Cognitive Remediation Therapy, Narrative Coherence, and the Psychosocial Functioning of Persons with Schizophrenia and other Psychotic Disorders: A Case Study

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ABSTRACT

Schizophrenia is one of the most prominent forms of mental illness, and has a tremendously debilitating impact not only on the lives of persons with this disorder, but also society. In addition to the symptoms of schizophrenia and others psychotic disorders such as hallucinations and delusions, there are also associated cognitive, language, and functional deficits that exacerbate the debilitating nature of these conditions. This study explored the association between Cognitive Remediation Therapy (CRT) and the neurocognitive skills (such as attention and memory), narrative coherence (ability to speak in a logical, coherent manner) and psychosocial functioning (ability to engage in activities of daily living such as traveling independently on public transportation) of persons with schizophrenia and other psychotic disorders. This study also explored the benefits and barriers to conducting inpatient research regarding effective treatment for this population. The pre- and post-test performance on neuropsychological, narrative, and functional assessments of eight participants (in-patients at Westborough State Hospital, Westborough Massachusetts) with a psychotic disorder who completed fifty hours in a computer-based cognitive rehabilitation program were analyzed. Results did not show statistically significant differences from pre- to post-test performance; however, a case study of one of the participants highlighted the narrative and functional improvements this person experienced after receiving cognitive remediation. Additionally, the steps and challenges to conducting inpatient research with this particular population were illuminated. These outcomes highlight the possible benefits of using cognitive remediation therapy to treat the cognitive deficits of schizophrenia, and the organizational preconditions of institutions that compound the barriers to clear outcomes when studying this population.
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CHAPTER 1
Development of the Research Question

*Background*

“It all started when I was in the ninth grade, when Shalom first appeared in my life. At first, the information was about how special I was, but slowly these messages began taking a darker turn” (Davis, 2005, p. 299). Gwen Davis, a person with schizophrenia, recounted this recurring hallucination experienced since adolescence. Hallucinations are one of many symptoms associated with schizophrenia.

Schizophrenia is a chronic and persistent mental disorder that is the most debilitating psychiatric condition worldwide (Hogarty, Flesher, Ulrich, Carter, Greenwald, Pogue-Geile, et al., 2004). According to the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition-Text Revision (DSM-IV-TR), schizophrenia affects one percent of the U.S. population and fifty-one million people worldwide (American Psychiatric Association, 2000). The median age of onset for the first episode of psychosis is early twenties for men and late twenties for women (American Psychiatric Association, 2000). Relatives of individuals with schizophrenia have a risk for schizophrenia that is ten times greater that the general population, and they may have increased risk for other psychotic disorders (American Psychological Association, 2001). There are also socioeconomic factors that confound the debilitating effects of schizophrenia. Draine, Salzer, Culhane, & Hadley (2002) found that thirty percent of homeless persons have schizophrenia. In the U.S., increasing numbers of persons with schizophrenia are arrested and populate the jails (Draine et al., 2002). Moreover, persons with schizophrenia have a twenty to fifty percent higher likelihood than the general population to commit suicide (Pinikahana,
Happell, & Keks, 2003). The tremendous impact of schizophrenia on those who are diagnosed with this disorder as well as their family members and the larger society has led to extensive and varied research in an effort to identify effective, economical treatment options.

The DSM-IV-TR defines schizophrenia as a condition, lasting at least six months, that includes at least one month of active-phase symptoms, that is, two or more of the following: delusions, hallucinations, disorganized speech, grossly disorganized or catatonic behavior, and/or negative symptoms (affective flattening, alogia, avolition) (American Psychiatric Association, 2000). The general course of schizophrenia is chronic, often beginning with the manifestation of prodromal symptoms, for example social withdrawal or deterioration in daily functioning, followed by the appearance of active-phase symptoms, which occur over a lifetime (American Psychiatric Association, 2000; Lewis & Lieberman, 2000). Schizophrenia can be further categorized based on subtypes, which are defined by the predominant symptomology: paranoid, disorganized, catatonic, undifferentiated, and residual (American Psychiatric Association, 2000). The symptoms of schizophrenia are classified as positive and negative. Positive symptoms are characterized by an excess or distortion of function, whereas negative symptoms signify a loss of functioning (American Psychiatric Association, 2000). For example, hallucinations, delusions and disorganized speech are considered positive symptoms whereas restricted facial expressions or affective flattening, and poverty of speech or alogia are classified as negative symptoms.

In addition to the aforementioned symptomatology, schizophrenia has associated neurocognitive deficits that have been linked to specific parts of the brain (Lewis & Lieberman, 2000). Structural and functional neurocognitive abnormalities have been found in the brains of persons with schizophrenia, specifically in the frontal and temporal regions (Marvel, Schwartz,
& Keren, 2004; Walder, Seidman, Cullen, Su, Tsuang, & Goldstein, 2006). These neurocognitive deficits often present as difficulties with neurocognitive functions such as attention, memory, and language (Goldberg, Aloia, Gourovitch, Missar, Pickar, & Weinberger, 1998; Walder et al., 2006). Silver and Feldman (2005) found evidence that attention and memory, that is sustained attention and working memory, share the same neural mechanism, which is impaired in persons with schizophrenia. Additionally, it has been found that attention and memory deficits may present in early childhood and may be genetic indicators of schizophrenia (Erlenmeyer-Kimling, Rock, Roberts, Janal, Kestenbaum, Cornblatt, Adamo, & Gottesman, 2000). The language deficits found in persons with schizophrenia are linked with the superior temporal gyrus and Broca's area, which are both areas of the brain that support the production and processing of language (Kircher, 2005; Walder et al., 2006). Language deficits can include derailment or loose word associations, linguistic disorganization or word salads, and neologisms or using nonsense words (American Psychiatric Association, 2000). These language deficits can lead to impaired social functioning such as difficulty maintaining social contact with others (Kumar & Debruille, 2004). Thus, many persons with schizophrenia may feel disconnected from others in their environment as well as themselves (Schneider, Scissons, Arney, Benson, Derry, Lucas, et al., 2004). Given the adverse effects of neurocognitive deficits such as attention, memory, and language as well as the symptoms of schizophrenia, exploration of treatment to attenuate these deficits and symptoms is warranted.

The treatment of mental illness has evolved over several decades. Beginning in the 1950's, research revealed that mental health problems were more common than previously thought. Increases in outpatient mental health services and the development of psychototropic
medications led to the emergence of mental health services as a separate and viable aspect of health care (Cooper & Gottlieb, 2000). Currently, mental health services provide a variety of treatments that allow many persons with mental illness to improve their daily functioning and socially connect to their environment; in other words, to increase their psychosocial functioning. Specifically, with cases of schizophrenia that are chronic and persistent, treatment can provide substantial assistance with reducing life-constricting symptoms. McGrath and Emmerson (1999) found that the dysfunction associated with symptoms of schizophrenia is significantly lessened with treatment.

Several treatments are used to reduce symptoms and increase the functioning of persons with schizophrenia. One of the most commonly used treatments, anti-psychotic medication, has been shown to significantly reduce symptoms in persons with schizophrenia (McGrath, & Emmerson, 1999; Ponde de Sena, Santos-Jesus, Miranda-Scippa, Castro Quarantini, & Reis de Oliveira, 2003; Rosenheck, 2005; Zink, 2005). Anti-psychotic medications are classified into typical/conventional or atypical, the latter being the newer medications. Although the effect of anti-psychotic medications on positive and negative symptoms are widely noted, there is limited evidence as to whether medication positively effects the neurocognitive deficits associated with schizophrenia (McGrath, & Emmerson, 1999; Ponde de Sena et al., 2003; Rosenheck, 2005; Zink, 2005).

Psychosocial interventions such as vocational rehabilitation programs, case management and family education constitute another class of treatment that has been found to improve the psychosocial functioning of persons with schizophrenia by enhancing gainful employment opportunities (McGrath & Emmerson, 1999). Such interventions may indirectly impact the
neurocognitive deficits found in schizophrenia but are not geared to provide direct treatment of these deficits. In other words, these interventions often include teaching direct skills to increase psychosocial functioning as opposed to specific remediation of the cognitive structures that underlie these skills. Thus, psychosocial rehabilitation provides supportive services to improve patients' daily functioning, as with psychotropic medications, psychosocial interventions do not target the basic neurocognitive structures that underlie functional skills. Given that these commonly used treatments for schizophrenia are not specifically directed at attenuating the associated neurocognitive deficits, effective interventions that can directly target neurocognitive structures are important. As this discussion moves towards treatment that can directly impact neurocognitive functioning, psychotherapy becomes relevant.

Psychotherapy is a widely used form of treatment for mental health issues in which an established professional relationship between a qualified clinician and a patient is utilized to facilitate therapeutic change (Glick, 2004). Research has substantiated psychotherapy as an effective treatment for schizophrenia (Barrowclough, Haddock, Tarrier, Lewis, Moring, O'Brien, et al., 2001; Glick, 2004). Specific types of psychotherapy, namely Cognitive Rehabilitation Therapy (also referred to as Cognitive Remediation Therapy) and Cognitive Behavior Therapy, have been used to treat schizophrenia and have been shown to result in significantly increased psychosocial and cognitive functioning (Daniels, 1998; Hogarty et al., 2005; Sensky, Turkington, Kingdom, Scott, Siddle, O'Carroll, & Barnes, 2000; Tarrier, Yusupoff, Kinney, McCarthy, Gledhill, Haddock, & Morris, 1998; Wykes, Brammer, Mellers, Bray, Reeder, Williams & Corner, 2002). Lysaker, Lysaker and Lysaker (2001) have examined the use of psychotherapy in the treatment of persons with schizophrenia and purport that psychotherapy can attenuate
disorganized speech, a language deficit associated with schizophrenia, such that it improves ability to converse in a logical, coherent manner. Lysaker, Lysaker, and Lysaker have referred to this specific ability as “narrative coherence” and have conducted research that found that psychotherapy increases the narrative ability of patients. This is an important finding that establishes psychotherapy as a viable treatment for the language deficit associated with schizophrenia.

Cognitive Remediation Therapy (CRT) includes the use of neurocognitive rehabilitation to improve the neurocognitive abilities of persons with schizophrenia (Seltzer, Cassens, Ciocca, O'Sullivan, 1997). CRT often involves repeated exercises that relate to particular neurocognitive functions. For example, an exercise to increase concentration would be listening to a tape recording of someone talking and pressing a button when certain words are heard. Seltzer et al. (1997) found increased productive activity to be an outcome of a program which provided CRT to patients with schizophrenia. This result provides evidence of the benefits of CRT with regard to improved functional outcomes. Overall, the aforementioned studies have laid the foundation for psychotherapy as a treatment that improves neurocognitive functioning in persons with schizophrenia. This line of research has opened a portal to further explore whether CRT can not only improve neurocognitive and psychosocial functioning, but whether CRT can improve the specific neurocognitive function of language, further defined as narrative coherence.

The existing research regarding the effectiveness of therapy as a treatment for schizophrenia has been conducted in both inpatient and outpatient settings (Hogarty et al., 2005; Greenwood, Landau, & Wykes, 2005; Kurtz, Seltzer, Shagan, Thime, & Wexler, 2007; Reeder, Smedley, Butt, Bogner, & Wykes, 2006; Seltzer et al. 1997). However the precise nature of
conducting such research in a hospital setting is not clear in the literature. Qualitative
information can help to identify appropriate research designs for exploring treatment
effectiveness. Thus, there is a valuable opportunity to explore the quality and nature of
cconducting schizophrenia research regarding treatment effectiveness in a hospital setting.

