

**A Study of the Relationships Between Cognitive Functioning, Prodromal Cognitive
Decline, and Predictors of Psychosis in an Adolescent Inpatient Population**

By

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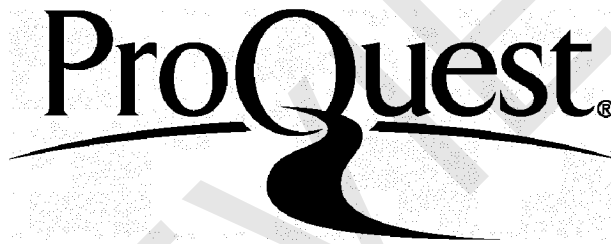
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Table of Contents

ABSTRACT	vi
CHAPTER	
I	INTRODUCTION..... 1
	Definitions 4
II	LITERATURE REVIEW 4
	Definition of the Concept of the Prodromal Period 5
	Prevalence 10
	Psychotic Disorders and Cognitive Decline 14
	Limited Cognitive Functioning and Psychosis 25
	Psychosis, Cognitive Decline, and Clinical Symptomatology..... 31
	Psychosis, Limited Cognitive Functioning, and Clinical Symptomatology..... 35
	Indicators of Psychosis in Psychological Testing 38
	Examining Estimated Premorbid Cognitive Decline 44
	Statement of Purpose..... 48
	Research Questions 49
III	METHODOLOGY 49
	Participants..... 49
	Measures 50
	Wechsler Intelligence Scale for Children-Fourth Edition (WISC-IV) 50
	Wechsler Individual Achievement Test 3 rd edition (WIAT-III)..... 51
	The Minnesota Multiphasic Personality Inventory-Adolescent (MMPI-A) 52
	The Minnesota Multiphasic Personality Inventory-A-Restructured Form (MMPI-A-RF) 55
	The Rorschach Comprehensive System..... 55
	The Hopkins Psychiatric Rating Scale..... 56
	Procedures..... 57
IV	RESULTS 61
V	DISCUSSION 85
	Findings 85
	Limitations 93
	Implications for School-Clinical Child Psychology and Future Research 94
VI	REFERENCES..... 98

List of Tables

Table 1. Descriptive Statistics for the WISC Index Scores.....	62
Table 2. Descriptive Statistics for the WISC-IV Predictor Variables	63
Table 3. The Group Statistics by Gender and Results from the Independent Sample t-test.....	64
Table 4. The Relationship between Cognitive Functioning and Chronological Age	66
Table 5. Scheffe Post Hoc Test	67
Table 6. Correlations between the Cognitive Functioning Variables and MMPI-A Variables.....	69
Table 7. Correlations between the Cognitive Functioning variables and MMPI-A-RF Variables	72
Table 8. Correlations between the Cognitive Functioning variables and Rorschach Variables	74
Table 9. Correlations between the Cognitive Functioning variables and the HPRS Variables	77
Table 10. Regression Analysis: Predicting MMPI-A Psychosis Variables from Cognitive Functioning Variables	79
Table 11. Regression Analysis: Predicting MMPI-A-RF Psychosis Variables from Cognitive Functioning Variables.....	81
Table 12. Regression Analysis: Predicting HPRS Psychosis Variables from Cognitive Functioning Variables.....	82
Table 13. Regression Analysis: Predicting Rorschach Psychosis Variables from Cognitive Functioning Variables.....	84

Abstract

There is strong evidence that people with limited cognitive functioning are at higher risk of developing schizophrenia (SC) and other psychotic disorders. However, it is also known that the occurrence of severe psychopathology in children and adolescents is likely to have a deleterious effect on cognitive functioning. The present study looked at the associations between cognitive deficits, estimated premorbid cognitive decline, clinical symptomology, and psychotic disorders in adolescents. The sample was drawn from a larger sample of 819 males and 742 females, ages 13-18, who were referred for psychological evaluation in an inpatient hospital setting. The sample was administered cognitive, performance, self-report, and therapist report measures in order to examine cognitive, symptom, and personality patterns. Results revealed significant relationships between patterns of cognitive deficits in adolescents and psychotic symptoms. Specifically, older adolescents are more likely to demonstrate prodromal cognitive decline. Further, results demonstrated that general cognitive ability, cognitive efficiency skills, and verbal fluency abilities significantly predicted psychotic symptoms on self-report and therapist ratings but limitedly on a performance based measure. Visual-motor abilities demonstrated variable and less robust relationships with psychotic symptoms across the measures. Overall the study supports past research, done primarily with adults, that has found psychosis to be associated with significant and widespread impairments in neurocognitive functioning. These findings have important implications for school-clinical child psychologists.

