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THE INFLUENCE OF CHILDHOOD ABUSE ON LONGITUDINAL COURSE OF RECOVERY IN PSYCHIATRIC REHABILITATION

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by

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THE INFLUENCE OF CHILDHOOD ABUSE ON LONGITUDINAL COURSE OF RECOVERY IN PSYCHIATRIC REHABILITATION

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Background: Empirical outcome studies have identified specific symptomatic, cognitive, emotional and functional sequelae of childhood abuse in people with severe mental illness (SMI). These findings illuminate the need for an integrated understanding of biological, psychological, environmental, and developmental aspects of SMI.

Purpose: The purpose of the present study includes the following: 1) to examine reliability and validity of the comprehensive child abuse rating system in a sample of individuals with SMI, 2) to examine the influence of childhood abuse severity on recovery of psychotic symptoms, neurocognition and social-cognition, and social functioning in people with SMI during 12 months of inpatient psychiatric rehabilitation, and 3) to examine moderating effects of social cognition on the relationship between severity of different types of child abuse history and social functioning.

Results: In Study I (*N*=171), the child abuse rating system produced reliable ratings and some subtypes of child abuse history were related to poorer premorbid functioning and cognition, higher overall psychiatric symptoms, and lower social functioning.

In Study II (*N*=161), the longitudinal factor pattern invariance of the measures of social functioning, externality, and psychiatric symptoms were confirmed across 3 time

points (e.g., at admission, at 6 months, and at 12 months). In addition, significant but varied linear relationships between subtypes of child abuse and each level of assessment of functioning were identified.

In Study III (*N*=143), the results showed that higher baseline social inference, independent of history of child physical abuse (CPA), played a protective role in improvements in social functioning. High externality appeared to be counter-therapeutic for individuals with no history of CPA but protective for individuals with a more severe history of CPA.

Conclusion: The child abuse rating system appears to provide reliable and valid assessment of subtypes of child abuse history of individuals with SMI. Considering the extreme heterogeneity in both SMI and child maltreatment, the current finding sheds light on providing individualized treatment and assessment planning for individuals with SMI and a history of childhood abuse.

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TABLE OF CONTENTS

TABLE CAPTIONS

FIGURE CAPTIONS

Chapter 1

Introduction

Over the past four decades, evidence for the role of childhood abuse in severe mental illness (SMI) has accumulated. Research has indicated a very high prevalence of histories of childhood abuse and maltreatment in people with SMI. Estimates of the rate of childhood maltreatment among adults hospitalized for psychosis range from 45% to 92% (Goodman, Rosenberg, Mueser, & Drake, 1997; Read, 1997; Read, Perry, Moskowitz, & Connolly, 2001; Shaw, McFarlane, Bookless, & Air, 2002). This is about twice the rate in the general population (Palmer, Bramble, Metcalfe, Oppenheimer, & Smith, 1994; Read, 1997). Rates of child sexual abuse (CSA) and child physical abuse (CPA) among persons with SMI have been reported from 34% to 60% (Darves-Bornoz, Lemperiere, Degiovanni, & Gaillard, 1995; Greenfield, Strakowski, Tohen, Batson, & Kolbrener, 1994; Ross, Anderson, & Clark, 1994). One half of all adult out-patients with schizophrenia and 78% of female out-individuals with schizophrenia are estimated to have experienced CSA.

The strong linear associations between childhood abuse and symptomatology, neurocognition, social cognition, and social behaviors in later childhood and adulthood have contributed to provoking attention to this issue from policy makers and clinicians as well as researchers. However, since the importance of interrelations among dynamic systems and the processes of breaking down and compensatory mechanisms have been emphasized (A. J. Sameroff & Chandler, 1974), Cicchetti and Valentino (2007) noted that more attention should be paid to identifying complex relationships between childhood abuse and a full range of human functioning including symptomatology,

neurocognition, social cognition, and social behaviors. Along this same line, current theories of SMI also emphasize reciprocal and dynamic relationships among different levels of human functioning ranging from neurophysiological dysregulation to socio-environmental problems (Spaulding, Sullivan, & Poland, 2003). For example, early research demonstrating a linear relationship between cognitive deficits and social functioning has since become more sophisticated with more complex inter-relationships including possible mediators and moderators such as social cognition (Brekke, Hoe, Long, & Green, 2007; Penn, Spaulding, Reed, & Sullivan, 1996; Salomon & Perkins, 1989).

