

Fragmented Selves: Recall of Self-Referenced Adjectives and the Self-Schema in Schizophrenia

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The self-schema has been implicated in the social and cognitive disabilities found in people diagnosed with schizophrenia. It is hypothesized that the self-schema is relatively disorganized and unstable in schizophrenia patients compared to healthy individuals. Few studies have examined this hypothesis in the literature, as the self-schema in schizophrenia is not yet fully understood. Testing this hypothesis, mean recall for 20 adjectives was compared between 20 adult male participants with schizophrenia and 20 adult male nonclinical participants under two levels of processing: semantic and self-referential. Results showed that self-referencing facilitated memory (i.e., the self-reference effect). There was a significant difference in the mean recall of the nonclinical participants under the two encoding conditions, but this difference was not significant for schizophrenia patients. That is, schizophrenia patients showed a global impairment in word recall compared to the nonclinical participants, and the self-reference effect was not shown. Accordingly, treatment should aim to ameliorate these deficits in self-concept and social cognition in addition to the standard rehabilitation repertoire.

The self is a concept that has stirred much passionate debate in philosophical and psychological literature. Renee Descartes (1641) put forth the idea that the ability to have self-awareness (i.e., being able to reflect on one's own inner cognitive and emotional states, and monitor one's behavior), is a necessary condition to gain the status of full personhood and is a proof of one's own existence. Kihlstrom et al. (1988) have defined the self as a mental representation of everything a person knows about him or herself. A person's self-knowledge can be roughly divided into perception-based knowledge (i.e., self-image) and meaning-based knowledge (i.e., self-concept). The self consists of a memory structure that has abstract representations of all the past experiences of an individual. If there are deficits in the self of an individual, that may affect the mental health of that person in substantial ways. Therefore, understanding the specific nature of the self-schema in schizophrenia may allow us to prevent and treat the disorder more effectively.

The Self-Reference Memory (SRM) Effect

The role of the self-schema in memory processes is often investigated using the depth of processing (DOP) incidental recall paradigm (Craik & Tulving, 1975), in which participants process a list of words at different levels of depth. Depth refers to the extent or amount of processing that a stimulus receives, and it is positively correlated with the strength and subsequent recall of the stimulus. For example,

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the structural coding task involves rating whether a given word is written with capital letters or lowercase letters. Other words are rated according to either phonemic or semantic rating tasks, which involves processing whether the word rhymes with another word or processing the meaning of the word, respectively. After the rating task the participants are asked to recall the words they remember in a surprise recall test i.e., the participants are not told about the recall test in advance.

An influential meta-analysis of the self-reference effect by Symons and Johnson (1997) analyzed various studies on the SRM effect in order to investigate whether there is a unique mnemonic advantage to the role of the self in recall. Their analysis showed that the SRM effect was indeed shown in majority of the studies and was a robust phenomenon. The authors argued that self-referential coding was sufficient—although not necessary—to promote superior recall of information because it promotes the processing of new information and helps relate it to previously stored related information. Furthermore, the involvement of the self-schema in the encoding stage provides superior recall by providing a compatible retrieval condition involving the same related self-schema items that were present during encoding. Rogers, Kuiper, and Kirker (1977) wrote that it was the well-structured and relatively stable nature of the self-schema that makes it such a powerful memory structure, stating that “in order for the self-reference to be such a useful encoding process, the self must be a uniform, well-structured concept” (p. 686).

Self-Schema Deficits in Schizophrenia

The exploration of the SRM effect in different populations, especially among those with psychopathology, can provide us with information about the nature of their self-schema and executive abilities. For instance, the nature of

schizophrenia involves the fragmentation and disorganization of numerous cognitive processes, such as attention, perception, memory and appraisal (Carter & Flesher, 1995). The disorganization and fragmentation of the self-schema and self-experience among schizophrenia patients is considered a crucial and important aspect of the disorder (Guller, 1966; Mishara, 2007). Therefore, the DOP paradigm can elucidate the nature of these self-related cognitive deficits and potentially provide us with targets for therapeutic interventions.

Although there has not been much research on self-schema deficits in people with schizophrenia, there is some preliminary support for the hypothesis that the self-schema may play an important role in schizophrenia. For instance, schizophrenia patients often report having unclear self-awareness or self-concept. Guller (1966) investigated the stability of the self-concept of people with schizophrenia and found that their self-concept was very variable and resulted in inconsistent self-descriptions. Guller (1966) claimed that schizophrenia has an important “self-concept disorder” (p. 279) component, which contributes to a number of the symptoms found in schizophrenia, such as an inability to plan ahead, and difficulties in effectively communicating or anticipating other’s reactions.