Key Words: adolescent cognitive functioning, cognitive deficits, psychosis

A Study of the Relationships between Cognitive Functioning, Prodromal Cognitive Decline, and Predictors of Psychosis in an Adolescent Inpatient Population

Chapter 1

Studying dual-diagnoses, defined here as, the diagnosis of an intellectual disability (ID) or limited cognitive functioning and psychiatric disorders in children and adolescents has been a topic of increasingly more scientific and clinical attention. In fact, recent research has found significantly higher prevalence rates of emotional, behavioral, and/or personality disorders in children and adolescents with limited cognitive functioning as compared to typically developing youth. Challenging behavior and psychiatric disorders in people with cognitive limitations have substantial direct and indirect impact in their clinical, social, and fiscal functioning. Comorbid psychopathology and limited cognitive functioning is the major cause of failure of community residential placement, reduced occupational opportunity, and leads to restrictions in participation in educational and recreational programs (Einfeld et al., 2006). Additionally, in psychiatric inpatient units, individuals with limited cognitive functioning and/or cognitive deficits have longer lengths of stay and higher rates of rehospitalization than the general population (Alexander, Chester, Gray, & Snowden, 2012).

However, people with co-occurring cognitive deficits and mental health disorders have been characterized as one of the most underserved populations in the United States (Fletcher, Loschen, Stavrakaki, & First, 2007). Historically, people with intellectual disabilities were seen as incapable of having a mental illness (Borthwick-Duffy, 1994). More recent epidemiological studies, however, consistently refute this, showing that

people with mild ID (intelligence quotient (IQ) in the 50-70 range) have a higher frequency of mental health problems than the general population (Bouras et al., 2004). In the Werner and Stawski (2012) research study it was found that improvements must be made concerning the competence and knowledge of practitioners who are working with children with limited cognitive functioning and psychiatric disorders. Specifically, research demonstrates that interdisciplinary teams in psychiatric hospitals do not feel prepared to work with clients with intellectual disabilities. Nonetheless, research has shown that not all behaviors of individuals with cognitive deficits are a result of their cognitive system. In fact, current views of dual diagnosis, as defined in the present study, are that people with intellectual disabilities are likely to experience mental health illnesses similarly to those in the general population (Zigler, Bennett-Gates, Hodapp, & Henrich 2002; Hersen & Thomas, 2007).

The term “diagnostic overshadowing” (Smiley & Cooper, 2003; Mason & Scior, 2004) increased awareness of the diagnostic challenges that clinicians encounter in attempting to diagnose psychological and emotional difficulties in people with limited cognitive functioning. Diagnostic overshadowing refers to the process of over-attributing a patient’s symptoms to a particular condition, resulting in key comorbid conditions being undiagnosed and untreated. The term referred to people with developmental disabilities, whose psychiatric symptoms and behaviors were falsely attributed to their disability and therefore left comorbid psychiatric illness undiagnosed. It is highly important for psychologists to understand the mental health and cognitive patterns that exist for children and adolescent patients who exhibit both limited cognitive functioning and severe psychiatric disorders.