Description of the problem

Pharmacological treatment has been extensively used to treat schizophrenia and other
psychotic disorders; however, there is limited evidence regarding the effects of these treatments
on the associated neurocognitive deficits. Additionally, it has been established that the cognitive
impairment associated with schizophrenia has pervasive debilitating effects on psychosocial
functioning (Gioia, 2006; see also Daniels, 1998; Hogarty et al., 2005; Lysaker, Lysaker, &
Lysaker, 2001; Sensky et al., 2000; Tarrier et al., 1998; Wykes et al., 2002). Lewis and
Lieberman (2000) have asserted that the prognosis for persons with schizophrenia is best
predicted by degree of cognitive impairment. This assertion would lend support to the
therapeutic focus on treatment that can remediate cognitive impairment. Research has
established the effectiveness of psychotherapy, and more specifically CRT, as a treatment
intervention to improve neurocognitive functioning of persons with schizophrenia (Hogarty et
al., 2004; Medalia & Richardson, 2005; Trower, Birchwood, Meaden, Byrne, Nelson, & Ross,
2004; Wykes et al., 2002). Research on CRT has been focused on the general improvement of
functional outcomes for persons with schizophrenia. However, research has not sufficiently
focused on whether CRT can specifically improve the neurocognitive function of language,
which has been measured and defined by Lysaker, Lysaker, and Lysaker as Narrative Coherence,
the ability to express oneself in a logical, coherent manner. Moreover, whether cognitive
remediation of neurocognitive structures and improved Narrative Coherence of persons with schizophrenia are associated with increased psychosocial functioning is unclear. Given that language is an integral aspect of communication, and communication is, in turn, a large part of psychosocial functioning, this study seeks to explore these associations.

There is also limited literature that explores the benefits and barriers to conducting research using a particular research design to study this population in a particular setting. Exploring these factors when studying inpatients with schizophrenia can provide valuable guidance to future research. Thus, this study also seeks to explore the quality and nature of conducting research on treatment effectiveness with an inpatient population with schizophrenia.

Statement of purpose

The purpose of this study was to conduct a retrospective exploration of the association between Cognitive Remediation Therapy (CRT) and Narrative Coherence and psychosocial functioning in persons with schizophrenia and other psychotic disorders. Using a battery of assessments including a narrative coherence assessment, neuropsychological assessments, and an assessment of psychosocial functioning, the effects of CRT on the neurocognitive functioning, Narrative Coherence, and psychosocial functioning of persons with schizophrenia and other psychotic disorders was investigated. Thus, this study sought to contribute to understanding the role of CRT in the functional outcomes of persons with schizophrenia and other psychotic disorders, and to explore the benefits and barriers to conducting research regarding treatment effectiveness with this population in a state hospital setting.

Theoretical perspectives

This study was grounded in theoretical perspectives that identify the neurocognitive and
ecological aspects of human functioning. From an evolutionary standpoint, the human brain can
be understood as a complex system with regulatory mechanisms that underpin functioning
(Geary, 2005). Given the intricacy of these regulatory systems, they can be susceptible to
breakdown. The changing demands of an evolving society may also contribute to the
susceptibility of regulatory systems. Thus, mental illnesses such as schizophrenia may be the
result of systemic breakdowns in complex neural functions. Persons with schizophrenia then
face the challenge of maneuvering through daily life in a changing social system with inherent
cognitive dysfunction.

As it relates to schizophrenia, the evolutionary model of neurocognitive functioning is
further illuminated by the ecological model, which highlights the interdependent relationship
between individuals and contextual systems (McLaren & Hawe, 2005). From an ecological
perspective, humans are understood with greater clarity through acknowledgment of the various
social contexts with which they interface. For a person with schizophrenia, the associated
cognitive deficits challenge his/her ability to effectively and efficiently participate in social
systems, and thus, limits the person's psychosocial functionality. It is possible that increasing the
neurocognitive functioning of this person may also increase his/her overall functional outcomes.
Such a result would not only be beneficial to the individual, but to each social system in which
the individual may be better able to participate. From both the evolutionary and ecological
perspective, this study seeks to explore ways in which persons with schizophrenia can become
more capable of adaptively participating in the changing world in which they live through
increased functional outcomes.
Summary

Schizophrenia has become the leading cause of psychiatric disability worldwide and continues to consume enormous personal and economic resources (American Psychiatric Association, 2000). The direct costs of schizophrenia, for example inpatient and outpatient treatment, jail, medication, etc., is estimated to be nineteen billion dollars annually (Weiden & Olfson, 1995). When the indirect cost of schizophrenia to society are included, that is, lost time from work for patient care, social services, public assistance, etc., the cost rises to approximately sixty-five billion dollars (Schizophrenia.com, 1996). Moreover, the National Institute of Mental Health (2006) estimates that approximately ten percent of persons with schizophrenia prematurely die by means of suicide (NIMH, 2006). The extensive effects of schizophrenia to society, families and individuals warrant continued efforts to address this debilitating disease through more effective education, research, and clinical practice. While there are established treatment approaches regarding positive symptoms, negative symptoms and functional skills, the emergence of Cognitive Remediation Therapy provides hope for improving the neurocognitive deficits of schizophrenia as well.

Research questions

This study focused on the following research questions:

A. Research Question 1: Is Cognitive Remediation Therapy associated with increased neurocognitive functioning in persons with schizophrenia?

Research Question 2: Is Cognitive Remediation Therapy associated with increased narrative coherence in persons with schizophrenia and other psychotic disorders?

Research Question 3: Is Cognitive Remediation Therapy associated with increased
Research Question 4: Is increased narrative coherence associated with increased psychosocial functioning in persons with schizophrenia and other psychotic disorders?

B. Research Question 1: What are the benefits and barriers of using a traditional research design to study treatment outcomes with an inpatient population with schizophrenia in a state hospital setting?

Operational definition of terms

Current Evaluation of Risk and Functioning Revised (CERF-R): an instrument that measures psychosocial functioning skills and risk behaviors (Barry, Lambert, Vinter, & Fenby, 2007).

Cognitive Rehabilitation Therapy/Cognitive Remediation: A type of therapy that utilizes structured exercises to enhance cognitive functions such as attention, concentration, memory, and problem solving skills with the goal of increasing cognitive functioning (Wykes, Reeder, Williams, Corner, Rice, & Everitt, 2003). An example of CRT would be repeatedly presenting a patient with problem solving dilemmas and appropriate courses of action to increase his/her decision making skills or repeated list memorization exercises to increase memory.

Cognitive Behavior Therapy: A type of therapy that utilizes an integrated restorative focus on cognitive processes and guided behavioral modifications to assist a client with achieving therapeutic goals to increase both cognitive and behavioral skills (Tarrier et al., 1998). An example of Cognitive Behavior Therapy would be the use of behavior analysis, a technique which entails the therapist guiding a patient through a recount of a recent situation and highlighting the manner in which thoughts, feelings, behaviors and
consequences connect. This connection is utilized to promote achievement of preferred future outcomes.

**Delusions:** A symptom, often of schizophrenia and other psychotic disorders, characterized by an erroneous belief usually involving misinterpretation of perceptions or experiences. For example, believing that one is God (American Psychiatric Association, 2000).

**Hallucinations:** A symptom, often of schizophrenia and other psychotic disorders, characterized by a perceptual experience, occurring in the absence of external stimuli, which can occur in any sensory modality (auditory, visual, etc.) (American Psychiatric Association, 2000). For example, hearing the U.S. president and vice president having a conversation in the White House (in the absence of an external source such as television or radio or any other viable access).

**Narrative Coherence:** Narrative coherence refers to one's ability to express oneself in a manner that is consistently logical, plausible and sequential such that others are able to understand (Lysaker, Lysaker, & Lysaker, 2001). The degree of coherence will be measured with the use of the Narrative Coherence Rating Scale (NCRS). An example of narrative coherence would be:

“Last week I was leaning against a wall and the day was so hot, I thought I saw a bush on fire. It was too hot to eat anything that needed to be heated, so I ate a cold cut sandwich.”

**Narrative Incoherence:** Narrative incoherence refers to language that lacks logical, plausible, and sequential content (Lysaker, Lysaker, & Lysaker, 2001). An example to narrative incoherence would be:

“Last week when I walked up the wall, I saw Moses was outside my window and he lit a kite on
fire. The car wasn't well cooked so I had to reheat it in the sandwich.” Narrative incoherence should be distinguished from purposeful confabulation or exaggeration, as may occur when recapping a story and/or jokingly relating to others.

Narrative Coherence Rating Scale (NCRS): An instrument which examines the content of narratives in regards to the plausibility, richness of detail, and temporal sequencing (Lysaker, Lysaker, & Lysaker, 2001).

Neurocognitive functions: Brain activities that characterize ways to process information including memory, attention, language, and problem solving; these functions are associated with neural pathways in the brain (Wykes et al., 2002).

Neurocognitive deficits: Impairment in neurocognitive functions (Wykes et al., 2002).

Psychopharmacology: the use of medication to attenuate psychiatric symptoms. Antipsychotic medications are a class of medication commonly used in the treatment of schizophrenia (Meltzer, Park & Kessler, 1999).

Psychosocial functioning: refers to activities of daily living such as but not limited to personal hygiene, nutrition, work, and interpersonal skills (Gershberg, 2005).

Psychotherapy: an established professional relationship between a qualified clinician and a patient to effect therapeutic change. For example, cognitive behavior and cognitive therapy are types of therapy that are based on particular theories and utilize specific intervention to promote therapeutic change (Glick, 2004).

Schizophrenia and other Psychotic Disorders: As defined by the Diagnostic and Statistical Manual of Mental Disorder IV TR, disorders that include psychotic symptoms as a prominent aspect of their presentation such as schizophrenia, Schizoaffective disorder,
Delusional Disorder, Schizophreniform Disorder, Brief Psychotic Disorder, Shared Psychotic Disorder, Psychotic Disorder due to a General Medical Condition, Substance-Induced Psychotic Disorder and Psychotic Disorder Not Otherwise Specified. These disorders include symptoms such as hallucinations, delusions and disorganized behavior and speech (American Psychiatric Association, 2000). The diagnosis of a psychotic disorder is the primary criteria for this study, given that disorganized speech can be a feature of any psychotic disorder.
CHAPTER 2
Review of the Literature

This study focused on the association between cognitive remediation therapy, narrative coherence and the psychosocial functioning of patients with schizophrenia. Specifically, this study sought to examine whether the specific symptom of disorganized speech can be attenuated to produce narrative coherence with the use of cognitive remediation therapy. In addition, the association between cognitive remediation and psychosocial functioning was examined. In an effort to elucidate the constructs of this study, this chapter will review the literature relevant to the symptomatology, impact and treatment of schizophrenia, as well as the types of psychotherapies used to address these symptoms of schizophrenia.

Course of schizophrenia and other psychotic disorders

As outlined in chapter one, schizophrenia has become the most serious psychotic disorder and affects one percent of the U.S. population (American Psychiatric Association, 2000). Longitudinal research has found that the long-term effects of schizophrenia typically include dysfunction in major life areas such as interpersonal relations, self care, education and employment, often resulting in chronic hospitalization, chronic disability, and lack of gainful employment (American Psychiatric Association, 2000; Lewis & Lieberman, 2000). Furthermore, these marginalizing effects of schizophrenia often lead to substance abuse, homelessness and involvement in the legal system. In fact, there is a high prevalence of inmates with mental disorders in jail in addition to rates of homelessness, specific to schizophrenia, at approximately thirty percent (Draine et al., 2002). While it is noteworthy that these outcomes are likely attributed to more that a diagnosis of mental illness, these are debilitating
circumstances that persons with schizophrenia often endure throughout their lifetime (Draine et al., 2002). Additionally, there is a percentage of individuals who do not appear responsive to treatment, often referred to as having symptoms of schizophrenia that are treatment resistant (Sensky et al., 2000). Despite these findings, the potential for recovery remains a viable expectation for most persons diagnosed with this disorder given the variety treatment options available and the wide body of research denoting positive outcomes for persons with schizophrenia (Barrowclough, Haddock, Tarrier, Lewis, Moring, O'Brien, Schofield, & McGovern, 2001; Daniels, 1998; Glick, 2004; Hogarty, Flesher, Ulrich, Carter, Greenwald, Pogue-Geile, et al., 2004; McGrath, & Emmerson, 1999; P.H. Lysaker, Lysaker & Lysaker, 2001; Ponde de Sena et al., 2003; Rosenheck, 2005; Sensky et al., 2000; Tarrier et al., 1998; Wykes et al., 2002; Zink, 2005).

