The pattern of correlations and the results of the simultaneous regression analyses suggest that SCCS scores are more strongly associated with positive symptoms in people with schizophrenia. One explanation for this difference may be that negative symptoms have been shown to be associated with avoiding emotions (Cicero et al., 2015b; Martin et al., 2013), which could also reflect a tendency to avoid introspection more generally. Participants with high negative symptoms may not pay adequate attention to their self-concepts to self-report low self-concept clarity on the SCCS, but may be more likely to display low self-concept clarity with inconsistent responses on the MNMDT.

The current research provides more evidence that people with schizophrenia may benefit from psychotherapy designed to increase self-concept clarity and resolve discrepancies in ideas about themselves. For example, previous research has found that personal

narratives (*i.e.*, the stories people tell about their personal histories) of people with schizophrenia are disrupted and lack coherence, particularly when the narrative involves the story of the development of the schizophrenia (Lysaker and Lysaker, 2002). Dialogical therapy, in which people are encouraged to tell and understand their personal narratives, could be beneficial to people with schizophrenia (Lysaker and Lysaker, 2010). Such therapy could be incorporated to existing programs such as cognitive-behavioral therapy to facilitate recovery (Lysaker et al., 2001).

One potential limitation of the current research is that the differential item functioning (DIF) of the SCCS items has not been tested. Thus, it is possible that the comparison between the groups is not valid because the scores may have different meanings in the different groups. In other words, the lower scores observed in the schizophrenia group could be the result of the psychometric properties of the SCCS rather than lower levels of self-concept clarity. Methodologists recommend at least 100 to 200 participants per group to test differential item functioning (Lai et al., 2005; Scott et al., 2009). Thus, we are unable to test DIF in the current research. Future research could examine DIF with a much larger sample of people with schizophrenia and healthy comparison participants.

CONCLUSIONS

The current research provides further evidence that people with schizophrenia have disturbances in self-relevant information processing, and that these disturbances are related to the severity of their symptoms. Specifically, this study was the first study to show that people with schizophrenia have lower self-concept clarity than healthy controls on both a self-report measure and a behavioral task measure. The study also showed that self-concept clarity was negatively correlated with both positive and negative symptoms, which is consistent with previous research and theories of the role of self-concept disturbances in schizophrenia.