There is strong evidence that people with limited cognitive functioning are at higher risk of developing schizophrenia (SC) and other psychotic disorders (Deb et al., 2001; McCarthy, 2015;). However, it is also known that the occurrence of forms of psychopathology is likely to have a deleterious effect on cognitive functioning. In fact, the prodromal period of psychotic illness is believed to be associated with marked cognitive, social, and functional deterioration. Deficits in cognition have been shown to manifest years before the development of overt psychotic symptoms (Cannon et al., 2000; Niendam et al., 2006). There is substantial evidence that cognitive dysfunction in schizophrenia is associated with poor outcome in work, school, and social domains, and that clinical symptomatology may have an important impact on this relationship (Green et al, 2000; Niendam et al., 2006). Recent research has sought to determine whether intelligence deteriorates as a result of psychosis, whether individuals with lower IQs are more susceptible to schizophrenia and other psychotic disorders, or whether IQ may be related to such variables as severity or chronicity of the symptoms (Aylward, Walker, & Bettes, 1984). However, it is unclear whether youth who demonstrate IQ's in the intellectually disabled range are demonstrating further decline in their cognitive functioning in conjunction with psychotic episodes. While findings confirm that neuropsychological deficits are detectable before the onset of psychosis (Bouras, 2004; Niendam et al, 2006) the inter-relationship of prodromal symptoms with cognitive difficulties, and socio-emotional functioning prior to the onset of overt psychotic illness is not well understood (Niendam et al., 2006). Therefore, more research is needed in looking directly at the associations between cognitive deficits, cognitive decline, clinical symptomatology, and psychotic disorders.

Definitions

In the literature pertaining to dual diagnosis, as used in this study, writers interchangeably use the labels: intellectual disability, cognitive limitations, and cognitive dysfunctions. For the purpose of this study attempts will be made to stay with uniform definitions of each term. Intellectual disability refers to significant limitations both in intellectual functioning and in adaptive behavior. ID is defined as a functioning that is two standard deviations below the mean on a standardized intelligence test (IQ below 70-75) and a measure of adaptive behavior. Specifically, people with ID have marked deficits in social skills, communication, and independent living skills. The disorder must be evident before 18 years of age and occurs on a continuum from mild to profound (Matson & Shoemaker, 2011; Diagnostic Criteria for Intellectual Disabilities: DSM-5 Criteria - Intellectual Disabilities, 2015). Cognitive limitations or limited cognitive functioning refers to the functioning in people with intellectual limitations or low IQ's who do not necessarily have limits in adaptive skill areas and therefore may not be diagnosed as having an intellectual disability (Arc, 1999). Cognitive dysfunction/deficit refers to the functioning in the segment of the population who may have IQs above 75 but who have intellectual limitations such that they need education and/or supports to succeed with complex tasks. For example, attention, processing speed or working memory deficits (Tymchuk, Lakin, & Luckasson, 2001).

Review of the Literature

This chapter will review the theoretical and empirical literature relevant to the associations between cognitive dysfunction, prodromal cognitive decline, and psychopathology in children, adolescents, and adults. After a discussion of the concept of

the prodromal period, the prevalence of mental health disorders in children with intellectual disabilities will be explored, in addition, the prevalence of childhood psychotic disorders will be reviewed. Then, the literature on psychotic disorders and its association with cognitive decline will be reviewed, followed by the literature that has studied the relationship between limited cognitive functioning and psychosis. The chapter will then examine the indicators of psychosis in psychological testing. The chapter will end by examining the research that has used estimates of premorbid cognitive decline to study the interaction between cognitive functioning and psychosis

Definition of the Concept of the Prodromal Period

The term “prodrome” is derived from the Greek word *prodromos* meaning the time before the event occurs (Fava and Kellner, 1991). In clinical medicine, a prodrome refers to the early symptoms and signs of an illness that precede the characteristic manifestations of the acute fully developed illness. Prodrome in psychotic disorder is similarly defined; a heterogeneous group of behaviors that occur before the onset of psychosis (Young and McGorry 1996). Beiser et al., (1993) defined the prodromal period as the time from first noticeable symptoms to first prominent psychotic symptoms. Therefore, the term refers to a period of prepsychotic disturbance, representing a deviation from a person’s previous functioning. Beiser et al, (1993) found that prodromal periods vary highly in length from none at all to 20 years-duration. The median prodrome length in first episode schizophrenia (here the population was predominantly young, 75% were below the age of 30) is 52.7 weeks and is associated with substantial levels of psychosocial impairment and disability. The mechanism by which this prodromal state evolves into psychosis is not really understood (Loebel et al., 1993, Beiser et al., 1993).

Nonetheless, relapse prodromes seem considerably shorter than first psychotic prodromes. Tarrier et al. (1991) reported prodromal changes within 1 month of relapse in their prospective study. Birchwood et al. (1989), observed changes in his patients from 2-4 weeks before relapse.