Symptomology and associated impairment

As previously outlined, a diagnosis of schizophrenia is given when a patient presents with a particular constellation of symptoms that have been present for at least six months, though often occurring over a lifetime (American Psychiatric Association, 2000). Research has confirmed binary classifications of these symptoms as positive and negative (Blanchard & Cohen, 2006; Cohen & Docherty, 2005; O'Leary, Flaum, Kesler, Flashman, Arndt, & Andreasen, 2000). Positive symptoms are characterized by the presence of symptoms and among the most prominent are hallucinations and delusions. Disorganized behavior and speech are also classified as positive symptoms (Cohen & Docherty, 2005). Negative symptoms refer to the absence of healthy characteristics, that is, flattened affect, avolition and anhedonia, which respectively refer to reduced capacity for facial expressiveness, motivation and the experience of
pleasure. In addition to these symptoms of schizophrenia, neurocognitive impairments in
neurocognitive processes, such as attention, memory, comprehension and production of speech,
and motor speed, have also been associated with schizophrenia and are evident in other psychotic
disorders as well (Greenwood et al., 2005; Tuulio-Henriksson, Partonen, Suvisaari, Haukka, &
Lonnqvist, 2004; American Psychiatric Association, 2000).

Of particular interest for this study is the symptom of disorganized speech. Speech
disturbances are a well documented symptom of schizophrenia (Walder et al., 2006; see also
Giampaolo, Donatella, Carcione, Dimaggio, & Semerari, 2006; Kircher, T. J., 2005; Kumar, &
Debruilli, 2004; Nicholson, Lenane, Singarachararlu, Malaspina, Giedd, Hamburger, et al.,
2000). This symptom refers to the propensity of persons with schizophrenia to speak in a
manner that is incoherent and illogical (Cohen & Docherty, 2005). Disorganized speech should
be distinguished from poverty of speech, which is considered a negative symptom. This
distinction is of importance given that this study is examining the coherence, plausibility and
logical sequencing of speech as opposed to the lack of speech.

Language is the culmination of a complex neurocognitive process, which includes
components such as processing of speech sounds, visual representation of words, awareness of
word meanings, grammar, and articulation (Walder et al., 2006). These processes are products
of particular regions of the brain, that is, the prefrontal cortex, superior temporal gyrus, and
Broca's area, which have been found to have structural and functional abnormalities in the brains
of persons with schizophrenia (Marvel, Schwartz, & Keren, 2004; Walder et al., 2006). On
measures of verbal expression, persons with schizophrenia consistently demonstrate language
dysfunction, with poor verbal expression across language components (Walder et al. 2006).
Disorganized speech and narrative coherence

While several neurocognitive mechanisms underlie language comprehension and production, the language impairment found in schizophrenia is thought to be primarily associated with semantic processing, that is, understanding word meanings and appropriate use of words based on meaning (Goldberg et al., 1998; Kumar & Debruille, 2004). Language impairment can be further understood as the improper use of word meaning in the context of the relational aspects of language; it is therefore experienced by the listener as disorganized speech (Goldberg et al., 2004). Disorganized speech is then understood to be the result of impaired semantic processing, which is integral to meaningful communication. It is from this perspective that this study will address the concept of Narrative Coherence.

The concept of Narrative Coherence was born out of dialogical research, which has long undertaken narrative analysis in an effort to shed light on the processes involved in communication (Frank, 2005). Blackman (2005) purports that the patient with schizophrenia may be unable to organize how they, as an individual, fit into their experiences. It is in this sense that narratives can be analyzed through examining the components of the narrative, semantic processing being one component, the dialogical self being another, and ultimately, how narratives can become incoherent.

The concept of narratives is also discussed in the narrative therapy literature. Nichols and Schwartz (2005) assert that the basis of narrative therapy is the role of subjective experience in narratives. This form of therapy, often used for treating families, is concerned with the deconstruction of unproductive stories and the reconstruction of productive ones (Nichols & Schwartz, 2005). In this manner, clinicians who practice narrative therapy are chiefly concerned
with narratives as a means and a measure of improved interpersonal relationships within the family context. Although narrative therapy is not the form of treatment that is of focus of this study, this form of therapy provides an understanding of how narratives, unproductive or otherwise, relate to interpersonal functioning. Thus, narrative therapy sheds additional light on how narratives can be influence by treatment.

The narrative ability of persons with schizophrenia is often marked by impoverished, implausible and/or poorly sequenced content (Lysaker, Davis, Eckert, Strasburger, Hunter, & Buck, 2005). Lysaker, Davis et al. have referred to the concept of Narrative Coherence, defined as one's ability to express oneself in a manner that is consistently logical, plausible and sequential such that others are able to understand. The following is an example of a dialogue between a therapist and patient that possessed an incoherent quality:

**Therapist:** How are you?

**Patient:** Within normal limits (laughs) really I can't say how I am because I am not a single-saying person. How come I can see a picture of my uncle and then sometimes it's a terrifying picture of my uncle and sometimes not. I can see a picture of a woman that is sometimes promiscuous, and that's part of being at risk. If you have a purpose in mine you can shut it all out. I want a firearm permit so if I'm taking my jog in the woods I can carry a gun. But if you are arrested and have a dog, the animal will go to waste. Why do I go to the gym? I've got credibility, so I'm interested? In sewing and home economics from the food point of view. One half of my effectiveness has been eroded (p. 406).

Considering the conceptualization of narrative coherence, the above paragraph
demonstrates communication that lacks organization and sufficient details for the therapist to accurately understand the meaning of the narrative. In contrast, the following paragraph provides an example of a narrative reflecting more coherent content (Lysaker & Buck, 2005):

Therapist: Since your mental illness what about you has changed and what has stayed the same?

Patient: Paranoia without medication. If I don't seem to take control over the situation or myself when entering a crowd of normal co-workers, for example, just being myself. That's all I want to do is just be [me]. I'm a happy person, even when things get bad, I learn how to front. If the question was asked, “Are you ok?” “I'm ok.” I may not be but mental illness is something you can't talk to just everybody about (p. 16).

This narrative is more reflective of personal agency, awareness of illness, and a sense of some level of connectivity to others (Lysaker, Davis, et al., 2005). These two narratives, occurring at the extreme ends of the narrative incoherence and coherence spectrum, provide a clear example of and distinction between these concepts.

A patient's ability to verbally construct their stories has an impact on treatment (Giampaolo et al., 2006). The therapeutic relationship between a patient with schizophrenia and mental health clinicians can be integral to the patient's recovery (Schneider et al., 2004). Thus, if a patient has difficulty organizing their narratives, it may be difficult for the therapist to understand the meaning of the narrative and for the patient to make sense of what he/she means and how he/she feels. This connection between language and therapeutic change creates a reasonable assumption that exploring ways to improve the narrative ability of persons with
schizophrenia carries with it the possibility of feasible improvement in psychosocial functioning within and beyond the therapeutic context.

*Psychosocial impact of schizophrenia*

The neurocognitive deficits associated with schizophrenia underlie many aspects of daily functioning (O'Leary et al., 2000). In other words, impairment in the neurocognitive functions of, for example, attention, memory, and language, may make it difficult for a person with schizophrenia to perform all the tasks associated with taking a trip to the bank, that is, taking care of personal hygiene, dressing in appropriate clothing, carrying personal identification and his/her bank card, having correct fare for transportation, and communicating with a bank teller. Therefore, impairment in neurocognitive functions can reduce the ability of a person with schizophrenia to function independently. These neurocognitive deficits may be related to, and also independent of, the negative and positive symptoms of schizophrenia which can create further functional difficulty, for example, experiencing lack of motivation and/or hallucinations while attempting to carry out the trip to the bank.

The social impact of schizophrenia can be felt by the individual who is diagnosed, as well as by family members and the larger society. Statistics indicate that sixty to seventy percent of persons with schizophrenia do not marry, and have limited social contact (American Psychiatric Association, 2000). While clinical and public understanding about schizophrenia has grown tremendously in the past few decades, empirical research continues to reflect the general public's perceived fear and rejection of persons with schizophrenia (Van Dorn, 2005). Van Dorn found that clinicians and family members were as likely as the general public to desire social distance from those with schizophrenia. Link, Struening, Neese-Todd, Asmussen, and Phelan (2001)
found that the stigma associated with mental illness is harmful to the self-esteem of many individuals who have serious mental illness. The social stigma such as the belief that people with mental illness are “hard to talk to,” “feel different from the way we do,” and are “unpredictable,” contributes to the social distancing and isolation that persons with schizophrenia experience (Draine et al., 2002).

The social isolation and deprived social interaction that often occurs with schizophrenia can exacerbate the symptoms of this condition. In particular, limited social interaction reduces the opportunity for individuals with schizophrenia to communicate, and thus, limits opportunities to develop and practice verbal skills.

*Treatment for schizophrenia*

As the social awareness, clinical understanding, and substantiating research about schizophrenia and other psychotic disorders increases, the array of available treatments multiply as well. Psychopharmacology, and more specifically, anti-psychotic medication, is commonly used to treat schizophrenia as there is overwhelming evidence of its efficacy (Buchanan, Ball, Weiner, Kirkpatrick, Gold, & McMahon, 2005; Meltzer, 1997; Ponde de Sena et al. 2003; Rosenheck, 2005; Smith, Chua, Lipetsker, & Bhattacharyya, 1996; Zink, 2005). Based on synaptic modulation of dopamine and other neurotransmitters, anti-psychotic medications reduce the symptoms of schizophrenia (Zymunt et al., 2002). In regards to the binary symptoms of schizophrenia, some anti-psychotic medications such as Risperidone and Clozaril appear to be associated with either reduced positive or negative symptoms respectively while others such as Olanzapine has been associated with a reduction in both positive and negative symptoms (Meltzer, 1997; Smith et al., 1996; Buchanan et al, 2005). Despite the efficacy of anti-psychotic
medications, high rates of medication non-compliance among persons with schizophrenia make it essential to explore other possible treatments (McGrath & Emmerson, 1999). Psychosocial interventions are another treatment often employed to treat schizophrenia as they have been found to improve medication compliance and general treatment outcomes (McGrath & Emmerson, 1999).

Psychosocial interventions include a range of social, educational, occupational, behavioral, and cognitive interventions geared to increase the quality of life of persons with schizophrenia (Barton, 1999; Bustillo, Lauriello, Horan, & Keith, 2001; McGrath & Emmerson, 1999). The symptoms of schizophrenia often result in debilitated functional ability such that treatment interventions beyond medications can greatly improve treatment outcomes by forming an interactive holding environment of comprehensive, wraparound services. Among the most prominent psychosocial interventions are assertive community treatment, vocational services, and family inclusion. These supportive interventions have been associated with improved daily psychosocial functioning for persons with schizophrenia as will now be outlined.