Similarly, the self-schema of schizophrenia patients seems to be less stable over time when compared to the self-schema of non-clinical individuals. Boulanger, Dethier, Jacob, Gendre, and Blairy (2009, September) compared the stability of the self-schema of individuals with schizophrenia to those with no identifiable psychopathology by asking them to define themselves on two parallel versions of a questionnaire with trait adjectives. Individuals with schizophrenia had a significantly less stable self-schema than non-clinical individuals. The individuals with schizophrenia also showed more depression and anxiety, but the difference in the stability of the self-schema remained even when these other factors were statistically accounted for.

Furthermore, individuals with schizophrenia also have difficulty in temporal aspects of self-referential memory, such as recalling specific events in their past and generating specific thoughts about future events (D’Argembeau, Raffard, & Van der Linden, 2008). This distorted sense of continuity of the self over time in individuals with schizophrenia may be partly associated with impairments in self-awareness and the self-schema.

Scharfetter (1981) classified dimensions of ego-consciousness and postulated that impairment in the dimension of ego-consistency was the core feature of schizophrenia. The impairment of ego-consistency has been described as “the destruction of the coherence of one’s self, the body and the soul, as a unitary being” (Kircher & David, 2003, p. 460). Therefore, ego-consistency seems to be fragmented in individuals with schizophrenia, and it is a crucial concept in understanding the nature of this disorder.

The SRM effect shown in nonclinical samples can be attributed partly to how the self is spontaneously invoked and involved in the processing of personally relevant information

(Foley, Belch, Mann, & McLean, 1999). Weckowisz and Sommer (1960) showed that participants with schizophrenia used self-references less than nonclinical controls. It seems that the self-schema in schizophrenia is not spontaneously invoked or a well-rehearsed structure for personally relevant processing of information.

People with schizophrenia show deficits in executive and organizational abilities and this may be another important factor in explaining why they do not show a normal SRM effect. A study comparing patients with schizophrenia with those with bipolar disorder and a group of non-clinical individuals revealed that patients with schizophrenia showed poorer performance than bipolar patients in generating definitions of words and then later recalling them (Rossel and Batty, 2008). The authors concluded that patients with schizophrenia have impairments in their executive and organizational abilities as well as greater deficits in their search and retrieval strategies. Bower and Gilligan (1979) claimed that the self-schema provided efficient search and retrieval strategies and this explains why a self-reference effect is observed. Therefore, if schizophrenia is marked by deficits in search and retrieval, as well as by deficits in organization, there might be a lack of a self-reference effect in people with schizophrenia.

Additionally, schizophrenia patients show difficulty in maintaining category boundaries, leading to the formation of vague and overextensive categories (Lawrence, Doughty, Al-Mousawi, Clegg, & Done, 2007). This may be due to the inability of schizophrenia patients to exclude contextually irrelevant items from categories. Thus, it seems that the self-concept as a category would suffer from the same documented distortions and it might be difficult for schizophrenia patients to maintain a proper self-concept or schema. Since the self-reference effect depends primarily on the unity and coherence of the self-schema this might be another reason why patients with schizophrenia may lack the SRM effect.

The nature of the cognitive deficits related to the self-schema in people with schizophrenia can be a very fruitful domain of experimental inquiry because it will help explain some vexing questions about the nature, etiology, and treatment of this disorder. Experimental studies on nonclinical populations have shown repeatedly that the depth-of-processing experimental design is useful for tapping into the self-schema and understanding how the self is involved in normal social cognition and self-cognition. Similarly, this experimental design has elucidated the nature of the self-schema in other forms of psychopathology, such as depression (Davis & Unruh, 1981; Derry & Kuiper, 1981); therefore, we can expect to find interesting and useful insights into the self and the social cognition of schizophrenia patients using this procedure.

In fact, a recent study used a personality adjectives recognition DOP paradigm in order to examine whether patients with schizophrenia show the mnemonic advantage of self-referential encoding as compared to structural and social desirability (i.e., a type of semantic encoding) encoding

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(Harvey, Lee, Horan, Ochsner, & Green, 2011). Interestingly, patients with schizophrenia had similar memory recognition of personality adjectives compared to the controls in the structural and social desirability conditions, but they had significantly less memory recognition than controls in the self-referential condition. This points to a specific self-cognition deficit, presumably in the self-schema, rather than depicting broader social cognition impairments or neurocognitive impairments in executive functions.