Several research groups have identified characteristics of young people, below the age of 18, thought to be at “ultra-high risk” of developing psychosis. These individuals are described as experiencing cognitive changes as the earliest detectable anomaly, followed by attenuated negative symptoms such as decreased motivation and socialization. Later, positive psychotic symptoms develop but are not sufficient in intensity or duration to meet formal criteria for psychotic illness. This constellation of symptoms has been combined with having: 1) a first degree relative with psychosis or 2) a diagnosis of a mood disorder plus a decline in function, to create what is termed an “at risk mental state” or ARMS (Yung et al., 2003; Cornblatt, et al., 2001; Broome et al., 2005). In contrast to the amount of literature on prodrome in schizophrenia, relatively little is written about prodromal features of affective psychoses. As of this date, there are limited studies specifically examining prodromes in first-episode patients with affective disorders. Nonetheless, the psychotic prodrome is potentially important for early diagnosis and management of psychotic disorder, early detection of relapse, and prognosis. This detection can help with early diagnosis and management in schizophrenia to reduce or prevent the psychological and social disruption that results from psychosis (Falloon 1992; Birchwood and Macmillan 1993). In addition, the delay in treatment of the first episode is associated with poorer outcomes (Yung and McGorry, 1996; Alison, and Barnaby 2011). Therefore, a detailed characterization of the symptoms and signs of

initial psychotic prodrome and a study of the evolution of prodromal symptoms to psychotic symptoms is highly important.

The Childhood and Adolescent Prodromal Period. In their research, Rosenbaum, Asarnow and Ben-Meir (1988) examined the premorbid adjustment, onset patterns, and severity of impairment in 66 child psychiatric inpatients with diagnoses of schizophrenia, major depression and dysthymic disorder. When compared to children with depressive disorders, schizophrenic children showed poorer premorbid adjustments, lower IQs, and greater impairment in socialization skills at hospitalization. In addition, the authors found that while some children experienced acute onset of psychosis, the majority appeared to have been chronically impaired or show insidious onset patterns with a time span of 98 to 120 weeks between the onset of nonpsychotic symptoms and psychotic symptoms.

Cornblatt et al. (2003) used data from their Recognition and Prevention (RAP) program to study the prodromal period in adolescence. Specifically, data was collected from 62 adolescents (mean age = 16.4) who were recruited into the RAP program to be treated because they were considered to be in the prodromal state of schizophrenia. This included moderate to severe attenuated positive symptoms (CHR+ group), these symptoms included hallucinations and delusions, suspicions/persecutory ideas, grandiosity, and conceptual disorganization. The second group referred was a CHR- group and included individuals who exhibited only nonspecific, attenuated negative symptoms, such as social isolation and deterioration of school functioning. The third group included emerging attenuated positive symptoms of moderate intensity. Attenuated positive and negative symptoms were measured by the Scale of Prodromal Symptoms

(SOPS; Miller et al, 1999; McGlashan et al. 2001). In the study four risk factors were derived to reflect a vulnerability core: cognitive deficits, affective disturbances, social isolation, and school failure. All four domains were equally impaired across the three risk groups. Specifically, all three groups were cognitively impaired relative to normal controls across the Continuous Performance Test (CPT) and the Wisconsin Card Sorting Test (WCST). Performance indexes were converted into z scores, based on published norms for the WCST and the normative data base for the CPT; all were below normative performance levels (CHR-, $z = -.57$, $SD = .83$; CHR + mod, $z = -.86$, $SD = .83$; CHR+sev, $z = -.93$, $SD = 1.06$) with no differences between groups. Further, results indicated that despite level of positive symptoms, prodromal adolescents, in general, were characterized by a consistent and high level of negative symptoms (as measured on the SOPS) and nonspecific behavior problems (dysphoria). Thus, the negative symptoms dimension appears to be a core vulnerability and exists at the earliest stages of emerging illness. This supports the presence of the underlying vulnerability core regardless of the magnitude of emerging positive symptoms. School failure, which is reflective of refusal to attend and/or participate in school activities, reflects early negative symptoms and were not correlated with cognitive deficits. The authors concluded that school refusal is a better reflection of early negative symptoms rather than cognition. Finally, moderate to moderately severe levels of depression were seen in all three groups; implying that depression is one of the core features of the prodromal phase rather than a reaction to increasing symptoms. This research demonstrates that the prodromal period is not only a time of high risk for future psychosis but also represents a clinical condition, that in itself, is in need of treatment. The authors theorized that there must be a shift from prioritizing

attenuate positive symptoms as the time for intervention to the earlier emerging disturbances period as a time for primary intervention.