Bustillo et al. (2001) highlight assertive community treatment (ACT), which refers to a multidisciplinary team of providers that assist the patient with utilizing treatment services. The multidisciplinary team customarily includes treatment providers such as social workers, therapists, case managers, nurses, and psychiatrists to assist the patient with maintaining his/her connection with the multiple services they need to function in the community. While the role of medical staff such as psychiatrists and nurses is primarily concerned with psychopharmacological treatment, the role of other treatment providers, such as a case manager, is providing a link to community services. It may include, but is not limited to, checking the
patient's pill bottles to monitor medication compliance, assisting the client with completing housing applications, and accompanying the patient on a bus ride to assist him/her with learning how to use public transportation. Assertive community treatment can provide a supportive layer of services that can assist persons with increasing their functional adaptations and quality of life.

Vocational rehabilitation services have been found to be an effective treatment for schizophrenia. Approximately less than twenty percent of those with severe mental illness are able to obtain and maintain competitive employment, that is, independently hold a regular community job (Bustillo et al., 2001). Vocational services are an important aspect of keeping persons with schizophrenia as independently functional as possible. These services include employment programs overseen by rehabilitation agencies that provide supportive services such as vocational skills training and accompaniment to job sites by support staff such as job coaches. These supportive vocational services assist with increasing positive treatment outcomes and quality of life.

The inclusion of families is yet another intervention found to positively effect treatment outcomes of schizophrenia (Barton, 1999; Bustillo, et al., 2001; Dyck, Hendryx, Short, Voss, & McFarlane, 2002). More specifically, Dyck et al. (2002) found that engaging family members as an ally in treatment through providing information about schizophrenia as well as educating the family about techniques for improving communication, medication compliance and crisis intervention, often creates improved outcomes for the persons. In addition to outreach to individual families, psychoeducational family groups can be an effective method to involve families in the treatment of the patient (Bustillo et al., 2001; Dyck et al, 2002). These groups, which include multiple families, can augment family education through the interaction amongst
families who share similar experience and empathic understanding of the effects of schizophrenia.

There is an ample supply of literature that confirms the effectiveness of psychotherapy as a treatment option for schizophrenia and other psychotic disorders (Daniels, 1998; Glick, 2004, McGorry, Alison, Phillips, Hok Pan, Francey, Cosgrave, et al., 2002; Zygmunt, Olfson, Boyer, & Mechanic, 2002). More specifically, Cognitive Behavior Therapy is a well established psychotherapy used to treat schizophrenia (Barrowclough et al., 2001; Bustillo et al., 2001; Daniels, 1998; Haddock & Lewis, 2005; Sensky et al., 2000; Tarrier et al., 1998; Turkington, Kingdon, & Turner, 2002). Cognitive Remediation Therapy (CRT) has also been established as a viable treatment for psychotic disorders (Bell, Bryson, Greig, Corcoran, & Wexler, 2001; Hogarty et al., 2004; Kurtz et al., 2007; McGrath & Emmerson, 1999; Seltzer et al., 1997; Trower et al., 2004; Wykes et al., 2002; Wykes et al., 2003).

Therapy has also been found to augment the benefits of pharmacology such that the combination is more beneficial that either alone (Barrowclough et al., 2001; Glick, 2004; Haddock & Lewis, 2005; Hogarty et al., 2004; Sensky et al., 2000; Tarrier et al., 1998). Glick (2004) ventured a step beyond addressing the use of psychotherapy and pharmacology to advocate for the integrated use of these interventions such that both are actively discussed with the patient as complementary treatments. Glick asserts that either modality alone is insufficient and that integrated use of psychopharmacology and psychotherapy can quicken the attenuation of symptoms, reduce the probability of the recurrence of symptoms, and enhance psychosocial skills.
Cognitive Remediation Therapy

Of particular interest for this study, is the use of Cognitive Remediation Therapy (CRT) to address the neurocognitive deficits associated with schizophrenia. CRT has been utilized and substantiated as an effective intervention to increase the neurocognitive abilities of persons with schizophrenia (Bell et al., 2001; Hogarty et al., 2004; Kurtz et al., 2007; McGrath & Emmerson, 1999; Seltzer et al., 1997; Trower et al., 2004; Wykes et al., 2002; Wykes et al., 2003). This type of therapy utilizes structured exercises geared to enhance neurocognitive functions such as attention, concentration, memory, and problem solving skills with the goal of increasing social cognitive functioning. An example of an exercise used in CRT would be repeatedly presenting a patient with problem solving dilemmas and appropriate courses of action to increase his/her decision-making skills, or repeated list memorization exercises to increase memory. The use of CRT can provide persons with schizophrenia the needed functional skills to reduce the manifestation of symptoms and can be effectively used alongside pharmacological treatment to attain favorable treatment outcomes.

Research has showed that persons with schizophrenia treated with CRT have significant increases in brain activation in certain brain regions; particularly in the frontocortical areas of the brain (Wykes et al., 2002). Additionally, in a study that explored the durability of the effects of CRT six months after the treatment was withdrawn, the effects remained apparent (Wykes et al., 2003). This research supports the effective use of CRT in the treatment of neurocognitive dysfunction in persons with schizophrenia.

The Institute of Living in Hartford Connecticut established the schizophrenia Rehabilitation Program (SRP) in 1995 to address the poor functional outcomes of persons with
schizophrenia (Seltzer et al., 1997). SRP utilizes neurocognitive rehabilitation to improve the neurocognitive abilities of patients. Rehabilitation techniques require patients to repeat exercises that are related to particular neurocognitive functions. For example, one technique involves listening to a tape recording of someone talking and pressing a button when they hear certain words or answering questions about what they heard. This exercise is geared toward increasing concentration. Over time, the exercises become more complex such that the patient will listen to the tape for increasing amounts of time and the number of people speaking on the tape will increase. Other interventions include computer based exercises that also increase in level of difficulty over time. An example would be the Sequence Recall Digits Visual exercise, which was geared toward enhancing memory. In this exercise, the patient is presented with a series of two to ten digits displayed serially on the computer. After a delay, the patient is asked to select the numbers in the order they were presented (Seltzer et al., 1997).

A retrospective review of fifty-two patients in the SRP revealed outcomes that were stated in terms of increased productive and meaningful activity (Seltzer et al., 1997). Fifty-three percent held competitive jobs or were attending college, twenty-six percent held supported employment positions in the hospital and twelve percent held volunteer positions in the community. These results highlight the positive outcomes associated with cognitive remediation in regards to employment; however, outcomes associated with other aspects of psychosocial functioning, were not assessed.

Lewis and Lieberman (2000) have asserted that the prognosis for persons with schizophrenia is best predicted by degree of cognitive impairment. This contention lends support to the exploration of treatments that specifically target remediation of cognitive deficits.
Furthermore, it has been suggested that Narrative Coherence is more than an effect of recovery, but an outcome itself, such that the ability to converse may be seen as a direct representation of recovery (Lysaker, Davis et al. 2005). While the focus of Cognitive Remediation Therapy (CRT) research has been on the neurocognitive skills of attention and memory, the potential benefits of CRT on language have not been explored. Language is an integral aspect of communication, and thus, can have a large role in the psychosocial functioning of persons with schizophrenia. It is from this perspective that this study measured Narrative Coherence, as an outcome measure denoting and related to functionality.

Research Design

The existing literature has provided some information regarding the nature of inpatient research (Citrome, Epstein, Nolan, Tremeau, Elin, Roy, & Levine, 2008). Citrome et al. delineated some of the steps involved in inpatient research such as recruitment of patients and influencing factors such as discharges. Other studies have explored specific aspects of inpatient research such as the capacity of inpatients to give consent (Palmer, Dunn, Appelbaum, Mudaliar, Thal, Henry, Golshan, & Jeste, 2005; Carpenter, Gold, Lahti, Queern, Conley, Bartko, Kovnick, & Appelbaum, 2000). Other factors such as the appropriateness of particular research designs when conducting inpatient research has not been explored. Thus, this study sought to explore the benefits and barriers of using a traditional research design when studying an inpatient population with schizophrenia in a state hospital setting.

Summary

The general and specific understanding of the etiology, symptomology and life course of schizophrenia has grown concurrently with viable treatment options for the condition.
Pharmacological treatments as well as psychosocial interventions have been extensively utilized to improve the lives of persons with schizophrenia. In addition, the use of psychotherapy as a treatment for schizophrenia has increasingly been explored in empirical research and has been shown to improve specific symptoms associated with schizophrenia such as language impairment. Furthermore, their expressive ability, or narratives, is/are often illogical, containing implausible and poorly sequenced content. Research concerning Narrative Coherence has asserted that psychotherapy can be an effective treatment which reduces disorganized speech such that narrative expression can become more coherent with respect to structure and content (Lysaker, Clements et al., 2002; Lysaker, Davis et al., 2005; Lysaker, France, Hunter, & Davis, 2005; Lysaker, P.H., & Lysaker, J.T. 2002; Lysaker, P., Lysaker, J.T. & Lysaker, J.T., 2001; Lysaker, Wickett, Campbell, & Buck, 2003; Lysaker, Wickett, Wilke, & Lysaker, 2003).

This study sought to explore the use of CRT to treat the neurocognitive deficits associated with schizophrenia. Given that CRT is associated with increased neurocognitive functioning, namely language functioning, there may be benefits of CRT that are associated with Narrative Coherence. Narrative Coherence may be viewed as a measurable outcome of recovery, and thus, may be associated with other outcomes, namely psychosocial functioning. This study sought to contribute to existing research by exploring the association between CRT and improved neurocognitive functioning and Narrative Coherence, as well as the association between Narrative Coherence and improved psychosocial functioning. This study also explored the challenges of using a traditional research design when studying an inpatient population with schizophrenia.
CHAPTER 3

Methods

Overview of proposed study

This chapter provides a detailed description of the methods and instrumentation used in this study. This study focused on persons with schizophrenia and other psychotic disorders in an effort to discern whether Cognitive Remediation Therapy (CRT) can improve their neurocognitive skills and functioning, and to explore the barriers and benefits to using a traditional research design to study this population in a state hospital setting. The major research questions were:

A. Research Question 1: Is Cognitive Remediation Therapy associated with increased neurocognitive functioning in persons with schizophrenia?

Research Question 2: Is Cognitive Remediation Therapy associated with increased narrative coherence in persons with schizophrenia and other psychotic disorders?

Research Question 3: Is Cognitive Remediation Therapy associated with increased psychosocial functioning in persons with schizophrenia and other psychotic disorders?

Research Question 4: Is increased narrative coherence associated with increased psychosocial functioning in persons with schizophrenia and other psychotic disorders?

B. Research Question 1: What are the benefits and barriers of using a traditional research design to study treatment outcomes with an inpatient population with schizophrenia in a state hospital setting?

Participants

Participants of this study were patients with schizophrenia and other psychotic disorders
participating in the Cognitive Rehabilitation Program (CRP), which is part of a performance improvement (PI) project at Westborough State Hospital (WbSH) in Westborough, Massachusetts. The data was continuously collected over a two-year period during the time that patients participated in the PI project, which approximately began in February 2007. It was estimated that the number of participants with measurable data after a two-year period would be twenty-five; however, due to attrition factors, data for eight patients were available. Originally, the larger sample size was expected given the number of patients being referred to the CRP. However, the sample of patients with psychotic disorder has proven to be a difficult group to maintain in the study. Thus, the data-to-date was used to make preliminary judgments about the research questions for the present report. To wait longer for additional data would have caused additional issues. For example, if the study ran for a longer period, the length of time between the initial and follow-up visits, changes in professional staff and personnel of the institution as well as to the treatment that is prescribed for each participant, and changes in the participant's condition, might confound the effects of the study.