A Cognitive Model of Schizophrenia

Schizophrenia usually develops in vulnerable individuals during the transitory phase between late adolescence and young adulthood (Carter & Flesher, 1995). According to Erik Erikson's (1968) stages of life theory, this period is marked by a need to define one's identity and the expanding of social roles. The expanded social roles that a person occupies put increased demand on the individual to develop an increasingly complicated and extensive self-schema. Thus, considerable cognitive skill and energy is involved in the formation of a self-schema. These developmental demands can produce a good deal of stress and anxiety in individuals (Carter & Flesher, 1995).

According to the *vulnerability theory* of schizophrenia (Zubin & Springer, 1977), certain individuals have neuropsychological and cognitive deficits that make them vulnerable to schizophrenia, such as attention deficits and lack of cognitive flexibility. These cognitive deficits are implicated in the emergence of schizophrenia precisely during the phase of life in which the individual is expected to form a complicated self-schema that makes him or her functional in adult society. It is hypothesized that psychotic breaks may affect the already vulnerable self-schemas of individuals and can lead to distorted appraisals, beliefs and thoughts, which may contribute to dysfunctional moods and behaviors. These processes may lead to a downward spiral eventually resulting in the individual developing schizophrenia.

This cognitive model of psychosis addresses the role of automatic appraisals, which are driven by schemas in the onset and maintenance of psychosis. For instance, individuals who develop symptoms of hallucinations are more likely to go on to develop schizophrenia if they develop depressive symptoms after their hallucinatory experiences (Krabbendam et al., 2005). This suggests that there might be intervening beliefs that may affect self- and other-schemas and thereby lead to depression and psychosis (Krabbendam et al., 2005).

The specific research question addressed by this study is whether or not people diagnosed with schizophrenia have the self-reference effect. If they do, this study will address how it is similar or different from the self-reference effect found with nonclinical people. Such investigations could be particularly important given speculations that the self-schema may play a role in moderating the onset of schizophrenic symptomatology.

Due to the deficits in schizophrenia related to executive functions (i.e., organization and search and retrieval

strategies), and to the self-schema (i.e., fragmentation, instability and cognitive distortions), it is predicted that the result of the standard DOP incidental recall paradigm will be different in people with schizophrenia, as compared to the nonclinical participants, in the self-reference task. It is predicted that the mean recall of the adjectives will not significantly improve in participants with schizophrenia in the self-reference task as compared to their mean recall of the adjectives in the semantic task. Specifically, it is hypothesized that either the SRM effect will not be demonstrated in participants with schizophrenia or it will be significantly weaker as compared to the SRM effect observed in the nonclinical participants.

Method

Design

A 2 x 2 between-groups design was used in this study. One of the independent variables used was the level of processing. This was a manipulated experimental factor with two levels: *semantic processing* and *self-referential processing*. The other independent variable was the psychiatric status of the participants. This was a subject factor, rather than an experimentally manipulated factor, that had two groups: people diagnosed with schizophrenia and nonclinical participants. The participants with schizophrenia were randomly allocated, using the block randomization technique, to both conditions of the level of processing factor (semantic and self-referential) in a way to ensure that exactly half ($n = 10$) were divided across both levels. The same random allocation technique was done for the nonclinical participants, so that four groups were made in total with 10 participants in each group. The dependent variable used was the number of correct items recalled under free recall conditions.

Participants

Twenty adult male participants diagnosed with schizophrenia were selected from the Punjab Institute of Mental Health (PIMH) and from the Fountain House Institute in Lahore, Pakistan to participate in the research project. All schizophrenia subtypes were included in the study, except schizophrenia patients who had ever experienced an episode of drug-induced psychosis. The participants with schizophrenia had no known history of brain injury, epilepsy, neurological illness, intellectual disabilities, co-existing psychiatric disorders, or drug or alcohol abuse or dependence. The participants with schizophrenia used in the study were clinically stable, chronic inpatients in a residential setting with mild to moderate symptom levels, allowing them to participate properly in the experiment. All of the participants with schizophrenia were on an antipsychotic medication for at least six months. The schizophrenia patients were recruited by informing the psychiatric administrators of the required type of patients for the research project. The authorities selected suitable patients with schizophrenia, who were evaluated for their capacity to give informed consent. These participants

either agreed or disagreed to participate in the research project after information about the experiment was given. Overall, half of the selected schizophrenia patients gave their consent to participate in the study, and there were no significant differences between those who declined to participate and those who consented to participate.