The Young Adult and Adult Prodromal Period. Loebel et al., (1992) found a mean duration of 52 weeks of psychotic symptoms before initial treatment in a sample of first-episode psychosis patients, ages 15-54, 54 people were diagnosed with schizophrenia and 16 were diagnosed with schizoaffective disorder. The study also found that poorer outcomes were associated with treatment delay such as, longer illness duration before treatment was associated with longer time to remission of symptoms and a lesser degree of remission. Similarly, Beiser et al., (1993) used reports by family and friends of a sample of 141 subjects diagnosed with Schizophrenia, Major Depressive Disorder with psychotic features, or Bipolar Disorder with initial mania presentation, ages 15-54, with first-episode psychosis, to get a better understanding of the first appearance of prodromal signs of psychotic illness, the emergence of an acute episode, and the initiation of treatment seeking. The authors wrote that 75% of the population was under the age of 30. Results found that the prodromal period (first noticeable symptoms to first prominent psychotic symptoms) was highly variable in lengths. For all patients in this sample, the values ranged from 0 (no prodrome at all) to 20 years. Overall, the authors found that the length of interval between first noticeable symptoms and first prominent psychotic symptoms was equally characteristic of those with Schizophrenia, MDD with psychotic features, and Bipolar illness. On average, the interval between first psychotic symptoms and treatment seeking for the schizophrenic subjects lasted more than 1 year. However, the treatment lag time for subjects with affective psychosis was much shorter. The authors concluded that symptom differences offered a partial

explanation for the differences in treatment lag time. The narrative histories offered by the subjects, their relatives, and their friends suggested that self-destructiveness, seen more in affective psychosis than in schizophrenia, was a behavior that was most likely to call attention to psychosis. In addition, the examiners found that Schizophrenia emerged earlier in their sample than did both MDD with psychotic features or bipolar disorder (early 20's), and that the differences held true for the appearance of prodromal symptoms, and for the emergence of acute psychotic symptoms. This study found no gender differences in age at onset of the prodrome, at first episode, or at treatment seeking when the subjects were diagnosed according to ICD-9. However, this finding varies from most research which demonstrates that on average schizophrenia in females occurs later than in males, suggesting that past findings have found females have a longer prodromal period (Beiser and Iacono, 1990; Stromgren, 1987).

Prevalence

Prevalence of Mental Health Disorders in Children with Intellectual Disabilities. Researchers have also explored the link between overall intellectual functioning and psychopathology by studying mental health of individuals with intellectual disabilities (Einfeld, Ellis, & Emerson, 2011; Dekker & Koot, 2003). Emerson & Hatton (2007) found a difference in the prevalence of psychiatric disorders, using ICD-10 criteria, among children with intellectual disabilities and typically developing children. According to this study, the prevalence of psychiatric disorders among children with intellectual disabilities was 36%, while the prevalence of disorders among those without intellectual disabilities was significantly lower, at 8%. Dekker & Koot (2003) similarly found that prevalence of children between the ages of 6 and 18

with intellectual disabilities that met DSM-IV symptoms criteria for a disorder was 39% which is higher than community-based estimates. In a review of the literature examining the comorbidity between intellectual disabilities and psychiatric disorders, Einfeld, Ellis, & Emerson (2011) concluded that there are markedly increased rates of mental disorders among children and adolescents with intellectual disability, with prevalence rates ranging from 30%-50%.

Prevalence Rates of Childhood Psychotic Disorders. Throughout the research significant variability exists with regard to prevalence estimates of psychotic disorders in children and adolescents across all cognitive levels, sex, and age. In their study Greenstein & Clasen et al., (2011) found that 10-20% of children with a primary psychotic disorder such as Early Onset Schizophrenia have intelligence quotients (IQ's) in the borderline to severely deficient range. Hove and Havik, (2008) found that 4.6% of children and adolescents with ID have a psychotic disorder. Differently, in their study, White, Chant, Edward and Townsend (2005), reported on an ongoing Australian study of young people aged 4-18 years and found that 1.3% of this population who was diagnosed with ID also was diagnosed with a psychotic disorder.