Thus, the influence of childhood abuse in SMI should be investigated in a biosystemic framework in order to better understand its complex relationships among different levels of human functioning. The following introductory sections will review the existing literature in a biosystemic framework and implications for the present study: first, empirical research related to the effects of childhood abuse in SMI is summarized. Second, a systematic literature review to analyze measures of childhood abuse and statistical methods used in the empirical studies is presented. Based on the empirical literature review, research hypotheses of this study are established.

1. Symptomatology, childhood abuse, and SMI.

A strong linear association between a history of childhood abuse and symptomatology in people with SMI has been consistently reported. Read, Agar, Argyle, and Aderhold (2003) investigated whether CSA and CPA are related to hallucinations, delusions, and thought disorder in adults, and whether those relationships are greater in those who have suffered abuse during adulthood as well as childhood. The results showed that adult

sexual assault was related to hallucinations, delusions, and thought disorder. In linear regression analysis, a combination of child abuse and adult abuse predicted hallucinations, delusions, and thought disorder. However, child abuse was a significant predictor of auditory and tactile hallucinations, even in the absence of adult abuse. The linear relationship between child abuse and symptomatology was also supported by (Janssen et al., 2004). This study supported the hypothesis that individuals from the general population who report childhood abuse are at increased risk of developing positive psychotic symptoms. The association between childhood abuse and psychotic symptoms was robust and remained significant after adjustment for demographic information. Shevlin, Dorahy, and Adamson, (2007) also found that CPA was a significant predictor of psychosis in the total sample after controlling for depression. The authors indicated that CPA may affect neurobiological development, resulting in an increase of the risk for a psychotic illness.

The linear relationship between a history of childhood abuse and symptomatology appears to be more complicated. Whitfield, Dube, Felitti, and Anda, (2005)examined the relationship between multiple adverse childhood experiences (ACE) and the likelihood of reporting hallucinations. The authors found that there was also a mediating role for substance abuse in the ACE score-hallucination relationship.

The linear association between childhood abuse and symptomatology is further complicated by demographic factors (e.g., gender). Ucok and Bikmaz (2007) found that 52% of individuals with first episode schizophrenia reported at least one kind of childhood abuse, and 43% of them reported at least one kind of childhood neglect. However, childhood trauma was only associated with positive symptoms but not with

negative symptoms. Spataro, Mullen, Burgess, Wells, and Moss (2004) examined the association between CSA in both boys and girls and subsequent contact to treatment for mental disorder using a prospective cohort design (n=1612; 82.3% girls). Boys were significantly more likely than girls to have had contact with public mental health services (22.8% vs. 10.2%). In the category of childhood disorders, boys were overrepresented for both conduct disorders (1.8% vs. 0.2%) and other childhood mental disorders (5.6% vs. 1.0%). However, no significant differences were found for the rates of contact in adult life for specific diagnostic groups such as schizophrenia (1.1% vs. 0.8%), major affective disorders (0.7% vs. 1.1%), anxiety disorders (2.8% vs. 1.7%), and personality disorders (1.1% vs. 0.4%), but for the group without a recorded diagnosis the male cases were more numerous (8.4% vs. 4.1%). The authors also found that compared to general population, significant increases were apparent for major affective disorders, anxiety disorders, personality disorders and disorders of childhood. However, alcohol- and drug-related disorders were not associated with CSA. Also, the differences between people with and without schizophrenia did not reach significance level. However, these findings should be interpreted with some caution because the average age was in the 20s, so many participants had yet to pass the peak years for developing schizophrenia and related psychotic disorders. Still, the findings suggest that special attention needs to be directed to investigating factors that mediate and potentially ameliorate the impact of not only sexual abuse but also of the whole range of childhood adversities in order to be able to mitigate the damage.