Only male volunteers were recruited for the study as access to female patients with schizophrenia was difficult to obtain due to cultural norms regarding gender segregation, making it difficult for a male researcher to interview female patients with schizophrenia. Therefore, an equivalent all-male nonclinical sample was also required to ensure comparability of the schizophrenic and nonclinical samples. Thus, 20 adult male nonclinical participants were selected from the general population. Ten nonclinical participants were recruited from the undergraduate student population at Lahore University of Management Sciences (LUMS) by sending a mass email calling for male participants for a psychology cognitive experiment. The other ten of the 20 nonclinical participants were recruited through purposeful sampling from different socio-economic classes, language/ethnic groups, and age groups. Therefore, the participants with and without schizophrenia were matched on age, gender, and ethnicity. Attempts were made to match the groups on socioeconomic status (SES) by using the last attained educational degree as one indicator. Despite matching the educational attainment levels, the living conditions and unemployment among the patients with schizophrenia suggest that the current socioeconomic levels (personal or familial) of the two groups were significantly different.

The nonclinical participants were asked to self-report any history of psychiatric illnesses, substance abuse or dependency, head injury, or neurological disorders and only those who reported none were recruited for the study. Furthermore, the nonclinical participants were asked to report if there was any history of schizophrenia among their first-degree relatives and only those with no such history were selected.

Materials

A list of 20 Urdu and Punjabi adjectives was prepared and tested on samples of randomly selected patients and students. These samples were different from the samples used during the interventions. A sample of 40 inpatients was randomly selected from the hospital records of the two psychiatric institutions and 40 LUMS students were randomly selected from the university admission records. They were asked to judge whether these words were familiar to them and, in their opinion, to others in order to verify that these adjectives would be equally familiar to all experimental participants involved, regardless of educational qualification, first language, or mental health status.

Among the participants involved in the four experimental conditions of the study, 40% of participants' first language was Urdu and 60% of participants' first language was Punjabi, although all participants spoke and understood both languages. An equal number of adjectives had positive and

negative traits or valence, and they were listed in random order. This was used to prevent the response acquiescence bias (i.e., a tendency to choose yes as an option or select a positive option without careful consideration). This was also necessary to allow the adjectives to tap both the positive and negative traits that might be represented in the self-schemas of the various participants. Derry and Kuiper (1981) have pointed out the importance of making sure that the experimental traits are relevant to the self-schemas under investigation. They explained that the content-specificity component of the self-as-a-schema model predicts superior recall for words that are already present in the self-schema. Therefore, it was necessary to ensure that the word list did not have only positive or only negative words, as that might not effectively represent the self-schemas of participants. Furthermore, the average number of letters and syllables in the positive and negative words was kept equivalent.

The semantic processing condition had the same 20 adjectives, as well as either correct or incorrect definitions of each word. Therefore, the participants had to determine whether the definition given for a word was correct or incorrect. This was done to obtain both "yes" and "no" answers and prevent a response bias in the semantic processing conditions.

Procedure

Each participant was read the initial list individually for encoding and then tested for recall individually. A standardized protocol was observed to keep the experimental conditions as similar as possible and to avoid any confounding demand characteristics. Standardized instructions were given to each participant in Urdu, and the instructions were different for the semantic and self-referential levels but the same across the mental status groups. The participant then answered either "yes" or "no" after each of the 20 adjectives according to the instructions given, i.e., whether the adjectives described them or not (self-referential encoding), or whether the definitions of the adjectives were correct or not (semantic encoding). All participants were given a maximum of 30 seconds, monitored by the researcher on a stopwatch, to answer after the researcher spoke each word.

After the last adjective was answered, one minute was allowed to pass before a surprise recall test was administered and the participants were asked to verbally recall as many of the adjectives (not the definition sentences) as possible, in any order. The entire procedure was verbal for all participants as some of the participants were illiterate. All participants were given a maximum of three minutes for this task. After the recall test all participants were suitably debriefed. All participants were given 40 rupees (approximately \$1 at the time of study, but is worth more in terms of purchasing power) as a compensation for participating in the study. The methodology, purpose and implementation of this study was approved and monitored by the Lahore University of Management Sciences (LUMS) senior research study advisors.