Meta- analyses demonstrate that individuals with ID are at least three times more likely to experience psychosis than those with normal cognitive functioning. In the Kim et al., (2015) study they found 52.9% of participants with schizophrenia and 31% of participants with bipolar disorder have experienced a severe intellectual decline, although this does not mean that they are functioning at the ID level. Overall, the prevalence rates of Schizophrenia Spectrum Disorder (SC), Bipolar Disorder (BD), and other psychotic

disorders, in children and adolescents with cognitive limitations all seem uncertain (Aman, Naeem, Farook, & Ayub, 2016).

Reasons for this variability have been attributed to wide ranging criteria used across research. Further, there are unique challenges of diagnosing individuals with cognitive limitations as they can have difficulty expressing their thoughts, feelings, and experiences. In addition, the screening and assessment measures differ widely across research and epidemiological studies, which provides very different results and makes it difficult to compare outcomes. Further, investigators frequently exclude individuals with ID or very low Full Scale IQs from studies of severe psychopathology in order to focus on homogeneous populations and to avoid the risk of including dually diagnosed patients. Studies of severe psychiatric disorders in children and adolescents with limited cognitive functioning is sparse. Therefore, the prevalence rates recorded are likely an underestimation of the true number of individuals that demonstrate comorbid cognitive limitations and psychotic disorders (Einfeld & Emerson, 2011).

Further, an issue that has been less well researched, is the extent to which individuals who are receiving treatment for formal psychiatric diagnoses, and are being treated for those conditions have impaired intellectual functioning that have not previously been detected. The failure to identify such individuals is important, as problem behaviors and psychiatric symptoms may have entirely different causes in intellectually deficient children and adolescents than they have in their intellectual normal peers, and they may respond to different treatments. In their study, Pogge, Stokes, Buccolo, Pappalardo, and Harvey (2014), used a 10-year sample of 23,629 consecutive child and adolescent admissions (ages between 6 and 17) to inpatient psychiatric treatment in order

to examine the rates of undetected cognitive disability. Results indicated that 16% of the cases had undetected ID. Further, that cases with previously undetected ID were found to be significantly more likely to have a diagnosis of a psychotic disorder and less likely to have a diagnosis of a mood disorder than cases with typical IQ scores. Interestingly, there were no differences in the prevalence of diagnoses of primary behavioral disturbance across levels of IQ. This data suggests a high rate of undetected cognitive limitations in cases with a psychiatric condition serious enough to require hospitalization. In general, there may be a greater number of intellectually deficient or cognitively declining children and adolescents entering mental health systems than is currently recognized. This is problematic because intellectual and cognitive limitations may have significant impact on their response to psychiatric care and seriously affect their long-term outcomes.

An additional barrier to accumulating accurate prevalence rate is that while there is considerable literature on the impact of psychiatric symptoms on intellectual functioning, particularly the impact of schizophrenia and bipolar disorder on cognitive processes, these studies do not differentiate between cognitive and intellectual decline and stable cognitive deficiencies (Woodberry, Giuliano, & Seidman, 2008; Pogge, et al., 2014). Research consistently demonstrates that the rate of psychosis, particularly schizophrenia, is significantly higher among individuals with mild to moderate ID compared with those in the general population without ID (Deb, Thomas, & Bright, 20012). In fact, in his review of the available data, Turner (1989) concluded that prevalence of schizophrenia-spectrum disorders in people with ID is 3%, a figure that is three times higher than in the general population. In addition, he concluded that this number probably is an underestimation because of the difficulties of diagnosis in this

group. However, in all of these studies, ID was based on current diagnosis, and a careful developmental history was not taken. Therefore, the possibility that these subjects demonstrated a pattern of cognitive decline prior or upon onset of the disorder was not considered.