There was no age, gender, ethnic, or religious exclusionary criteria for participants. Demographic information for participants was provided by WbSH staff and included: age, sex, education level, attendance to rehabilitation programs, diagnosis, medication compliance, medication type, medication changes, and responses to the pre- and post-assessment measures. Permission to analyze the data was acquired through Northeastern University Internal Review Board (IRB) and the Department of Mental Health (DMH) Institutional Review Board (IRB). Additionally, participants were tracked via a coding system. Thus, information provided for this study was redacted by WbSH staff such that the participant's identity could not be deciphered or
reconstructed based on the demographic information provided.

*Instruments*

The instrumentation used to yield data for this study included assessments that measure neurocognitive functioning, narrative coherence, and psychosocial functioning, which were administered by WbSH staff as a part of the data collection for the CRP over the last two years.

The neuropsychological assessments included: the Brief Test of Attention (BTA), the Finger Tapping Test, the Hopkins Verbal Learning Test (HVLT), the National Adult Reading Test (NART), the Taylor Complex Figure, and the Digit Span subtest of the Wechsler Adult Intelligence Scale, Third Edition (WAIS III). All instruments were selected because each provided a measure of specific neurocognitive skills, and thus, a measure of each participant's overall cognitive functioning. Additionally, this battery of instruments provided a means of assessing component neurocognitive skills in a different format than the computer-assisted cognitive rehabilitation participants received in the CRP. In regards to normative data, all of the neuropsychological instruments included in this study have established reliability and validity as outlined below.

The BTA was selected because it provides a measure of the neurocognitive function of attention. The BTA is an auditory perception task that measures non-visual, sustained, and divided attention (Broman, West, Munoz, Bandeen-Roche, Rubin & Turano, 2004). Data indicates that the BTA has minimally acceptable test-retest reliability at .50, and criterion related validity in relation to other measures of working memory (Broman et al., 2004).

The Finger Tapping Test was selected because it provides a measure of visual-motor skills. This test has a reported test-retest reliability of .75 (Lezak, Howieson, & Loring, 1995).
The concurrent validity was established in comparison to the 9-hole peg test and the Tremor ADL questionnaire; both of which measure motor dexterity (Alusi, Worthington, Glickman, Findley, & Bain, 2000).

The HVLT was selected to measure short-term memory. The test-retest reliability of the HVLT was reported to be .74, while the validity was found to be between .65 and .77 when correlated with the Wechsler Memory Scale Revised (WMS-R) (Spreen & Strauss, 1998).

As a measure of pre-morbid intellect, the NART, a word-reading task, was selected. The NART has an internal consistency of .935. The validity was established between .40 and .80 when the NART was correlated with the Wide Range Achievement Test Revised (WRAT-R) (Spreen & Strauss, 1998).

The Taylor Complex Figure is a constructional task that measures visuospatial skills and visual memory. The test-retest reliability was established between .85 and .98 (Awad, Tsiakas, Gagnon, Mertens, Hill, & Messier, 2004). The Taylor Complex Figure was also found to have acceptable validity in comparison to the Rey Osterrieth Complex Figure (Awad et al., 2004).

Digit Span is a subtest from the Working Memory Index of the WAIS III; it was selected to provide a measure of memory and concentration. This subtest has a test-retest reliability coefficient ranging from .66 to .89. Criterion validity was established to be .60 when correlated with the Object Assembly subtest of the WAIS III (Lezak et al., 1995).

To measure Narrative Coherence, a structured interview was used to obtain the patient narrative, which was subsequently rated using the Narrative Coherence Rating Scale (NCRS). For the purposes of this study, the structured interview questions of the NCRS were reformatted. The rationale for these changes were: 1) To include questions that were appropriate to an
inpatient population with chronic mental illness; 2) To obtain narrative stories that would yield measurable data; and 3) To elicit responses that were adequate as well as succinct.

As shown in Appendix 1, the structured interview of the reformatted NCRS was conceptually composed of two sections: storytelling and real life narratives. For section one, select cards from the Thematic Apperception Test (TAT) were used. Selection of the TAT stimulus cards included in this study was based on the emotional neutrality of the stimulus cards and the likelihood of generating a narrative story. The selected cards were: 7GF-A black and white pictorial of a woman and a girl on a couch, with the girl holding something wrapped in cloth; 6BM-A black and white pictorial of an older woman looking out a window and younger man facing forward; 13B-A black and white pictorial of a young boy sitting in a doorway.

The TAT is a projective instrument used to elicit stories; its use is guided by the fundamental assumption that environmental stimuli are perceived and organized by an individual's needs, motives, feelings, and cognitive structures (Teglasi, 2001). Thus, the story that is produced is understood as a reflection of the individual's personal and cognitive schema. Projective instruments have previously been used in the assessment of persons with schizophrenia (Hien, Haas & Cook, 1998; Hilsenroth, Fowler & Padawer, 1998). For the purposes of this study, the elicited stories provided narratives that were evaluated using the reformatted NCRS.

The original NCRS is a six item, 18-point rating scale used to assess narrative coherence (Lysaker, Clements et al., 2002; Lysaker, Wickett, Campbell et al., 2003). As shown in Appendix 2, the NCRS examines the temporal conceptual connections, richness of historical detail and the plausibility, as evidenced in patient narratives. The reliability and validity of the
NCRS was evaluated based on the results from a sample of 33 persons recruited from a Midwestern VA Medical Center outpatient clinic with a DSM-IV diagnosis of schizophrenia or schizoaffective disorder (Lysaker, Clements et al., 2002). The patient narratives were evaluated using tape recordings of psychotherapy sessions. Internal consistency was calculated using the six individual ratings, that is, past and present ratings for all three subscales; the alpha was established at .88. Interrater reliability was found using three raters for the same sixteen cases; intraclass correlations ranged from .81 to .95.

In regards to validity, the construct, concurrent and predictive validity has been established (Lysaker, Clements et al., 2002). A comparison of NCRS scores with the vocabulary subtest of the Wechsler Adult Intelligence Scale III (WAIS) and the Positive and Negative Syndrome Scale (PANSS) was made to establish the NCRS as more than a mere reflection of verbal ability or gross symptomatology. The NCRS was correlated with the WAIS III vocabulary subtest, yielding a Spearman Rho of .26. The Spearman Rho regarding the PANSS was -.58 for positive symptoms and .23 for negative symptoms (Lysaker, Davis et al., 2005). The concurrent validity is based on correlations with the Scale to Assess Unawareness of Mental Disorders (SUMD), yielding a significantly related correlations (r= -.41, p<.01) (Lysaker, Davis et al., 2005). Predictive validity was established through correlation of the NCRS with other variables often related to traditional assessment of insight and cognitive symptoms of illness using the PANSS, yielding a significant prediction equation (F (2,52)=26.7, p<.0001) (Lysaker, Clements et al., 2002). The external validity was established through correlations with the DSM-IV diagnoses and clinical characteristics.

The primary tool used to measure the functional ability of participants was the CERF-R,
a function-based assessment tool that measures psychosocial functioning skills and risk behaviors (Barry, Lambert, Vinter, & Fenby, 2007; Lambert, McCorkle, Fenby, Patel, Rubano, & Vinter, 1999). The CERF-R can provide an indication of functional improvement and reduced risk potential, and was chosen based on its availability and practical usability as an assessment tool (Gershberg, 2005). The CERF-R is a six point, anchored scale that is administered in a team setting. Each patient's functional abilities and risks are discussed during a team meeting of their multidisciplinary treatment team who collaboratively create a CERF-R score. Thus, the CERF-R scores of each patient participating in the PI project is collaboratively determined by the treatment team staff at Westborough State Hospital (WbSH). As shown in Appendix 3, the CERF-R consists of nine functional items, seven risk items, two health status items, and three level of care items.

For each item, a level between one and six can be assigned based on the descriptor that the treatment team believes appropriately describes the patient. The descriptors for functional items range from “fully able” to “not able,” and for risk items from “not an issue” to “extreme risk” (Barry et al., 2007). Each descriptor has a specific anchor; for example, for level one on functional items, the descriptor “fully able” corresponds to the anchor “Client currently demonstrates complete independence and full personal responsibility for the functional area specified.”

The reliability and validity of the CERF-R has been investigated (Barry et al., 2007). Results yielded a Chronbach's alpha of .90, which indicated an acceptable level of internal consistency. For all CERF-R items, intraclass correlation coefficients ranged from .76 to .91, and test-retest reliability was established between .70 and .92. In regards to concurrent validity,
the CERF-R was established in relation to the Allen Cognitive Levels Test (ACLS) and the Routine Task Inventory (RTI). It was found that approximately 40% of the variance in the CERF-R was common to the ACL and RTI. Additionally, the discriminant validity revealed a significant separation (Wilks' Lambda = .978) between the levels of care received by consumers living in the hospital and in the community.

Additional measures of functional ability include the two occupational therapy assessments that were available to be used at WbSH: the Allen Cognitive Level Screen (ACLS) and Routine Task Inventory (RTI). The ACLS is a perceptual-motor task that measures ability to learn and perform motor tasks. The interrater reliability of the ACLS was found to be .98 (Penny, Messer, & North, 1995). In regards to validity, a correlation of .73 was found with the Block Design and Object Assembly subtests of the WAIS (Mayer, 1998). The RTI is an assessment tool used to describe the functional behavior of persons with cognitive disabilities. The test-retest and interrater reliability of the RTI were both established at .99; the validity was established with the Mini-Mental Status Exam at .67 (Burns, 1992).

This battery of neuropsychological, narrative, and functional assessments were selected to provide a snapshot of the cognitive skills and abilities of the participants prior to and after exposure to cognitive remediation with the goal of measuring pre- to post-test change. The pre- and post-test scores from this battery were provided for data analysis.

**Cognitive Rehabilitation Program procedures**

As part of the Performance Improvement (PI) project at Westborough State Hospital (WbSH), the Cognitive Rehabilitation Program (CRP) provides computer-based Cognitive Rehabilitation Therapy. Through the use of cognitive rehabilitation software from Psychological
Software Services, the PSSCogRehab 95, participants received computer-assisted cognitive remediation (Bracy, Oakes, Cooper, Watkins, Watkins, Brown, et al., 1999). This software package includes sixty-four computerized tasks with parameters that are modifiable such that the task requirements can be changed commensurate with the participant's skill level. The tasks involved are geared to increase neurocognitive skills such as attention, concentration, and memory. For example, one task entails looking at a group of objects that appear on the computer screen for ten seconds; once the objects are removed, a second, larger group of objects appear. The goal of the task is to accurately choose which objects from the second group appeared in the first group. As a patient masters the task, he/she advances to a new task that requires either more complex use of a cognitive skill, or the use of a new cognitive skill.

The CRP is housed in a partially divided, adequately illuminated room in a controlled-entry building on the grounds of WbSH. The CRP consists of two daily sessions that are held five days a week. At maximum, participants can attend one session a day, five days a week. Staff to patient ratio is approximately one staff per every three to four participants; sessions can have a maximum of ten patients. Each staff person has an active role throughout each session with the aim of providing patients support to maximize their progress and performance. Staffing duties include preparing the work area, providing directions and feedback for task completion, setting patient goals, participant coaching, and end of session debriefing. More specifically, preparing the work area involves turning on each computer, and displaying appropriate names and progress charts at each work station. Providing directions and feedback includes giving positive feedback regarding past performance, and giving step-by-step instructions and reminders on how to perform each computerized task. Setting patient goals involves creating a
target performance level that provides a “just right” or adequate challenge for the participant; that is, a goal that requires reasonable effort to attain. For example, based on the performance pattern the patient demonstrates on tasks, and the performance he/she demonstrated the previous day, the goal for the day may be to reduce the task completion time by ten seconds. Patient coaching refers to providing a high frequency of encouragement and praise, verbal prompting to help the patient to remain task-focused, and highlighting ways to improve performance by reducing errors and increasing task efficiency. End of session debriefing includes reviewing participant performance and progress, and setting goals for future sessions. Additionally, CRP staff monitor each patient's physical and mental health, specifically regarding any adverse effects of participation in CRP. Patients can choose to decline participation, to leave a session, or to leave the CRP entirely, at any time.

