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In and out of schizophrenia: Activation and deactivation of the negative and positive schemas

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ABSTRACT

Theorists, clinicians, and investigators have attempted to find a common source for the negative and positive symptoms of schizophrenia. We propose that a unified theory, based on a common cognitive structure not only has explanatory value, but can serve as a framework for a psychotherapeutic intervention. Specifically, we propose that the cognitive triad – the negative view of the self, others, and the future – is the source of the content for the negative and positive symptoms. We report literature supporting the relationship between each facet of the negative triad and each of the key symptoms: expressive negative symptoms, delusions, and verbal hallucinations. We conclude that the literature supports the validity of the cognitive model of negative and positive symptoms. The cognitive model furthers the understanding of the positive and negative symptoms of schizophrenia, and we describe how this provides a framework for a psychotherapeutic intervention.

1. Introduction

Both negative and positive symptoms of schizophrenia can be analyzed within the traditional cognitive model, in which the cognitive triad (schemas about self, world, and the future) shapes beliefs, appraisals of events, and consequent responses. Stressful life events, childhood trauma, and genetic predispositions (alone or combined) can result in the development of negative beliefs (such as, "I am unlovable," "People are dangerous," or "Things will never get better"), emotions (e.g. sadness) and maladaptive behaviors (e.g. withdrawal) (Beck and Bredemeier, 2016). For both negative and positive symptoms, the content is similar: the view of the self as weak, vulnerable, ineffective, and worthless; the view of others as controlling, dangerous, rejecting; and the view of the future as uncertain or forbidding. The cognitive triad can also be used to develop effective treatments for individuals with schizophrenia. The individual's views of the self, others, and future effect the presentation of negative and positive symptoms. We have found that interventions that target the meaning behind both positive and negative symptoms often ameliorate them.

2. Schemas

In order to understand the fluctuation in the intensity, duration, and frequency of the symptoms of schizophrenia, as well as other disorders, we have introduced the concept of cognitive schemas, which are responsible for cognitive organization (Beck and Haigh, 2014). These structures have a variety of characteristics, such as width (the extent of situations encompassed by them), permeability, density (their robustness), intensity (their charge), and content. The durability of schemas is reflected in their clinical manifestations. The chronic, continuous persistence of the schema is a reflection of the density and the acute intensity reflects the degree of charge. According to the theory, content of the schemas originates in the cognitive triad (negative beliefs about the self, external situation, and the future), which are then translated into schemas pertaining to specific situations (e.g., "If I try something, I will only fail" or "people will reject me if I try to socialize"). We label schemas as dysfunctional when they interfere with the adjustment or accommodation to life situations. The schema is delusional when the content is extreme or fantastic, and not subject to correction.

3. Development of schizophrenia

The early stages of the precursors to schizophrenia follow a similar pathway to the development of non-psychotic disorders. Some individuals may have an inherited predisposition consisting of a negative cognitive bias in the interpretation of life events. These individuals are likely to over-interpret negative events or make negative interpretations of neutral events. As the totality of negative interpretations increases over time, the individual develops relatively stable, negatively-biased beliefs about the self, personal world, and future. These dysfunctional negative beliefs give rise to specific predictions and rules, such as "if I try this, I'm only going to fail" or "don't stick your neck out." The

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negative beliefs become embedded in schemas. Other individuals may not be genetically predisposed to the same type of negative cognitive bias, but are subjected to so much negativity in their environment that they eventually develop the same type of dysfunctional negative beliefs. In the development of schizophrenia, the dysfunctional attitudes may lead to negative symptoms of schizophrenia; specifically, withdrawal, avoidance, and isolation.

The development of positive symptoms may start with the dysfunctional attitudes. Due to some genetically determined anomalous brain circuitry, the dysfunctional beliefs become transformed into delusions and hallucinations, which constitute an exaggeration or bizarre expression of the dysfunctional belief. The development of positive symptoms would follow the stressor pathway, beginning from the impingement of life events on the vulnerable, dysfunctional beliefs, leading to an exaggeration of the life event and triggering a psychophysiological system: overstimulation of the HPA axis → excessive output of cortisol → excessive flow of dopamine into the limbic and other regions of the brain → development of delusions and hallucinations.