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Results

Analysis of variance (ANOVA) for four independent samples was used to analyze differences in participants' ages. The mean age of the participants was 29.25 years ($SD = 7.61$). There was no significant difference in the age of participants in different groups, $F(3,36) = 0.26, p = .85$.

The data were also analyzed with a 2 (schizophrenic and non-clinical) x 2 (semantic and self-referential) ANOVA. The level of alpha was set at .05 and it was single-tailed because the limited power of the study prevented using a two-tailed alpha level. The mean recall across all conditions for semantic processing was 5.40 ($SD = 2.23; min = 4, max = 9$), and across all conditions for self-referential processing was 6.75 ($SD = 3.00; min = 6, max = 13$). The difference was significant and a main effect for level of processing was found, $F(1, 36) = 4.97, p = .032, \eta_p^2 = .12$. The mean recall across all conditions for the nonclinical participants was 7.80 ($SD = 2.39; min = 2, max = 7$), which was higher than the mean recall across all conditions for the patients with schizophrenia ($M = 4.35, SD = 1.72; min = 2, max = 7$). A highly significant main effect was found for mental status, $F(1, 36) = 32.48, p < .001, \eta_p^2 = .47$. A significant interaction effect occurred between mental status and the level of processing, $F(1, 36) = 4.26, p = .046, \eta_p^2 = .11$.

A simple effect analysis (independent samples t-test) of the level of processing in the participants with schizophrenia showed that even though the mean recall for the self-

referencing group was slightly higher than the mean recall of the semantic group the difference between the means was not significant, $t(18) = -0.13, p = .90, d = .061$, while for the nonclinical participants there was a significant difference, $t(18) = -2.84, p = .011, d = 1.34$, between the means of the semantic condition and the self-referential condition (see Figure 1). Descriptive statistics are given in Table 1, which shows that the difference in mean scores across the levels of processing was much higher for the nonclinical groups than the schizophrenic groups.

Table 1

Mean and Standard Deviation of Recalled Adjectives as a Function of Level of Processing and Mental Status of Participants.

Level of Processing	Schizophrenic <i>M (SD)</i>	Nonclinical <i>M (SD)</i>
Semantic Processing	4.30 (2.00)	6.50 (1.96)
Self-Referential Processing	4.40 (1.50)	9.10 (2.13)

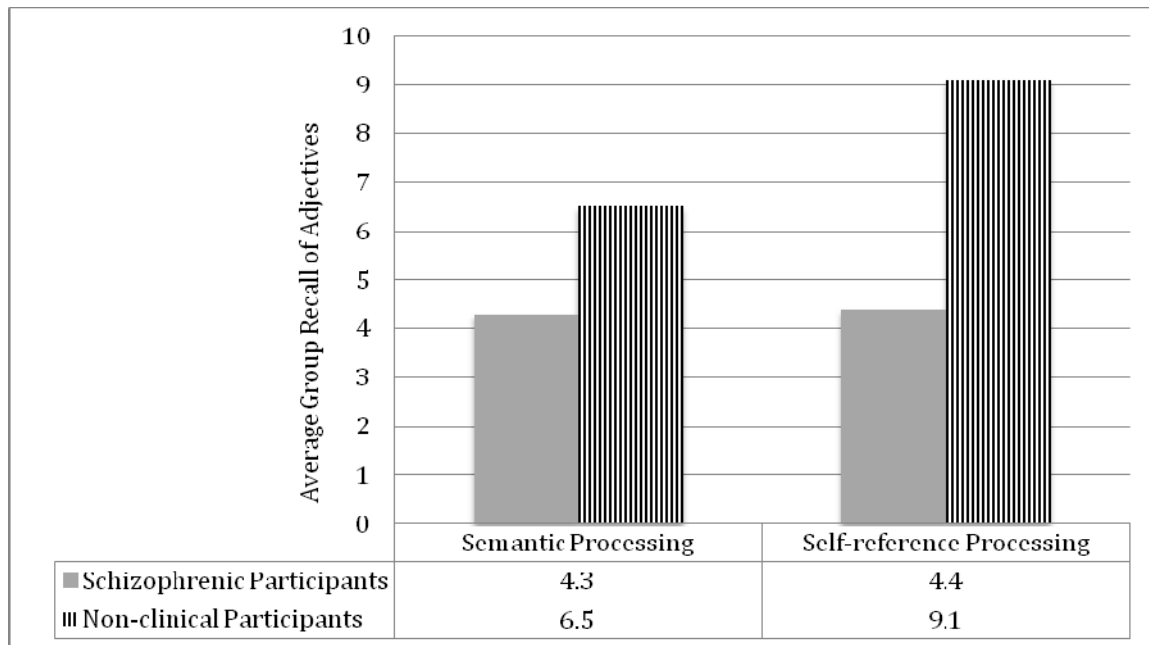


Figure 1. The self-referencing of trait adjectives leads to a memory boost, relative to semantic processing of the same trait adjectives, only in non-clinical participants.