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DISCLOSURE

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REFERENCES

- Baier M (2010) Insight in schizophrenia: A review. *Curr Psychiatry Rep.* 12:356–361.
- Bedford NJ, David AS (2014) Denial of illness in schizophrenia as a disturbance of self-reflection, self-perception and insight. *Schizophr Res.* 152:89–96.
- Bell V, Halligan PW, Ellis HD (2006) The Cardiff Anomalous Perceptions Scale (CAPS): A new validated measure of anomalous perceptual experience. *Schizophr Bull.* 32:366–377.
- Bigler M, Neimeyer GJ, Brown E (2001) The divided self revisited: Effects of self-concept clarity and self-concept differentiation on psychological adjustment. *J Soc Clin Psychol.* 20:396–415.
- Brébion G, Gorman JM, Amador X, Malaspina D, Sharif Z (2002) Source monitoring impairments in schizophrenia: Characterisation and associations with positive and negative symptomatology. *Psychiatry Res.* 112:27–39.
- Butzer B, Kuiper NA (2006) Relationships between the frequency of social comparisons and self-concept clarity, intolerance of uncertainty, anxiety, and depression. *Pers Individ Dif.* 41:167–176.
- Campbell JD (1990) Self-esteem and clarity of the self-concept. *J Pers Soc Psychol.* 59:538–549.
- Campbell JD, Trapnell PD, Heine SJ, Katz IM, Lavalley LF, Lehman DR (1996) Self-concept clarity: Measurement, personality correlates, and cultural boundaries. *J Pers Soc Psychol.* 70:141–156.
- Chapman LJ, Chapman JP, Raulin ML (1976) Scales for physical and social anhedonia. *J Abnorm Psychol.* 85:374–382.
- Cicero DC, Becker TM, Martin EA, Docherty AR, Kerns JG (2013) The role of aberrant salience and self-concept clarity in psychotic-like experiences. *Personal Disord.* 4:33–42.
- Cicero DC, Docherty AR, Becker TM, Martin EA, Kerns JG (2015a) Aberrant salience, self-concept clarity, and interview-rated psychotic-like experiences. *J Pers Disord.* 29:79–99.
- Cicero DC, Krieg A, Becker TM, Kerns JG (2015b) Evidence for the discriminant validity of the Revised Social Anhedonia Scale from social anxiety. *Assessment.* doi: 10.1177/1073191115590851.
- Diehl M, Hay EL (2011) Self-concept differentiation and self-concept clarity across adulthood: Associations with age and psychological well-being. *Int J Aging Hum Dev.* 73:125–152.
- Eckbald M, Chapman LJ, Chapman JP, Mishlove M (1982) The Revised Social Anhedonia Scale. (Available from L.J. Chapman, Department of Psychology, 1202 West Johnson Street, University of Wisconsin, Madison, WI 53706).
- First MB, Spitzer RL, Gibbon M, Williams JBW (1998) *Structured Clinical Interview for DSM-IV Axis I Disorders*. New York: New York State Psychiatric Institute.
- Friith CD, Blakemore S, Wolpert DM (2000) Explaining the symptoms of schizophrenia: Abnormalities in the awareness of action. *Brain Res Brain Res Rev.* 31:357–363.
- Haggard P, Martin F, Taylor-Clarke M, Jeannerod M, Franck N (2003) Awareness of action in schizophrenia. *Neuroreport.* 14:1081–1085.
- Hasson-Ohayon I, Mashiach-Eizenberg M, Elhasid N, Yanos PT, Lysaker PH, Roe D (2014) Between self-clarity and recovery in schizophrenia: Reducing the self-stigma and finding meaning. *Compr Psychiatry.* 55:675–680.
- Haug E, Lien L, Raballo A, Bratlien U, Oie M, Andreassen OA, Melle I, Møller P (2012) Selective aggregation of self-disorders in first-treatment DSM-IV schizophrenia spectrum disorders. *J Nerv Ment Dis.* 200:632–636.
- Hermans HJM (1996) Voicing the self: From information processing to dialogical interchange. *Psychol Bull.* 119:31–50.
- Hodges JR (1994) *Cognitive Assessment for Clinicians*. Oxford: Oxford University Press.
- Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE (2005) Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry.* 62:593–602.
- Lai JS, Teresi J, Gershon R (2005) Procedures for the analysis of differential item functioning (DIF) for small sample sizes. *Eval Health Prof.* 28:283–294.
- Lodi-Smith J, Roberts BW (2010) Getting to know me: Social role experiences and age differences in self-concept clarity during adulthood. *J Pers.* 78:1383–1410.
- Lysaker PH, Clements CA, Plascak-Hallberg CD, Knipscheer SJ, Wright DE (2002) Insight and personal narratives of illness in schizophrenia. *Psychiatry.* 65:197–206.
- Lysaker PH, Lysaker JT (2001) Psychosis and the disintegration of dialogical self-structure: Problems posed by schizophrenia for the maintenance of dialogue. *Br J Med Psychol.* 74:23–33.
- Lysaker PH, Lysaker JT (2002) Narrative structure in psychosis: Schizophrenia and disruptions in the dialogical self. *Theor Psychol.* 12:207–220.
- Lysaker PH, Lysaker JT (2010) Schizophrenia and alterations in self-experience: A comparison of 6 perspectives. *Schizophr Bull.* 36:331–340.
- Lysaker PH, Lysaker JT, Lysaker JT (2001) Schizophrenia and the collapse of the dialogical self: Recovery, narrative and psychotherapy. *Psychother-Theor Res.* 38: 252–261.
- Lysaker PH, Wickett AM, Wilke N, Lysaker J (2003) Narrative incoherence in schizophrenia: The absent agent-protagonist and the collapse of internal dialogue. *Am J Psychother.* 57:153–166.
- Manning V, Wanigaratne S, Best D, Strathdee G, Schrover I, Gossop M (2007) Screening for cognitive functioning in psychiatric outpatients with schizophrenia, alcohol dependence, and dual diagnosis. *Schizophr Res.* 91:151–158.