4. Negative symptoms

The negative symptoms are concerned with the individuals' behavior: whether the individual becomes inactive or active. Motivation plays a key role in the development of negative symptoms. Table 1 outlines the theoretical formulation of the relationship of the dysfunctional attitudes, regarding the three components of the negative cognitive triad and their relationship to the negative symptoms.

4.1. Factor I of negative symptoms: Amotivation factor

The symptoms in the last column represent Factor I of the Scale for the Assessment of Negative Symptoms (Andreasen, 1984; Kelley et al., 1999): the amotivation factor. According to the cognitive model, negative beliefs are transformed into negative symptoms. For example, the dysfunctional belief, "I am broken," illustrates the individual's beliefs about the self. If the individual feels broken, then facing a task, demand, or even opportunity activates a belief consistent with the negative self-concept: "If I try something, I will fail." This expectation then undermines access to motivation to attempt or accomplish the task. The self-attributes of the negative self-image are focused on weakness, worthlessness, and helplessness. The development of negative symptoms differ from the development of positive symptoms and are represented by dysfunctional beliefs, such as "if I try something, I'm only going to fail" or "no point in trying to fit in a social group, I'll only be rejected." The goal is to avoid hurt, frustration, and disappointment through withdrawal, avoidance, and distancing. The symptoms in Factor I are more or less conscious and are readily attributable by the individual to the dysfunctional attitude, for example, "I know I'm going to fail, so I won't try so hard.". It is possible for the individual to rise above these beliefs and make an effort if the attraction to the activity is strong enough to mobilize positive expectations. For example, an individual may feel too fatigued to become active and join a group of people, but if they play music, start dancing, and serve refreshments, he may experience sufficient motivation to join in—in this case, the positive expectation of the experience overrides the negative attitude.

4.2. Factor II of negative symptoms: Expressive factor

Factor II of the negative symptoms (Blanchard and Cohen, 2006; Kelley et al., 1999) is manifested in the repertoire of interpersonal responses that include facial expression, gestures, and speech. In contrast to Factor I, these expressive symptoms occur automatically and in the absence of conscious volition. Also, in contrast to the symptoms of Factor I, which are dependent on a reduction in access to motivation or effort, symptoms of Factor II constitute an inhibition of behavioral responses. In this sense, it is akin to freezing in cases of public speaking anxiety (inhibition of speech) and panic disorder (generalized inhibition of motor activity). Taken together, Factor I and Factor II combine to promote inactivity and seclusion.

4.3. Empirical basis for cognitive model of negative symptoms

4.3.1. Beliefs about the self

Beliefs about the self have been found to influence negative symptoms. For example, positive evaluations of the self correlate with fewer negative symptoms among individuals with schizophrenia (Barrowclough et al., 2003). On the other hand, negative self-concepts related to interpersonal abilities, dysfunctional acceptance beliefs, and global perceptions of the self as worthless, useless, and a failure significantly correlate with the severity of negative symptoms among individuals with schizophrenia, explaining over a third of the variance in negative symptoms over and above the impact of depression and neurocognition (Lincoln et al., 2011). Further, a longitudinal first episode study determined that increases in positive beliefs about the self-predicted decreases in negative symptoms, while increases in negative beliefs about the self significantly predicted increases in negative symptoms (Palmier-Claus et al., 2011). Additionally, lower self-efficacy has been found to correlate with more severe negative symptoms among

Table 1
Situation-specific dysfunctional attitudes related to the amotivation factor[1] of negative symptoms.