Discussion

The results of this study supported the hypothesis that the participants with schizophrenia would show impairments in their self-schema. The results showed that the individuals diagnosed with schizophrenia did not seem to show a self-reference effect, while there was a significant difference in mean recall between the two levels of processing for the nonclinical participants. The interaction effect between mental status and levels of processing was significant and demonstrated that the mnemonic advantage of the self is observed in nonclinical participants, whereas no such substantial advantage is seen in participants with schizophrenia. There was a significant main effect for the levels of processing; overall, self-referencing of personal information lead to a better recall than semantic association. However, the significant interaction effect between the participants' mental status and their relative ability to recall under different levels of processing is of greater interest. There was a small difference in the mean recall of patients with schizophrenia between the semantic and self-referential conditions, but inferential analysis showed that this was a nonsignificant difference.

The Self-Memory System (SMS) Model

According to the self-memory system (SMS) model, the reduced SRM effect in patients with schizophrenia may be explained by deficits in the self-schema, cognitive distortions within the self-schema, and executive function deficits. Autobiographical memories have been proposed to be a part of the self-memory system (SMS), which involves different sets of self-schemas that are activated and brought into consciousness according to the goals of the working self (i.e., the part of the self-concept accessible consciously at a particular moment) (Conway & Pleydel-Pearce, 2000). The activated self-schema brings with it a sense of continuity and coherence because it has an attached autobiographical memory bank. The working-self is primarily composed of the various executive functions involved in coordinating cognitions (including memories), emotions, and behaviors. Therefore, when individuals with schizophrenia have difficulty forming a sense of self-continuity and lack a well-developed and coherent self-schema, it could partly be due to deficits in the executive functions that coordinate goals and memories associated with relevant self-schemas. In addition to executive functions, this model also suggests that individuals with schizophrenia may have deficits in self-schemas due to lack of effective encoding, storage, retention, and retrieval, as well as distorted cognitions.

Autobiographical and episodic memories are often considered the same type of memory, but recent research has shown that these can be classified as closely linked but separate memory systems (Gilboa, 2004; Wheeler, Stuss, & Tulving, 1997). These two memory systems share many neural correlates but also show distinct differences (Gilboa, 2004). Autobiographical memory has a larger significance for the individual in terms of self and identity than episodic

memory (Gilboa, 2004). Episodic memories are generally information stored about events in the past together with the context in which events occurred, and are often focused on relatively recent events (Wheeler et al., 1997). These events can be any information that the individual was exposed to, while autobiographical memory focuses more on information related to the self. Therefore, autobiographical memory is essentially tied to the self-schema of an individual and deals with broader, more generalized memories, which can be very old. The self-schema takes significant self-related episodic memories and processes the information to create multiple retrieval cues and associations with other data points within the self-schema. Hence, autobiographical memories can be cued by a diverse and general set of situations, while episodic memory cues are generally more specific.

The established explanation of how the self-schema facilitates word recall is that it not only elaborates and organizes data, but also provides similar conditions during retrieval as those found during encoding. Additionally, it is a spontaneous and well-rehearsed structure in the processing of trait adjectives; therefore it has a natural advantage as a mnemonic device compared to any other memory structure (Bower & Gilligan, 1979; Klein & Loftus, 1988). This study found that the schizophrenia patients did not show a self-reference effect to the same extent that nonclinical participants did, and this result can be interpreted according to the self-as-a-schema theoretical framework presented above. Presumably, not only is the self-schema disorganized in patients with schizophrenia, but it is apparently not a well-rehearsed and spontaneous structure in the processing of personally relevant information. It may not provide suitable retrieval cues and conditions, and hence is not rich enough to provide elaboration of personal information (Mishara, 2007; Scharfetter, 1981).