Research design

A mixed-methods research design was used in this study to examine the association between CRT and neurocognitive functions, Narrative Coherence and psychosocial functioning of persons with schizophrenia. Pre-test/post-test patient data provided by WbSH was used to explore the association between the dependent variables, neurocognitive functions, narrative coherence and psychosocial functioning, and the independent variable, CRT. The pre-assessment included a battery of instruments that was administered within two months prior to or within two weeks after the patient started the program. The same assessments were re-administered as a post-assessment measure after each patient completed fifty hours in the CRP or within two weeks of completing or ending the program, whichever occurred first. In addition to statistical analysis of data, qualitative observations were made to understand the impact of using
a traditional research design to study this population in a state hospital setting.

Data collection procedures

The CRP data for twenty-five patients who meet the inclusionary criteria for this study, that is, a psychotic diagnosis and completion of fifty hours in the CRP, was initially requested. Due to attrition factors, i.e., dropouts, discharges, decompensation, data for only ten patients was obtained. Regarding subject recruitment, as previously stated, existing data was requested for this retrospective study. Thus, the data that was being collected for the patient's medical record and/or the CRP-PI project was requested. Therefore, subject recruitment was necessary only in regard to securing authorization (release of information) to access existing patient information that can be provided by hospital staff without inclusion of patient identifiers. In other words, for the purposes of this study, there was no recruitment of patients; only authorized use of redacted patient data at the two-year mark after the CRP began operating.

Clinicians who provided data collection for the PI project administered the instruments included in this study as part of a battery of neuropsychological and psychosocial functioning assessments. The multidisciplinary clinicians include psychiatrists, a neuropsychologist, psychologists, nurses, social workers, registered licensed occupational therapists, rehabilitation counselors, and students in their predoctoral and masters level training experience.

The battery of data collection instruments used to measure CRP patient functioning was selected as a brief assessment that would provide adequate descriptive data. The assessment battery was only available to the PI project, but was made available for this study based on appropriate approval from the Northeastern University and DMH IRBs. The neuropsychologist and/or predoctoral/masters students under the supervision of the neuropsychologist administered
the neuropsychological instruments and the Narrative Coherence Rating Scale (NCRS). The occupational therapy instruments were administered by registered licensed occupational therapists. The Current Evaluation of Risk and Functioning Revised (CERF-R) was administered according to its standardized procedures by a broader team of clinicians, each contributing to the assigned rating.

Data analysis

The effects of CRT exposure through the CRP was assessed based on the pre- and post-test differences on the battery of neuropsychological and psychosocial instruments in a pre-post analysis. Additionally, data analysis also included using the Pearson product-moment correlation coefficient ($r$) between the dependent variables of narrative coherence and psychosocial functioning. Intraclass correlation coefficient ($ICC$) was used to analyze and establish interrater reliability for the revised NCRS. As a part of this mixed-methods research approach, case study analysis was also used based on information provided by WbSH. Given the small number of participants, within group differences such as rater discipline (occupational therapist versus psychologist) or type of psychotic disorder (schizophrenia versus schizoaffective disorder) was not examined.
CHAPTER 4
Results

The results of this study are summarized in this chapter. First, the quantitative results of this study are described in relation to the respective research questions. This is followed by a qualitative observations that include a case study outlining observations of a participant, and qualitative observations regarding the research design used in this study.

Quantitative differences in assessment measures

To test the first research question, which was concerned with the association between CRT on neurocognitive skills, paired t-tests were used to compare the means of the pre- and post-test performance on all neuropsychological measures. There were no significant differences between pre- and post-test performance. The second research question addressed the association between CRT and narrative coherence. Analyses of the NCRS data did not yield significant differences; however, interrater reliability was established using Intraclass Correlation Coefficient (ICC), and was found to be statistically significant at post-test ($f(7) = .82, p < .05$). This result suggests that the raters for the NCRS had strong agreement in their post-test ratings. In other words, the finding of no difference seemed reliable. The third research question was concerned with whether CRT was associated with changes in functional abilities and risk functioning; no significant difference were found. The fourth research question was concerned with whether increased narrative coherence was associated with increased psychosocial functioning in persons with schizophrenia. The correlation between pre- and post assessments for narrative and functional skills was not significant.

The difficulties posed by this population can be considered an outcome of this study. The
challenges of conducting research with this population were evident at various stages of this study. In the earlier stages, when participants were being referred to attend the CRP, some persons with schizophrenia would agree to attend the program; but once approached by CRP staff, would decide they did not want to attend. Participants also tended to show more consistent attendance initially, with reduced attendance as the study progressed. There were also several participants who could no longer attend the CRP because they began to decompensate, that is, become psychiatrically unstable, and thus, became uninterested, or too disorganized to attend the program. Some participants refused to allow their data to be used for research, which may have been due to attributes of their disorder such as being suspicious about how the information would be used or the explanation of the research not being clearly transmitted. These factors illuminate how the nature of this population presents challenges to conducting research on this particular group.

Qualitative observations of Participants

A typical participant in the CRP was Caucasian, male, and in his late forties to early fifties. Participant responses on measures demonstrated a range of ability. Particularly on the NCRS, this range of ability can be seen in the following examples. All participants were given general directions at the beginning of this task: “I am going to show you some cards with pictures and I would like you to tell me a story that has a beginning, middle, and ending.” For each card shown, the participant is asked, “tell me a story about what you see on the card.” Some responses were logical and coherent as illustrated in the following example. In response to TAT card 7GF, which contains a black and white pictorial of a woman and girl sitting on a couch, and the girl holding what might be a doll or baby, a participant responded, “Ms. Dreary,
the local seamstress, was sitting on a sofa one day when she heard a knock at the door. She went to answer the door and it was a little girl, Alexandria, who had a little doll with her. So she invited her into her apartment. She asked Alexandria what was the reason for the visit, and Alexandria said, 'my doll is not feeling well. Maybe you can take a look at it.' So they proceeded to.”

This response reflected sequenced information that was detailed and plausible based on the scene on the card. Other responses from other subjects were lacking in one or more of the three sub-categories of the NCRS, namely temporal sequencing, richness of detail, and plausibility. In the following example the participant's response, which was also to card 7GF, was lacking in detail; the information was so scant that it did not show sequencing of information: “The grandmother told Abigail a story, that's all.” Another example of such a response was, “A woman and a daughter holding a cat.” This response offered very little details, not enough information to be sequenced, and information that was not plausible based on the scene depicted on the card.

In an effort to gain a better understanding of the associated effects of cognitive remediation therapy, a case study was done for further illumination. The case of Xavier will be discussed in further detail. (The name Xavier is not real and was created for the purposes of readability. It was given to a subject, who was identified by a randomly assigned identification number in the data provided by Westborough State Hospital.) Xavier's data was chosen to be examined via a case study because there were changes in his pre- to post-test performance on the battery of instruments used in this study, suggesting improvements that possibly may be associated with cognitive remediation therapy.
The Case of Xavier.

Xavier is a forty-year-old Caucasian male who earned his high school diploma. It is unclear whether he was gainfully employed prior to experiencing the first signs symptoms of a psychotic disorder, or how long he has been receiving mental health services. He did, however, report previous inpatient admissions to several psychiatric institutions in Massachusetts. He also reported a history of substance use and involvement with the legal system. At the time of his participation in this study, he was a patient at Westborough State Hospital. Xavier met the inclusionary criteria for his data to be used in this study in that he carries a diagnosis of a psychotic disorder and attended at least fifty hours in the CRP. Xavier, as all the participants in this study, voluntarily agreed to have his data used for research purposes.

Improvements were noted on Xavier's pre to post-test performance on the NCRS. As previously noted, the NCRS measures narrative ability in terms of ability to sequence information (temporal), provide rich detail (richness), and provide plausible information (plausibility). In Xavier's case, his ability to provide sequenced and plausible information improved. More specifically, his temporal and plausibility scores improved by half a point, from 1.5 to 2 and 1 to 1.5 respectively. For example, on the pre-test, Xavier's response to one of the TAT cards (black and white pictorial of a young boy sitting in a doorway) was, “This is the story of a mother taking pictures. Like sometime in the playpen, in a cowboy hat, by the lake. This one is in the carriage house.” At post-test, the narrative quality of his response improved, “A young boy that can't get his own way saying, 'I want this, I want that,' but able to carry on.” The latter response contained a plausible in relation to the card being described. The latter
response also contained some degree of sequencing of information (“but able to carry on” logically follows the boy’s dissatisfaction with the boy not being able to get his own way). This change in Xavier's narrative ability relates to the first research question regarding the association between CRT and Narrative Coherence. His improved performance may result in increased ability to communicate with others.

Another change for Xavier was in his attendance to rehabilitation programming. Data showed that his attendance increased from eight out of ten sessions at pre-test to nine out of ten sessions at post-test. This increase in his attendance demonstrates improved psychosocial functioning in that he is more engaged in treatment. There were also observable changes in his performance from pre- to post-test on some of the instruments in the assessment battery he was administered. Such changes demonstrate tangible changes in his psychosocial functioning. Specifically, on the CERF-R, several changes were noted regarding his risk potential and level of care needs. In particular, he had lower scores in six areas related to risk, which signifies that his treatment team rated him as less apt to participate in risk behavior. For example, his rating improved from a level 4, moderate risk, to being deemed a level 1, “not an issue,” with regard to his likelihood to engage in substance abuse, and prematurely leaving treatment. He was also considered to be at moderate risk, regarding his impulse control at pre-test. At post-test, his rating improved to 1, which meant that his impulse control was considered “not an issue.” Thus, he demonstrated decrease tendency to engage in impulsive behavior. He also had lower scores in three level-of-care items, signifying that his treatment team rated him as requiring less restrictive care. For example, his treatment team deemed that Xavier's needed level of care changed from a locked hospital at pre-test to an unlocked hospital at post-test. Furthermore, his estimated level
of care in six months changed from “unlocked hospital” to “high-daily,” that is, residential program with full time staff. Thus, Xavier's treatment team saw improvements in his ability to appropriately and safely carry out daily functions in a less restrictive environment, and expect him to needed even less restriction in the future. Xavier's also experienced improvements on the functional ability measured by the CERF-R. For example, his ability to recognize and avoid common hazards and dangerous interpersonal situations improved from level 3, “somewhat able,” at pre-test to a level 2, “mostly able,” at post-test. His hygiene also improved from a level 2, “mostly able,” to a level 1, “fully able.” These positive changes in his narrative ability, functioning, and his level of risk can translate to Xavier having a better ability to function in the world.

Xavier's case illustrates the possibility that benefits can be associated with cognitive remediation therapy. His level of care improved in that his treatment team found that he needed less restrictive care, that he could appropriately function in an unlocked hospital setting versus the locked hospital that was deemed necessary at pre-test. He was better able to attend to his hygiene and avoid common hazards. His level of risk improved from moderate risk to not being considered an issue in many risk areas.

Given the lack of quantitative results in this study, it is difficult to conclusively support a claim that Xavier's improved functioning is a sole and direct result of CRT. It could possibly be due to other factors, that is, psychotropic medication, other rehabilitation supports (other groups, psychotherapy, etc.), increase family involvement, and many other factors. However, it can be said that, subsequent to attending CRT, he demonstrated improved functioning, and these changes signify possible functional benefits an individual can experience following participation
in CRT. Furthermore, it is possible that changes in his narrative ability could have been associated with his functional changes. These gains are potential quality of life changes that can occur for individuals who are diagnosed with schizophrenia and other psychotic disorders.