Cognitive triad / Specific situations	Self	External	Future	Symptom
Task orientation	I am broken, inadequate, and inefficient.	The task is too demanding.	I will fail.	Amotivation & Avoidance
Pleasure	I am incapable of having pleasure.	Nothing out there is enjoyable.	I won't enjoy the activity.	Anhedonia
Interpersonal	I am unlikable.	Other people aren't friendly.	If I socialize, I will be rejected.	Asociality & Avoidance
Energy	I don't have energy.	The demand is energy depleting.	I will not have the energy to do it.	Anergia

[1] Andreasen, N.C., 1984. Scale for the Assessment of Negative Symptoms (SANS). University of Iowa, Iowa City, IA.

individuals with non-affective psychosis (Avery et al., 2009). Negative symptoms, further, appear to mediate the link between self-efficacy and real-world functioning (Pratt et al., 2005; Vaskinn et al., 2015). Two studies have found that amotivation (Factor I) mediates the relationship between self-efficacy and functioning in individuals experiencing a first episode of psychosis (Chang et al., 2017; Ventura et al., 2014).

4.3.2. Defeatist beliefs

Beliefs about the future have also been found to influence negative symptoms and functioning. Beliefs about future success (e.g. "I will fail") correlate with more severe negative symptoms (Cox et al., 2016). Similarly, defeatist beliefs (overly generalized negative conclusions regarding task performance (Beck et al., 2009)) influence negative symptoms and functioning among individuals with schizophrenia or schizoaffective disorders (Green et al., 2012). These beliefs significantly correlate with negative symptoms in individuals with schizophrenia (Granholm et al., 2016; Grant and Beck, 2009), ultra-high risk adolescents and young adults (Perivoliotis et al., 2009), and individuals with elevated schizotypy (Luther et al., 2016). Those with either more severe avolition/apathy or more severe diminished expression exhibited more severe dysfunctional attitudes and poorer functioning (e.g. work and social functioning) (Strauss et al., 2013). Other findings similarly show defeatist beliefs significantly correlate with functional outcomes (Grant and Beck, 2009) and predict future community participation (Thomas et al., 2017). In addition, individuals who meet criteria for the deficit syndrome (characterized by more severe and persistent negative symptoms) endorse defeatist beliefs to a greater extent than those with less severe negative symptoms (Beck et al., 2013). Lastly, a recent meta-analysis of 10 studies concluded that defeatist beliefs were significantly associated with negative symptoms and functional outcomes in schizophrenia (Campellone et al., 2016).

Treatment studies further demonstrate the role of defeatist beliefs in negative symptoms. For instance, defeatist beliefs mediated improvement in negative symptoms in response to cognitive behavioral social skills training (Granholm et al., 2014; Granholm et al., 2013). Our group conducted a randomized clinical trial evaluating the efficacy of cognitive therapy for individuals with schizophrenia having elevated negative symptoms. Individuals receiving cognitive therapy had significantly better global functioning, ameliorated negative symptoms, and reduced positive symptoms at the end of treatment, compared to standard treatment in the community (Grant et al., 2012).

4.3.3. Anticipatory beliefs about pleasure

Research findings support anticipatory beliefs regarding pleasure (e.g., "I won't enjoy the activity") playing a role in negative symptoms. Findings consistently suggest that decreased expectations of pleasure correlate with more severe negative symptoms among individuals with schizophrenia (Chan et al., 2010; Da Silva et al., 2017; Engel et al., 2016; Gard et al., 2007; Loas et al., 2009; Mote et al., 2014) and healthy individuals (Engel et al., 2013). Reduced anticipatory pleasure correlates specifically with more severe anhedonia (Davidson et al., 2005; Gard et al., 2007; Loas et al., 2009) and amotivation (Da Silva et al., 2017; Engel et al., 2013). Similarly, impairments in the representation of rewards correlate with negative symptoms among individuals with schizophrenia (Gold et al., 2012).

4.3.4. Asocial beliefs

Beliefs about future interpersonal interactions (e.g., "If I socialize, I will be rejected") can influence negative symptoms. Asocial beliefs (e.g., "Making new friends isn't worth the effort it takes") correlate with asociality in schizophrenia (Grant and Beck, 2010), and individuals who meet criteria for the deficit syndrome endorse asocial beliefs more than individuals with less negative symptoms (Beck et al., 2013). Elevated asocial beliefs have been found to be an independent path from defeatist beliefs that also predict decreased community participation in the future (Thomas et al., 2017).