Executive Abilities Deficit in Schizophrenia

Patients with schizophrenia have been shown to have impairments in organizational and executive abilities, which might also partly explain why they do not organize personal data efficiently (Lawrence et al, 2007; Rossell & Batty, 2008). This hypothesis is supported by our results, which showed a highly significant difference in the overall mean recall of the trait adjectives between the participants with schizophrenia and the nonclinical participants. The nonclinical participants, across both levels of processing, performed much better than the participants with schizophrenia did under each of the two conditions. Thus there was a strong main effect of the mental status of the participants as the schizophrenia patients showed an overall lower recall rate of the trait adjectives. This result is not surprising as it is known that patients with schizophrenia suffer from widespread organizational and information-processing deficits (Neuchterlein & Dawson, 1984). There are general deficits in attention and an inability to selectively attend only to relevant information, leading to over-inclusive and incoherent categories (Lawrence et al., 2007). Furthermore, patients with schizophrenia not only show

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marked deficits in self-schema but also in semantic memory. Many psychologists have concluded from the evidence accumulated that “abnormalities in semantic memory are commonly proposed to be central to cognitive abnormalities in schizophrenia” (Rossell & Batty, 2008, p. 63). Semantic deficits have been shown in a wide variety of semantic tasks, such as categorization (Rossell & David, 2006), verbal fluency (Rossell, Rabe-Hesketh, Shapleske, & David, 1999) and priming (Rossell, Shapleske, & David, 2000).

Furthermore, it is plausible that the anti-psychotic medications that the participants with schizophrenia were taking might have affected their overall attention, memory and other executive abilities resulting in an overall lower recall of adjectives. These results point to broader executive and attentional deficits among the participants with schizophrenia but the low SRM effect is probably not due to these other factors alone. Harvey et al.’s (2011) study shows that patients with schizophrenia show a boost in recognition memory from structural to semantic level encoding but they lack the mnemonic boost for the self-reference encoding level. This suggests that the lack of mnemonic boost is more than just the attentional and organizational deficits that lead to the overall lower recall level of patients with schizophrenia. Furthermore, our study supports the results from Harvey et al.’s (2011) study and provides evidence that these results are seen even when using a recall paradigm.

Social Cognitive Perspective

The self-schema is a very important construct that is associated with effective interpersonal skills, patterns of adult attachments, goals, emotions, identity development, and psychopathology in different disorders (Conway & Pleydel-Pearce, 2000). For instance, the cognitive model for depression has been used in research studies over the last two decades in order to highlight the role of the self-schema, and researchers now have a deeper understanding of the mediating role of self- and other-evaluations in depression (Clark, Beck, & Alford, 1999). Similarly, research has begun to explore the role of the self-schema in PTSD (Brewin, 2003) and eating disorders (Fairburn, Cooper, & Shafran, 2003). Negative evaluations of the self and others have also been incorporated in cognitive models of psychosis and used to explain different symptoms, such as paranoia, hallucinations and delusions (Fowler, 2000; Fowler et al., 2006; Freeman, Garety, Kuipers, Fowler, & Bebbington, 2002). Therefore, the self-schema in schizophrenia patients is potentially an important concept to explore because it may be amenable to interventions designed to ameliorate its potentially negative role in the etiology and/or maintenance of schizophrenia.

This social cognitive perspective on schizophrenia provides another potentially useful understanding of the nature of the disorder and its causal pathways. It can also help devise new and effective treatment and rehabilitation options for patients with schizophrenia. The cognitive model of psychosis claims that if cognitive appraisals and underlying schemata are modified through CBT, then it may

be result in an improvement in the psychotic symptoms of schizophrenia. Furthermore, there are some encouraging results concerning the use of cognitive therapy, which targets self-and other-schemas, on individuals who are at high risk for developing psychosis, potentially preventing full-blown psychosis (Gould, Mueser, Bolton, Mays, & Goff, 2001; Morrison et al., 2004).