Observations regarding research design.

Using a traditional research design, there were benefits and barriers observed regarding conducting this research with this particular population. The naturalistic setting in which data was collected in this study was a state hospital. The helpful aspect of conducting this research in a hospital was having the backing of the institution. The hospital staff showed genuine interest in this research, which had the ultimate goal of improving the lives of persons with schizophrenia and other psychotic disorders. Once appropriate permissions were gained to conduct this study, hospital staff provided as much support as was allowable given their primary job duties related to routine patient care. Having the support of the staff facilitated each step in the process. Hospital staff sought informed consent from CRP participants and/or guardians, and followed up when consent forms were not returned within a reasonably expected time. Additionally, management staff that had previous experience with conducting hospital research provided guidance throughout the process of gaining access to data. Following the steps outlined by management staff provided some ease when moving through the approval process to conduct this study.

Despite having the backing of hospital staff, there were challenges faced in the process of gaining access to data. The data in this study were for inpatients who provided informed consent to have their data used for research. Of note, the treatment and data collection in this study occurred as a part of normal hospital operation; data was provided post-treatment. However, there were a number of steps that preceded obtaining informed consent. There are protective
layers that appropriately surround inpatients in a state hospital to ensure their safety and well-being that add to the complexity of conducting research in this naturalistic setting. Each of these steps often required several attempts before completion, which influenced the total time frame of this study.

The steps involved in conducting research in a state hospital setting included gaining written permission from both the educational institution (Northeastern University) of the primary investigator (PI), and from the overseeing institution of the hospital, the Department of Mental Health (DMH) of Massachusetts. More specifically, gaining permission to conduct research required consultation with staff from both review boards. The review board staff provided guidance regarding the type of information or data that is likely to be accessible for research purposes, and the precise language that should be used on the review board application to access useful data. The next step required contact with Westborough State Hospital (WbSH), and more specifically, the Department of Psychology at WbSH, to discuss the feasibility and operational aspects of conducting research. Other steps included interfacing with Department of Psychology staff and patient unit staff. Once these steps were successfully traversed, the last step was gaining permission from each patient to use their CRP data for research. Additionally, any information that was requested after initial permission was given required additional contact with the review board. Thus, the culmination of having the support of hospital staff and the challenge of navigating the process contributed to the decreased amount of data yielded and the total time frame of this study.
CHAPTER 5
Discussion

In this chapter, the implications of the results of this study are discussed as well as limiting factors and methodological considerations, followed by suggestions for future research. The primary goal of this study was to explore the association between cognitive remediation therapy and neurocognitive skills, narrative coherence, and psychosocial functioning of persons with schizophrenia and psychotic disorders. A secondary goal of this study necessarily became exploring the benefits and barriers to using traditional research designs when studying inpatients with schizophrenia in a state hospital setting.

Implications from Results

Data analysis did not show neurocognitive, narrative, or psychosocial changes as a result of CRT intervention. Though significant changes were not achieved, that is, no statistically significant changes were found, because of the low statistical power achieved with the small number of participants, it is encouraging to consider the case of Xavier. His case showed that neurocognitive and functional differences could be seen in terms of practical changes in daily functioning. A larger sample size might have revealed additional successful cases similar to the profile of changes experienced by Xavier sufficient to reach statistical significance. His case is in alignment with the results of a study in which the data of seventy-nine patients with schizophrenia were analyzed after exposure to cognitive remediation (Reeder, Smedley, Butt, Bogner, & Wykes, 2006). Reeder et al. found significant associations between social functioning and cognitive remediation. Their study supports the belief that cognitive remediation is associated with positive functional outcomes for patients with schizophrenia. The
current study focused on possible association between CRT and functional outcomes such as improved narrative ability, increased ability to carry out daily functions such as hygiene, and reduced likelihood of engaging in risk behaviors. These are positive changes that could possibly occur following CRT that can improve to quality of life of persons with schizophrenia and other psychotic disorders.

Clinical implications

The assertion of Lewis and Lieberman (2000) that the prognosis for persons with schizophrenia is best predicted by degree of cognitive impairment underscores the importance of further exploration of treatments that specifically target remediation of cognitive deficits. The expansion of treatment options can be beneficial for persons with schizophrenia and other psychotic disorders, as well as their families and society. Glick (2004) asserts that stand-alone treatment modalities are insufficient; he maintains that integrated use of psychopharmacology and psychotherapy can quicken the attenuation of symptoms, reduce the probability of the recurrence of symptoms, and enhance psychosocial skills. Thus, the literature supports the conclusion that, as a specific type of psychotherapy, Cognitive Remediation Therapy (CRT) can be a promising addition to the treatment of persons with schizophrenia and other psychotic disorders that can directly address cognitive and functional deficits alongside psychopharmacology efforts to address symptoms. In this regard, the case of Xavier illuminates the possibility of change in narrative and functional skills following CRT; such changes can signal enhanced psychosocial skills. His case is encouraging in terms of the potential of this line of research in improving the lives of those impacted by schizophrenia and other psychotic disorders.
Limiting Factors

There were numerous factors that impacted the progress and results of this study. The literature notes that persons with schizophrenia and other psychotic disorders experience symptoms and deficits that have a negative impact on their functioning. These functional impairments make this population difficult to study as they present with special problems that impede the research process. Specifically, impairments include disorganized and psychotic symptoms (being too disorganized and/or forgetting to attend the CRP on a particular day, experiencing paranoia regarding the CRP, etc), neurocognitive deficits, and periods of psychiatric instability that are generally a part of the course of psychotic disorders. These impairments lengthened the amount of time participants took to complete 50 hours in the CRP, and contributed to many participants not ultimately completing the number of hours needed for their data to be included in this study. Additionally, the protective layers within the hospital setting that are in place to ensure patients’ well being also presented a challenge. Each of these factors, which will be further discussed as they relate to the methodological concerns of this study, contributed to the small sample size and limited results of this study.

The resulting small number of subjects was an overarching outcome of this study; it demonstrated the challenge of studying this population. In addition to the above-mentioned factors, there were additional issues that contributed to the low number of subjects in this study. In some cases, patients who were referred by hospital staff or who showed initial interest in the CRP chose not to attend. Other participants discontinued their attendance at various intervals after they began attending. Discontinuation of attendance to CRP seemed to be as a result of various reasons such as disorganized thinking or behavior, lack of motivation, lost of interest,
conflict between CRP session times and other interests, and lack of understanding of what the program entailed. In other cases, the participants were discharged from the hospital, or they had conflicting work schedules. Some CRP participants experienced an increase in their degree of psychiatric symptoms and were unable to continue attending. Some participants chose not to have their data used as a part of a research study; in some cases, the participant’s guardian either did not consent to have the patient's data used for research or the guardian did not respond to efforts to contact them via mail regarding this. Thus, in some cases, although a participant had a qualifying diagnosis and completed fifty hours of treatment, the use of their data was not authorized and therefore could not be provided for inclusion in this study. There were also issues regarding accessing the data. Specifically, there are protective layers in place to ensure patient safety and well-being. This meant that permission needed to be sought at many institutional levels (Department of Mental Health, Westborough State Hospital (WbSH), WbSH Department of Psychology), and that the specific requirements at each level had to be met: forms had to be completed correctly and submitted, new forms had to be created and approved that were specific to this research study (for example, creating a form to verify participant competence to consent to being a part of research), and researcher roles had to be clearly defined. These issues took a considerable amount of time to be successfully resolved. It is also noteworthy that CRP participants had several diagnoses; only the data for participants with psychotic disorders were used since this study was focused on participants with psychotic disorders. Thus, data for many CRP participants were not usable for this study, as they did not have a qualifying diagnosis. All of these attrition factors impacted the feasibility of having the expected number of participants in the given two-year time frame for this study.
Methodological Concerns

Methodological considerations in this study fall into five categories: the population, the research and treatment setting, the treatment, instrumentation, and the research design. In considering these factors, further light can be shed on directions for future research when studying an inpatient population of patients with schizophrenia.

Population.

The population in this study was inpatients with schizophrenia in a state hospital. The nature of conducting research with inpatients had an impact on the outcome of this study in terms of functional capacity, symptom severity and chronicity, and motivation. State hospital patients are often the most difficult, chronic, and disorganized patients, and thus, are likely to be experiencing a greater number and degree of psychiatric symptoms. Additionally, inpatients will likely interact with other patients who are psychiatrically unstable during their inpatient stay. Further, they have guardians who may not respond to requests for participation even though the patient has agreed to participate. These are factors that could have had a varying impact on the research conducted in this study.

Research and Treatment Setting.

The setting of this research was a state hospital, which has inherent factors that impact any activity occurring within its parameters including research. The staff at WbSH was greatly supportive in regard to providing data. The nature of hospital operation creates a hierarchy of duties based on the needs of patients. Duties related to rehabilitation programming are given attention but are ancillary in relation to duties more directly related to the care and safety of patients. Given the secondary nature of these rehabilitation related duties, the efforts necessary
to optimize patient referral and continued involvement in rehabilitation programs, such as the CRP, are also ancillary. In other words, an inpatient unit staff person may complete the form to refer a patient to the CRP, but may or may not have time to follow up regarding whether the patient actually began attending. Thus, the staff person has made an initial effort, but may not have additional time to follow up given his/her other duties. This is one way in which having resources could have been beneficial. Having a person in place to provide continuity to the referral process may have allowed for a larger sample size. Another consideration related to the research setting is conducting research in a naturalistic setting. Research in naturalistic settings does not allow for random assignment of patients to treatment groups. This limits the extent to which variables can be manipulated, and thus, impacts the overall validity of the study.

An additional factor to be considered in inpatient research is the difference between state versus community hospitals. State hospitals receive funding from the state and are more subject to regulations. These regulations are formed with close attention to protecting patients and create layers of protection that need to be navigated to conduct research. Thus, a researcher conducting research in a state hospital setting has to consider this factor. In this study, the primary investigator (PI) was initially in the role of an extern at WbSH, which is a training position. This meant that the PI was part of hospital staff, and thus, had a particular level of access. The PI's role changed after one year of research was conducted. This change also impacted the PI's access to information and reduced the PI's general presence at the hospital. One could speculate that had the PI's degree of presence not changed, the outcomes of this study may have been different. In other words, the PI could have provided the linkage and continuity that funding would otherwise be used for, i.e., following up on referrals for patients who did not
eventually begin the program and making efforts to address the reasons leading to patients not attending the CRP regularly. Hospital staff was able to provide some degree of follow-up, however, having the PI more present could have increased the overall degree of continuity for CRP referrals and attendance.

Moreover, the inpatient setting is a unique environment that has an impact on those treated. Inpatients are in a more restricted, intense, specialized setting, (i.e., high staff to patient ratio, locked units with externally imposed schedules and activity restrictions, rehabilitation programming). This level of restriction is greater than the restrictions that, for example, patients in outpatient settings are subjected. All of these factors that are related to the setting in this study can have an influence on the research process when conducting inpatient research.