Most generally, research appears to support the cognitive model of negative symptoms in terms of beliefs about the future and behavior. Findings suggest that in individuals with schizophrenia, negative symptoms mediate the relationship between defeatist performance beliefs and functioning (Horan et al., 2010) and, further, that specifically amotivation mediates the relationship between defeatist performance beliefs and functional outcome (Pillny and Lincoln, 2016).

5. Positive symptoms

5.1. Delusions

The formation of delusions and hallucinations is the function of a cognitive system we labeled the transformational/imaginal system. This anomalous system is self-contained and isolated from other cognitive functions, such as reevaluation, logic, rationality, and reality testing, which are earmarks of the basic cognitive system. The delusional products that arise from negative attributes of the cognitive triad generally represent a symbolic, exaggerated transformation of the individual's fears (paranoid delusions) or an extreme fantastic compensation (grandiose symptoms). In the course of compensation, the grandiose delusions embody basic universal needs and urges, such as wanting to be valued and accepted. The negative symptoms, in contrast, represent the expectancy of failure in social or non-social situations. The various types of delusions can be traced back to the features of the cognitive triad. Paranoid or persecutory delusions, such as the fear of being killed or belief in being poisoned, can be seen as an extreme portrayal of other people being dangerous or rejecting. This could also take the form of social anxiety, in which the negative judgments of others trigger a need to avoid social encounters. The grandiose delusions, on the other hand, have a more convoluted development. The content appears to emanate from a more profound view of the self as weak, controlled, and devalued. In the case of both types of delusions, we have found that a therapeutic treatment plan can diminish the impact of these delusions. For example, individuals with paranoid delusions may decrease their guard and become less fearful when they have a series of positive social experiences and, particularly, become active in a social network. We have also observed that individuals with grandiose delusions benefit from corrective experiences that have an impact on their sense of weakness and undesirability. For example, when these individuals have the opportunity to help other people, they are empowered and consequently, their delusional thinking and negative symptoms are reduced.

5.2. Voices

Individuals normally experience a variety of thoughts that appear involuntarily in the stream of consciousness and are called automatic thoughts (Beck, 1976). These automatic thoughts can be self-evaluative, critical or positive; injunctions or commands; thoughts about other people and events. Auditory hallucinations mirror the content of these thoughts and are experienced as vocalized, from a source that can be either known or unknown to the individual. The designated (projected) vocalizer of the thought may be other known individuals, such as the neighbors, or unknown individuals. It could be a spirit, a god, dead loved one. The command hallucinations are generally ascribed to some all-powerful individual, such as God, or some unidentified entity.[1]

Like delusions, voices reflect the negative view of the self, others, and can be threatening about the future. An individual reported, for example, that the voice of God commanded her to vacuum the living room every day or she would get killed. The fear of being punished is in this way expressed as an absolute command.

As in delusions, the voices are embedded in the transformational/imaginal system and thus, tend to be absolute and irrefutable. However,

[1] Command hallucinations are verbal imperatives that implore action.

as noted above, they do reflect individuals' non-delusional automatic thoughts, which are attached to real experiences. By working with and reframing non-delusional automatic thoughts, it is possible to disempower the voices. Similarly, improvement in the view of the self and others may, over time, diminish the severity and distress associated with voices.

5.3. Empirical basis for cognitive model of delusions

5.3.1. Beliefs about the self

Recent research has found that negative-self schemas to be a predictor of negative affect and positive symptoms, which suggests that negative beliefs about the self occur first (Jaya et al., 2017). Beliefs about the self have been shown to impact delusion content, level of comfort with delusions (Bowins and Shugar, 1998), and severity of delusions (Barrowclough et al., 2003). Also, lower self-esteem, more negative evaluations of the self, and less positive evaluations of the self correlate with the severity of persecutory delusions (Garety et al., 2013), including greater distress and preoccupation regarding the delusions (Collett et al., 2016; Kesting and Lincoln, 2013; Smith et al., 2006; Sundag et al., 2014), higher perceived deservedness of the persecution (Kesting and Lincoln, 2013), and greater suicidal ideation (Collett et al., 2016). By contrast, beliefs that the self is powerful correlate with decreased distress (Paget and Ellett, 2014). Negative evaluative beliefs about the self are still significantly correlated with persecutory delusions when depression and self-esteem are statistically controlled (Smith et al., 2006).