The reasons for the higher frequency of schizophrenia and nonaffective psychotic disorder in people with ID is uncertain, however, there is significant evidence that a strong correlation between IQ and these psychiatric disorders exists (Bouras et al., 2004). Recent literature indicates that children with ID are a group at risk for psychiatric and behavior problems, at about a rate of 3-7% more compared with the general population (Wallander, Dekker, & Koot, 2006). Therefore, it is clear that in individuals identified with intellectual disabilities or risk factors for intellectual disability the assessment of mental health status and treatment of comorbidities is critical (Pogge et al., 2014).

Psychotic Disorders and Cognitive Decline

Cognitive and intellectual dysfunctions associated with schizophrenia and other psychotic disorders have been well established. In fact, research has found executive functioning, attention, memory, language, and general intellectual decline that is detectable before 8 years of age in people with schizophrenia and first episode psychosis (Weickert, et al., 2005; Aas et al., 2012; Seidman et al., 2013). In comparison to adults, children and adolescents with schizophrenia often present with higher rates of cognitive, motor, and behavioral deviations from previous functioning which are seen years before the onset of psychotic symptoms (Kumra & Schulz, 2008; Fish, 1977). Reichenberg et al., 2005 found that not all people with schizophrenia start off with lower cognitive abilities as children; however, there is evidence showing that adolescent cognitive

development, in particular, is subject to decline in at least 40% of men and women who later are diagnosed with schizophrenia. As evidence about the etiology of psychotic disorders has accumulated, there has been a heightened awareness of the need for multifactorial developmental models that take into account the social and cognitive domains impacted by psychotic processes (Ventura et al., 2009). The relationship between cognitive impairment and illness has been evaluated by many studies with differing methodological approaches.

Conflicting findings have emerged with regard to the early course of neuropsychological impairments and its relation with schizophrenia and other psychotic disorders. Some researchers suggest that the influence of early developmental cognitive decline precedes the onset of first episode schizophrenia with no further intellectual decline (Davidson et al., 1999; Nelson, Pantelis, Carruthers & Speller, 1990; Goldberg et al., 1993). However, other researchers have demonstrated that cognitive and intellectual decline is detectable after the onset of illness. Specifically, studies have found that patients with schizophrenia demonstrate intellectual decline compared to estimates of premorbid functioning at the time of first episode (Bilginer, et al., 2005; Bedwell, 1999, Bilder et al., 1992). A majority of the research demonstrates that reported deficits are present before onset and early in the course of schizophrenia. However, longitudinal neurocognitive studies have reported first-episode schizophrenics do not indicate a progression of neurocognitive dysfunction after the first year of illness. One study conducted by Stirling et al., (2003) concluded that first-episode patients (aged 18-45) have relatively stable neurocognitive deficits through at least 10 years of illness. Differently, a recent 4-year follow-up study of adolescents with early-onset schizophrenia

reported that most aspects of neurocognitive functioning remains relatively stable, but that there is evidence for deterioration in immediate verbal memory and attention (Frangou, Hadjulis, & Vourdas, 2008). Therefore, there is conflicting evidence concerning whether progression of cognitive abnormalities is observed after the onset of symptoms.

One approach to look at these differences is in evaluating neuropsychological data that has been collected retrospectively from individuals who later developed schizophrenia. In this research, the aim has been to determine whether any pre-existing abnormalities in cognitive functioning are apparent before the onset of schizophrenia or psychotic episode. The neurodevelopmental model of schizophrenia has been used to explain the subtle behavioral, motor, and cognitive deviations that are apparent in childhood, before overt clinical symptoms of schizophrenia are manifest (Rapport, Addington, & Frangou, 2000; Reichenberg et al., 2010). In fact, there is clear evidence of mild neuropsychological deficits among children who later develop schizophrenia, and research shows even more pronounced deficits among adults diagnosed with schizophrenia. Meta-analyses have shown an average premorbid 8-to 10 point IQ deficit among individuals who later develop schizophrenia (Meier et al., 2014; Kremen et al., 2010; Siedman, Buka Goldstein & Tsuang, 2006; Amminger et al., 2000; Bedwell et al., 1999). In addition, links between childhood trauma and first episodes of psychosis have been carefully examined. Individuals with psychosis have significantly greater histories of childhood trauma than others, and there seems to be a clear association between trauma exposure in childhood, cognitive weaknesses in attention, concentration, language