- Martin EA, Becker TM, Cicero DC, Kerns JG (2013) Examination of affective and cognitive interference in schizophrenia and relation to symptoms. *J Abnorm Psychol*. 122:733–744.
- Meehan T, MacLachlan M (2008) Self construction in schizophrenia: A discourse analysis. *Psychol Psychother*. 81:131–142.
- Meehl PE (1971) High school yearbooks: A reply to Schwarz. *J Abnorm Psychol*. 77:143–148.
- Miller GA, Chapman JP (2001) Misunderstanding analysis of covariance. *J Abnorm Psychol*. 110:40–48.
- Møller P, Husby R (2000) The initial prodrome in schizophrenia: Searching for naturalistic core dimensions of experience and behavior. *Schizophr Bull*. 26:217–232.
- Nelson B, Thompson A, Yung AR (2012) Basic self-disturbance predicts psychosis onset in the ultra high risk for psychosis “prodromal” population. *Schizophr Bull*. 38:1277–1287.
- Nelson B, Thompson A, Yung AR (2013) Not all first-episode psychosis is the same: Preliminary evidence of greater basic self-disturbance in schizophrenia spectrum cases. *Early Interv Psychiatry*. 7:200–204.
- Noyman-Veksler G, Weinberg D, Fennig S, Davidson L, Shahar G (2013) Perceived stigma exposure in schizophrenia: The key role of self-concept clarity. *Self Identity*. 12:663–674.
- Park S, Nasrallah HA (2014) The varieties of anomalous self experiences in schizophrenia: Splitting of the mind at a crossroad. *Schizophr Res*. 152:1–4.
- Parnas J, Handest P (2003) Phenomenology of anomalous self-experience in early schizophrenia. *Compr Psychiatry*. 44:121–134.
- Parnas J, Møller P, Kircher T, Thalbitzer J, Jansson L, Handest P, Zahavi D (2005) EASE: Examination of Anomalous Self-Experience. *Psychopathology*. 38:236–258.
- Peters E, Joseph S, Day S, Garety P (2004) Measuring delusional ideation: The 21-item Peters et al. Delusions Inventory (PDI). *Schizophr Bull*. 30:1005–1022.
- Proulx T, Heine SJ (2009) Connections from Kafka: Exposure to meaning threats improves implicit learning of an artificial grammar. *Psychol Sci*. 20:1125–1131.
- Raballo A, Parnas J (2011) The silent side of the spectrum: Schizotypy and the schizotaxic self. *Schizophr Bull*. 37:1017–1026.
- Raballo A, Parnas J (2012) Examination of anomalous self-experience: Initial study of the structure of self-disorders in schizophrenia spectrum. *J Nerv Ment Dis*. 200:577–583.
- Sass LA (2003) Negative symptoms, schizophrenia, and the self. *IJP&PT*. 3:153–180.
- Sass LA (2014) Self-disturbance and schizophrenia: Structure, specificity, pathogenesis (current issues, new directions). *Schizophr Res*. 152:5–11.
- Sass LA, Parnas J (2003) Schizophrenia, consciousness, and the self. *Schizophr Bull*. 29:427–444.
- Scott NW, Fayers PM, Aaronson NK, Bottomley A, de Graeff A, Groenvold M, Gundy C, Koller M, Petersen MA, Sprangers MA (2009) A simulation study provided sample size guidance for differential item functioning (DIF) studies using short scales. *J Clin Epidemiol*. 62:288–295.
- Stinson DA, Wood JV, Doxey JR (2008) In search of clarity: Self-esteem and domains of confidence and confusion. *Pers Soc Psychol Bull*. 34:1541–1555.
- Stopa L, Brown MA, Luke MA, Hirsch CR (2010) Constructing a self: The role of self-structure and self-certainty in social anxiety. *Behav Res Ther*. 48:955–965.
- Tombaugh TN, McDowell I, Kristjansson B, Hubley AM (1996) Mini-Mental State Examination and the Modified MMSE: Psychometric comparison and normative data. *Psychol Assess*. 1:48–59.
- Tombaugh TN, McIntyre NJ (1992) The mini-mental state examination: A comprehensive review. *J Am Geriatr Soc*. 40:922–935.
- Treadgold R (1999) Transcendent vocations: Their relationship to stress, depression, and clarity of self-concept. *J Humanist Psychol*. 39:81–105.
- van Dijk MP, Branje S, Keijsers L, Hawk ST, Hale WW 3rd, Meeus W (2014) Self-concept clarity across adolescence: Longitudinal associations with open communication with parents and internalizing symptoms. *J Youth Adolesc*. 43:1861–1876.
- Vollmer-Larsen A, Handest P, Parnas J (2007) Reliability of measuring anomalous experience: The Bonn Scale for the Assessment of Basic Symptoms. *Psychopathology*. 40:345–348.
- Weinberg D, Shahar G, Noyman G, Davidson L, McGlashan TH, Fennig S (2012) Role of the self in schizophrenia: A multidimensional examination of short-term outcomes. *Psychiatry*. 75:285–297.
- Zanarini MC, Frankenburg FR (2001) Attainment and maintenance of reliability of axis I and II disorders over the course of a longitudinal study. *Compr Psychiatry*. 42:369–374.
- Zanarini MC, Skodol AE, Bender D, Dolan R, Sanislow C, Schaefer E, Morey LC, Grilo CM, Shea MT, McGlashan TH, Gunderson JG (2000) The Collaborative Longitudinal Personality Disorders Study: Reliability of axis I and II diagnoses. *J Pers Disord*. 14:291–299.