For individuals with grandiose delusions, positive beliefs about the self and less negative beliefs about the self correlate with delusion severity (Garety et al., 2013; Smith et al., 2006). Moreover, one study established that positive views of the self strongly and uniquely predicted grandiosity in a non-clinical sample (Fowler et al., 2006). Paranoid thinking significantly correlates with less positive views of the self and more negative views of the self among nonclinical (Fowler et al., 2006; Gracie et al., 2007) and clinical samples (Freeman et al., 2013; Tiernan et al., 2014; Valiente et al., 2014) after controlling for depression (Valiente et al., 2014). One study found support for a directional pathway from negative cognition (low self-esteem, self-critical thinking, and extreme negative beliefs about the self and others) and depressed mood to paranoid symptoms, but no support of directional pathways leading from paranoia to negative cognition (or from paranoia to depressed mood) (Fowler et al., 2012). In an experimental study, nonclinical individuals from the general population were exposed to a computer-generated 3D environment that elicited paranoid thoughts in a proportion of them. In line with the cognitive model, emotional disturbance, negative views of the self, and a greater tendency to experience perceptual anomalies predicted paranoid ideas (Freeman et al., 2005). Negative beliefs about the self and others have also been found to account for the association between trauma and paranoia (Fisher et al., 2012; Gracie et al., 2007).

5.3.2. Beliefs about others

Smith et al. (2006) found that negative beliefs about others were one factor that corresponded to more severe persecutory delusions and more preoccupation and distress about the delusions in individuals with schizophrenia. Beliefs of inferiority to others (Collett et al., 2016) and beliefs that others are more omnipotent and malevolent than the self (Paget and Ellett, 2014) correlate with persecutory delusions. In addition, persecutory delusions may involve specific beliefs about the persecutor. For instance, Paget and Ellett (2014) found that beliefs about the persecutors' omnipotence predicted persecutory delusion conviction. Further, more negative views of others (e.g., as hostile, harsh, nasty, untrustworthy) correlate with paranoia in clinical (Valiente et al., 2014) and nonclinical samples (Fowler et al., 2006; Gracie et al., 2007) after accounting for depression, and this relationship may be present in non-diagnosed children with emotional and behavioral problems (Noone et al., 2015). Moreover, negative beliefs about others (along with negative beliefs about the self) mediated the link between trauma and paranoia among students (Gracie et al., 2007), and negative beliefs about others significantly and fully mediated the relationship between loneliness and paranoia among individuals with schizophrenia (Lamster et al., 2017). There was evidence supporting a directional pathway from negative cognition (which included negative views about others) and depressed mood to paranoid symptoms but no evidence in support of directional pathways leading from paranoia to negative cognition or from paranoia to depressed mood (Fowler et al., 2012).

5.3.3. Beliefs About the Future

Depressed individuals, depressed individuals with persecutory delusions, and non-depressed individuals with persecutory delusions rated future negative events as happening more frequently than did unaffected controls (Kaney et al., 1997). In a virtual reality study on individuals with an at-risk mental state, interpersonal sensitivity (feeling vulnerable in the presence of others due to the expectation of criticism or rejection) was one of the factors predicting persecutory ideation in the virtual reality environment (Valmaggia et al., 2007). Additionally, non-psychotic individuals with depression and individuals with schizophrenia, schizoaffective disorder, or delusional disorder who experienced paranoid delusions were found to believe that pleasant things would not happen to them. This pessimistic thinking was not present in individuals whose paranoid delusions were in remission (Corcoran et al., 2006). In a sample of individuals with schizophrenia, depression, or healthy controls, negative self-esteem and expectations of negative events strongly and independently correlated with paranoia in all groups. Moreover, predictions of future negative events and negative self-esteem accounted for more than half of the sample variance in paranoia scores (Bentall et al., 2008). Recent findings highlight how paranoia correlates with anticipation of future threatening events among individuals with delusions (Freeman et al., 2013) and victimization among nonclinical individuals (Jack and Egan, 2016).