Rehabilitative Interventions

Currently, most rehabilitative interventions for patients with schizophrenia focus on teaching them social skills. Social skills can be defined as discrete behaviors that can be standardized and rehearsed. Unfortunately, these interventions frequently do not lead to better social functioning (Carter & Flesher, 1995). Improved social skills do not sufficiently help in the navigation of a complex, fluid and dynamic social world that requires one to have mastered the art of role-taking that secondary socialization teaches. New interventions should be designed that activate secondary socialization processes (i.e., empathy, mind-reading, perspective-taking) and fill the gaps in secondary socialization skills in schizophrenia patients. Carter and Flesher (1995) describe socialization as “a far more inclusive construct referring to the ongoing process of adaptation of individuals to a variety of social contexts” (p. 210). A disorder-specific socialization program can be more effective in improving the social functioning of patients with schizophrenia than just focusing on social skills. The specific deficiencies shown in the self-schema and organizational abilities of patients with schizophrenia have to be adequately addressed and attempts should be made to teach individuals with schizophrenia techniques to compensate for these specific cognitive deficits. For instance, therapy can address the issue of the self-concept of people diagnosed with schizophrenia by helping them gain a clearer and more coherent concept of who they are. They could be encouraged to regularly write a journal and note their likes, dislikes, values, and habits in it and then examine the entries to find out stable patterns and traits. Patients can also practice different exercises designed to boost their secondary socialization skills, like empathy. For instance, guessing what a character is feeling based on their pictures or expressions. These interventions can help the patients during social interactions by being more aware of what they want and what other people may be thinking or desiring. Similarly, information processing techniques should be taught, including the use of mnemonics, to practice and develop efficient memory structures, and compensate for the lack of organizational and search and retrieval deficits.

Limitations

While there are several benefits of this study’s findings, several limitations were also present. The small sample size may have been a major limitation of this study and further studies should replicate this study with larger samples in order to get greater power. Furthermore, this study was not designed to take into consideration the effects of intelligence

(IQ) on recall performance. The IQ, intellectual and cognitive functioning of the participants with schizophrenia and nonclinical participants were only indirectly measured or matched in the research design by looking at educational attainment levels. IQ might have some role to play in the differences in the two mental status groups in the self-reference condition. Furthermore, IQ is probably related to the main effect of mental status on recall of adjectives and might have contributed to the overall lower recall of adjectives in patients with schizophrenia.

Another limitation of this study is the lack of equivalence of the non-clinical and schizophrenic groups in terms of socio-economic status (SES). It is possible that SES may play a role in the development of the self-schema in individuals and may result in differences in the self-schema amongst different SES groups. Future studies should explore whether distinct SES groups show differences in the self-reference memory (SRM) effect. Similarly, studies should compare participants with and without schizophrenia on the SRM effect with SES being controlled as a variable. Gender may also have distinct effects on self-schema development and on the SRM effect. It would be interesting to design studies to explore how the variable of gender is related to the SRM effect.

It is important to note that, due to the nature of the experimental design, only those patients with schizophrenia who were able to perform the cognitive tests and interact adequately with the experimenter were included. Hence, the schizophrenia participants in our sample were chronically ill and were not in an acute phase or highly symptomatic. Therefore, this research design should be replicated in order to establish the degree of generalizability of these results and to ascertain that the interaction effect is a reliable finding. Further research should be conducted specifically to see whether these results are obtained from participants with schizophrenia who are in the acute phase of this disorder and/or with those not taking anti-psychotic medications. It has been shown that reactive schizophrenia, in which there is an intense and sudden onset of the symptoms, has a better prognosis for recovery than a slow and insidious development of schizophrenia symptoms (Chapman, Day, & Burstein, 1961). It might be the case that the self-schema disturbances in the acute and chronic types of schizophrenia are different. This suggests that a slow and insidious development of schizophrenia symptoms involves a chronic, inherently fragmented self-schema, while in reactive schizophrenia there is only a temporary disturbance in the functioning and structure of the self-schema. Future research should compare the SRM effects between these two types of patients with schizophrenia, as it could help to explain why chronic schizophrenia has a worse prognosis for recovery.

Conclusion

Schizophrenia is a serious mental disorder whose symptoms and etiologies are complex and multiply determined. This study attempted to utilize the research methodology and concepts developed by cognitive

psychologists, especially in the domain of self- and social-cognition, to lift this shroud a bit and see what lies beneath. The self can be considered a schema that is actively involved in the processing of self-related information. This self-schema organizes, elaborates and provides a facilitative retrieval atmosphere for personally relevant information. This study confirms previous findings that schizophrenia is marked by numerous cognitive deficits, including specific problems with the self-schema and organizational processes. The self-schema in people diagnosed with schizophrenia seems not to be a well-rehearsed, stable and functional structure and so it does not act effectively as a superordinate schema that facilitates recall of self-related information. This study intended to highlight the importance of the self in schizophrenia, as it is a concept that is associated with numerous adaptive socio-cognitive functions and may lead to insights that can change how we prevent, treat and understand this disorder.

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