*Treatment.*

The independent variable in this study, cognitive remediation, was used as a continuous treatment and measured at pre-test and again after fifty hours of treatment (post-test). This is a viable approach to exploring the effects of treatment. However, this approach did not allow for teasing out the effects of the dose of treatment. CRP participants attend the program at different weekly rates over different durations of time. Therefore, the frequency and duration of cognitive remediation is a factor that was not measured. This speaks to the difference between a person attending the CRP four times a week for two months versus one time a week for six months, versus sporadic attendance over a year. Using a multiple baseline approach to measure different doses of treatment may have been effective. Thus, statistically significant results in this study may have been yielded by exploring the effect of treatment dosing rather than pure exposure to treatment.
**Instrumentation.**

Regarding the instrumentation, three factors were considered in terms of their usefulness in the study, the first being the use of the same instruments for pre- and post-assessments. This could have created a saturation effect due to re-exposure to the same battery of assessments. This may have been more of a factor for patients who completed fifty hours in the CRP over a relatively short period of time. This could have been addressed by using a different battery of instruments at post-test that measured the same constructs. For example, the Taylor Complex Figure is a constructional task that was used as a part of the neuropsychological battery, and was given at pre- and post-test. To avoid the saturation effect, the Rey Osterrieth Complex Figure could have been used at post-test. Both tasks are visuomotor and measure visuospatial skills and visual memory. Moreover, the Taylor Complex Figure was found to have acceptable validity in comparison to the Rey Osterrieth Complex Figure (Awad et al., 2004).

The method of research used in this study included confounding variables that could have influenced the results of this study. More specifically, factors such as having the primary investigator also serve as a scorer for the NCRS may have had a confounding influence on the data. This variable was dealt with by having a second rater; the positive interrater reliability found on the NCRS implies that the primary investigator's dual role as a scorer did not likely skew the results. Another confounding variable could have been introduced by the use of TAT cards for the NCRS. Observationally, some participants seemed to have an emotional reaction to the content of the TAT cards, at times stating that it was too difficult to talk about what was on the card. This may have negatively influenced the ability to generate stories. Thus, using a different, less emotively charged method to elicit narratives may have been more beneficial.
Yet another factor that was examined was related to the establishment of patient ratings for the CERF-R, one of the functional measures used in this study. The CERF-R is a function-based assessment tool that provided a measure of psychosocial functioning and risk behaviors. This instrument is electronically scored during a multidisciplinary treatment team meeting. WbSH staff described the scoring process; it is scored using a computer, and responses from the previous month automatically populate each answer box. This computerized scoring can lend itself to carrying over, that is, not changing the scores from the previous month, and thus, not truly evaluating each patient's current functional ability. The clinical team could accept a previous month's rating, without engaging in adequate discussion about why this should continue to be the rating. In other words, for the particular CERF-R functional item of hygiene, the treatment team could accept that a patient continues to be at a level four and is thus marginally able to perform hygiene related activities instead of discussing whether the patient truly fits the descriptive attached to this rating.

The revision made to the NCRS was also a consideration. As previously detailed, the original NCRS has well-established validity and reliability data in many published studies (Lysaker, Clements et al., 2002; Lysaker, Wickett, Wilke et al, 2003, Lysaker, Davis et al., 2005). The revised NCRS may have different levels of validity and reliability. If there were a larger sample size and time, efforts would have been made to establish the validity and reliability of the revised instrument. Although interrater reliability was established, further study would have been useful to substantiate the reliability and validity of the revised instrument, if sufficient data had been available.
Research Design.

A traditional research design was used in this study. This pre-test/post-test approach examined whether there were statistically significant changes in scores following exposure to treatment as measured by a single baseline approach. It is noteworthy that, without consideration to the effect of the dosing of treatment, it may be difficult to establish the effect of treatment because the duration and intensity of exposure to treatment was not examined. Additionally, a comparison group was not used in this study due to the additional resources and time it would have required to obtain. Without a comparison group of untreated subjects, it is difficult to determine whether potential changes are associated with treatment or other factors such as maturation. If there were additional time, permission would have been sought to have access to data for a comparison group of subjects.

Future research

The major usefulness of this study lies in the information it provides about appropriate research designs to explore treatment options for this population. In an attempt to contribute to the existing research regarding treatment for Schizophrenia, this study has illuminated both the benefits and barriers posed by working with this population. The nature and course of the illness, that is, the perceptual disturbances (hallucinations and delusions), disorganized behavior and speech, and the cognitive deficits, are all factors that make studying this population particularly difficult. Insofar as illustrating this difficulty, this study also highlights the need for continued research to explore the appropriate ways to identify treatments that can attenuate these symptoms and deficits. Honing in on effective research methods to study the patient population can provide more room to focus on the effectiveness of treatment.
Researchers exploring treatment effectiveness should select a research design that may be more amenable to a population with the symptoms, deficits, and protective layers by which persons with schizophrenia are encapsulated. It may be beneficial to choose a research design that can provide a more nuanced understanding of the impact of treatment. Using a multiple baseline approach could reveal the effects of the duration and intensity of exposure to treatment or re-exposure to treatment after specific time intervals. Also, it may be beneficial to include an untreated or delayed or differently treated comparison group with which to compare the sample of subjects exposed to treatment. This would help to address whether changes may be a result of other factors such as maturation or spontaneous remission (Meltzoff, 1998).

It may also be beneficial to examine whether concurrent treatment with different types of psychotherapy, for example, Cognitive Behavioral Therapy and Cognitive Remediation Therapy, are associated with increased positive outcomes versus either treatment alone. This would help illuminate whether combining treatment modalities can result in higher functional outcomes. Another direction for research would be to expand the disorders that are observed; this could mean including, for example, participants with mood disorders (Bipolar disorder, Major Depressive Disorder, etc.) as these conditions can also impact psychosocial functioning.

The field of psychology continues to expand its understanding of treatment options for schizophrenia and to seek increasingly nuanced methods with which to explore such treatment. Research efforts that explore these factors and outcomes provide valuable information to guide future research to ultimately improve the quality of life of individuals and society. Spaulding (1997) pointed out the importance of continuing to seek the mechanisms of treatment effects using available research designs rather than waiting for the resources needed for perfect, highly
controlled experiments. This is particularly relevant to this exploratory study, which attempted to add to the body of research that identifies effective treatment options for schizophrenia. Despite the lack of quantitative results, valuable qualitative information was garnered that can assist in fine-tuning the research process for future studies. Such research continues to be a worthwhile venture and underscores the benefit of continuous research efforts. Identifying research designs that are most effective for conducting inpatient research with this population can potentially lead to better assessment of the effectiveness of treatment. This possible benefit makes it necessary to expand the generalizable impact of treatment for the debilitating nature of schizophrenia on the quality of life of those affected.
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Appendices

Appendix 1. Structured Interview for NCRS Narratives

Section I: Storytelling

Material needed: 3 TAT stimulus cards presented in the following order: 6BM, 7GF, 13B

Document verbatim, or as accurately as possible, the patient's responses to each question:

Directions: “I am going to show you some cards with pictures and I would like you to tell me a story about what you see in the pictures. Tell me a story that has a beginning, middle, and ending.”

Acceptable prompts for storytelling and real life narrative:

“It's up to you.”

“Take as long as you need.”

“I'm sure you can think of something.”

“It can be anything, even something small or unimportant.”

Note: Do not ask any specific questions about parts of the story, as this may unnaturally lead the client to add details.
1) “Here is the first card.” *Show card 6BM.* “Remember to tell me what led up to this point and what happens after this point.”

Card 6BM:
2) “Here is another card.” Show card 7GF. “Remember to tell me what led up to this point and what happens next.”

7GF: __________________________________________________________

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3) “Here is the last card.” *Show card 13B.* “Remember to tell me what led up to this point and what happens next.”

13B:

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Section II: Real Life Narratives

1) “Now I'd like you to tell me some real stories. Remember that stories have beginnings, middles, and ends. For the first one, tell me the story of the things that led up to being admitted to the hospital. Tell me in as much detail as you can in 5 minutes or less.”

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2) “For the second story, tell me about something that happened in the last week. It can be anything.”
3) “What led up to or came before that?”
4) "What happened next or took place after that?"

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Section III: NCRS scores

Temporal Conceptual Connection: __________

Richness of detail: __________

Plausibility: __________
Appendix 2. Scoring Criteria for the Revised Narrative Coherence Rating Scale (NCRS)

There are 5 individual scores for each category (temporal, richness, and plausibility) for each interview. A score is assigned for the response to each stimulus card, as well as a score for the response to 'the events that led up to being admitted to the hospital,' and 1 score for the response to the last three questions concerning 'something that happened in the last week.' The 5 scores for each category should be averaged to yield one category score. Use the table below to determine the number of points for each response. Of note, repeated pieces of information and a patient asking a question are not scored. Irrelevant information or statements that do not pertain to answering the question are also not scored, i.e., statements such as, “I don't know if this is right.”

The following are examples to illustrate accurate scoring. If the five scores in the Plausibility category are 2, 3, 2, 1, 1, the Average score will be 1.8. This score is rounded to the nearest whole number; thus the Average Plausibility score is 2. If the scores averaged 1.4, it would be rounded down to 1, which is the nearest whole number. Here are examples of discreet pieces of information: “He was walking home,” “I got sick,” “She stopped.” Any of those statements would be could considered as 1 piece of information. The following is considered two pieces of information, “She is sitting on the couch holding a doll,” “He's got bad news and he's feeling sad.” An example of an incomplete piece of information: “He did,” “She has.”

<table>
<thead>
<tr>
<th>Categories</th>
<th>Score of 0</th>
<th>Score of 1</th>
<th>Score of 2</th>
<th>Score of 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporal Conceptual Connections Category</td>
<td>0 pieces of sequenced information</td>
<td>1-2 pieces of sequenced information</td>
<td>3 pieces of sequenced information</td>
<td>4 or more pieces of sequenced information</td>
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<tr>
<td>Richness of Details Category</td>
<td>0-1 piece of information</td>
<td>2 pieces of information</td>
<td>3-4 pieces of information</td>
<td>5 pieces of information</td>
</tr>
<tr>
<td>Plausibility Category</td>
<td>3 or more implausible pieces of information</td>
<td>2 pieces of implausible pieces of information</td>
<td>1 piece of implausible information</td>
<td>0 pieces of implausible information</td>
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</tbody>
</table>

*** Note: a rating of “0” is always afforded when there are many major moments lacking the key element. Thus, if someone says many plausible things but also says many significantly implausible things, they get a rating of “0” for plausibility; just as would someone who offered only many significantly implausible things.
## Appendix 3. CERF-R Categories

<table>
<thead>
<tr>
<th>Categories</th>
<th>Sub-categories</th>
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</thead>
<tbody>
<tr>
<td>Functional Abilities</td>
<td></td>
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<tr>
<td>A. Hygiene</td>
<td></td>
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<tr>
<td>B. Nutrition</td>
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<tr>
<td>C. Personal finances</td>
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<tr>
<td>D. Hold a job</td>
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<tr>
<td>E. Negotiate social situations</td>
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<tr>
<td>F. Pursue appropriate independence</td>
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<tr>
<td>G. Use services that promote recovery</td>
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<tr>
<td>H. Use medications as needed</td>
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<tr>
<td>I. Recognize and avoid common hazards and dangerous Interpersonal situations</td>
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<tr>
<td>Risk</td>
<td></td>
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<tr>
<td>J. Physical violence</td>
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<tr>
<td>K. Sexual offenses</td>
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<tr>
<td>L. Deliberate self-harm</td>
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<tr>
<td>M. Significant consequences from other unacceptable behavior</td>
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<tr>
<td>N. Substance use</td>
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<tr>
<td>O. Leaving services prematurely</td>
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<tr>
<td>P. Poor impulse control</td>
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<tr>
<td>Physical Health Status</td>
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<tr>
<td>Q. Get and use medical care</td>
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<tr>
<td>R. Health status</td>
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<tr>
<td>Level of Care</td>
<td></td>
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<tr>
<td>S. Level of care currently receiving</td>
<td></td>
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<tr>
<td>T. Level of care currently needed</td>
<td></td>
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<tr>
<td>U. Estimated level of care needed in 6 months</td>
<td></td>
</tr>
</tbody>
</table>