5.4. Empirical basis for cognitive model of voices

5.4.1. Beliefs About Self

Among individuals with schizophrenia, negative views of the self and low self-esteem correlate with voices (Barrowclough et al., 2003; Close and Garety, 1998) and negative views correspond to hearing voices that are more distressing (Paulik, 2012; Smith et al., 2006), negative (Close and Garety, 1998; Smith et al., 2006), and severe (Smith et al., 2006). Voices also correlate with more negative views of the self and less positive views of the self (Gracie et al., 2007; Noone et al., 2015) among nonclinical samples. Beliefs about voices can also reflect beliefs about the self. For example, Thomas et al. (2015) determined that negative beliefs about the self significantly predicted negative beliefs about voices (malevolence, omnipotence, metaphysical beliefs, and loss of control) in a sample of individuals with schizophrenia or schizoaffective disorder.

5.4.2. Beliefs about others

Individuals with schizophrenia may believe their voices are malevolent (Baumeister et al., 2017; Chadwick et al., 1994; Thomas et al., 2015), benevolent (Chadwick et al., 1994; Thomas et al., 2015), omnipotent/powerful (Baumeister et al., 2017; Thomas et al., 2015), omniscient (Paulik, 2012), external and real (Garrett and Silva, 2003), are of higher social rank and power than the individual (Birchwood et al., 2004; Paulik, 2012), or indicate that they are losing control or are going mad (Morrison, 1998). Nonclinical voice hearers may believe the voices indicate that they have done something bad or are a bad person (Morrison et al., 2002).

A systematic literature review by Paulik (2012), including 13 studies published from 2000 to 2010, highlighted the importance of interpersonal relationships in the experience of voices. They found that voice

hearers, who perceived themselves to be of low social rank or inferior relative to others, reported they also felt inferior in relation to their voice and behave accordingly.

Because individuals see voices as other than themselves, the beliefs about voices are related to beliefs about others. For example, among clinical samples, distress correlates with believing that the voices are malevolent, omnipotent, uncontrollable, dangerous (Baumeister et al., 2017), or of higher social rank and power than the individual (Birchwood et al., 2004). Among nonclinical individuals, distress correlates with believing that the voices indicate that the individual has done something bad, is a bad person, or is possessed (Morrison et al., 2002). Among individuals with schizophrenia, fear and anger correlate with believing the voices are malevolent (Birchwood and Chadwick, 1997), and depression correlates with believing the voices are malevolent (Andrew et al., 2008). Furthermore, a review concluded that cognitive appraisals of voices (e.g., the intent of the voice, power/omnipotence, omniscience, and control) are more closely linked to the affective and behavioral responses to the voices than the voice severity or content (Paulik, 2012).

6. Modes

The concept of mode is useful for understanding times when individuals with schizophrenia are doing better and worse. The mode is an integrated, situation specific system involving cognition (beliefs and attitudes), affect, motivation, and behavior. It is useful to distinguish an adaptive mode from a "patient" mode. The adaptive mode is active when individuals are playing a game, listening to an orchestra, or teaching a class. In individuals with schizophrenia who seem to face a more challenging course of illness, however, the "patient" mode is dominant and spreads across all situations. In a hospital unit, the prevalent cognition consists of a medley of attitudes such as; I am inadequate, broken, worthless, undesirable, useless, alone, etc. If faced with a task, the expectations are of social failure. Therefore, the motivation is to avoid, retreat, escape, and the resulting behavior is to withdraw. Each component is associated with unpleasant affect; particularly the expectations of failure and after an attempt at a task is made, the interpretation is failure. Performance is evaluated and interpreted in terms of the overlying attitude, which is "I am a failure." The goal of therapy is to engage the individual and structure the experience in such a way that the individual will interpret it as a success rather than a failure; experiencing positive rather than unpleasant affect. At times individuals can shift from one mode to another. Individuals who perceive that they are unfairly treated can become angry and strike out against the offender but then relapse into the "patient" mode of inactivity.

We have noticed on numerous occasions that even when individuals' delusions are very active they can at times show personalities that are in stark contrast to the personalities when they are in a "patient" mode (negative and/or positive symptoms). During special events on the unit, for example, they can sing and dance, play games, or act in plays so effectively that they are not distinguishable from the staff. Of course, the therapeutic program is geared to activating these aspects of the personality, when the individuals are engaged in something meaningful or that has purpose. The "patient" mode is no longer apparent. In due course, the laughing and making jokes, as well as the rest of the adaptive mode is activated for longer periods, until the individual can remain in this mode. To promote generalization, one very effective strategy is drawing conclusions (cognitive restructuring) to strengthen positive beliefs after positive corrective experiences.

7. Discussion

Both negative and positive symptoms can be analyzed within the framework of the cognitive model and specifically the cognitive triad. The content of both sets of symptoms can be traced to the negative cognitive triad. The negative symptoms stem directly from the dysfunctional attitudes associated with the negative cognitive triad, which are understandable in terms of normal cognitive processing. The positive symptoms, however, diverge from the ordinary cognitive processing and its content is transformed into unrealistic or irrational ideation.

For the most part, the literature on the cognitive approaches to schizophrenia (as well as other disorders) has focused on the negative beliefs, attitudes, etc. Nonetheless, there are sets of positive adaptive beliefs, which are the opposite of the negative dysfunctional beliefs. Thus, parallel to negative dysfunctional beliefs revolving around inadequacy, unworthiness, and weakness, are sets of positive adaptive beliefs involving adequacy, worthwhileness, and strength. Both positive and negative beliefs form the content of schemas. To the extent that positive schemas are activated, there is a corresponding deactivation of negative schemas.

It is important to utilize the cognitive model of delusions and hallucinations in formulating a case and developing a treatment plan. When the specific interactions leading to an individual's sense of inferiority are not apparent, the meanings behind the delusions and hallucinations can be used to understand the individual's reactions. For example, a woman who believed that her family was poisoning her also had a steady stream of voices criticizing her, based on her interactions with the family. The formulation focused on her sense of inferiority and vulnerability in relationship to members of her family. She started to bake pastry for other individuals on the unit and gradually moved to instructing them. She then felt confident enough to cook a meal for her family. As she moved from inactivity, to cooking and instructing others, her ideas about being poisoned and the critical voices gradually diminished. Following successful preparation of meals for her family, she no longer reported her delusions and voices. She was now in the adaptive mode.

In order to develop effective treatment interventions, a thorough understanding of the mechanisms behind the development of schizophrenia is needed. Thus, we have used our understanding of the cognitive model and cognitive triad to guide our treatment interventions for this population. In treating the severely mentally ill, we have noticed that as the individuals become more symptomatic, there is an increased activation of the negative beliefs. On the contrary, when the individuals start to improve, there is an increasing activation of the positive beliefs. With improvement, the negative beliefs may gradually become totally deactivated.

Our observation of the activation of positive beliefs has led to the formulation of Recovery-Oriented Cognitive Therapy which focuses on the positive aspirations, strengths, and values of the individual. In theoretical terms, the adaptive mode gradually replaces the "patient" mode.

Problems occur after the individual is rooted in the community and subject to the kinds of stresses and strains that activated their disorder in the first place. It is important, consequently, to train the individuals in the use of cognitive skills to prevent unpleasant situations from becoming stressors, for example looking at the evidence and drawing a conclusion, considering alternative explanations, and examining the logic behind a conclusion. The individual's reasoning powers are strengthened, making him/her less vulnerable to negative situations.

The research to date has concentrated on the negative content of the individual's beliefs, but little attention has been paid to positive adaptive beliefs. In clinical trials in particular, it is important to assess the roles of positive, as well as negative beliefs. As the individual improves, the progress can be attributed to the increased activation of positive adaptive beliefs, more so than the deactivation of negative dysfunctional beliefs. Of course, this has to be demonstrated in clinical or experimental studies nationwide.

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