Additionally, characteristics of childhood abuse (e.g., type, severity, duration, etc) have differential influence on diverse aspects of symptomatology. Shevlin and colleagues

(2007) found that the adverse effects vary according to the severity, types and frequency of childhood abuse. The importance of characteristics of childhood abuse (e.g., severity, frequency, and duration) was replicated in Schenkel, Spaulding, DiLillo, and Silverstein, (2005). The authors found no direct association between the presence of childhood maltreatment and an increased overall positive symptom factor score, but found a significant relationship between both the frequency and severity of childhood maltreatment and elevated hallucinations and delusions on the Brief Psychiatric Rating Scale (BPRS).

2. Neurocognitive deficits, childhood abuse, and SMI

Neurocognition is a range of cognitive processes involving neuronal activities distributed across the brain (Spaulding et al., 2003). Neurocognition includes processes from more molecular (e.g., visual feature detection) to more molar process (e.g., concept formation and executive functioning).

There are many similarities in the neurocognitive deficits observed in persons with extreme trauma and abuse histories and in persons with SMI (Read et al., 2001). Recent studies in SMI support the hypothetical link between childhood abuse history and neurocognition (Lysaker, Meyer, Evans, & Marks, 2001; Lysaker, Wickett, Lancaster, & Davis, 2004; Schenkel et al., 2005). Lysaker and colleagues (2001) examined whether self-reported childhood sexual abuse in schizophrenia spectrum disorders is linked with severity of neurocognitive deficits. The results indicated that childhood sexual abuse in schizophrenia spectrum disorders is associated with graver neurocognitive impairment. Specifically, participants who reported histories of childhood sexual abuse performed

more poorly on tests linked with working memory and information processing speed. There was also a positive relationship between a history of childhood abuse, levels of positive symptoms and cognitive deficits. However, the authors indicated the possibility that the link between neurocognition and CSA in schizophrenia spectrum disorders is mitigated by any of a number of other factors not directly investigated in the study. In another study, Lysaker, Wright, Clements, and Plascak-Hallberg (2002) found that poorer executive functioning was related to a history of childhood physical abuse. Schenkel and colleagues (2005) investigated the association between the type, duration and severity of childhood maltreatment and other functioning (e.g., premorbid functioning, current symptomatology, and cognitive functioning). The results showed that participants with one or more types of maltreatment demonstrated more deficits in neurocognition compared to participants with no maltreatment. Also, individuals with a history of abuse performed more poorly on learning and visual context processing tasks compared to controls.

3. Social-cognitive functioning bias, childhood abuse, and SMI

Social cognition is defined as the mental operations that underlie social interactions and social behavior. It covers a broad range of areas including social inference, facial affect recognition, emotional processing, and attributions (Brothers, 1990). Social cognitive impairments have been shown to have a closer relationship with social functioning than neurocognition in persons with SMI (Sergi et al., 2007) and contribute uniquely to the domain of behavioral problems observed on the ward (Penn et al., 1996).

Birchwood, Iqbal, Chadwick, and Trower, (2000) reported individuals who experienced childhood abuse exhibit marked distortions in judgment and reasoning,

particularly when processing of emotional information is required. Impairment of these faculties has been described to result in the formation of social cognitive biases, such as the tendency to judge people more negatively and to conclude that others hold strong unfavorable impressions of them.

Barahal, Waterman, and Martin (1981) found social cognitive bias in abused children. Specifically, maltreated children had more external locus of control than internal locus of control compared to non-maltreated children, which indicates little confidence in their power, especially in unpleasant and frustrating situations. The external locus of control found in maltreated children could be a consequence of adaptation to distressing circumstances. However, the locus of control pattern in clinical settings is reported to relate with over-compliance, slow development of self-confidence, and hypervigilance to external cues rather than internal thoughts (Beezley, Martin, & Kempe, 1976; Martin & Beezley, 1977; Rodeheffer & Martin, 1976). Also, it has been reported that external locus of control is associated with behavioral problems such as poor impulse control (Montgomery & Finch Jr, 1975), low self-esteem in children (Piers, 1977), and lack of self-confidence and insight in adults (Joe, 1971). In contrast, internal locus of control has been reported to be positively associated with perspective taking (Cohen & Farley, 1973).

Bronfenbrenner (1967) and Kohlberg, LaCrosse, and Ricks (1972) indicated that rigidity of role formation inhibits moral reasoning in unstructured or ambiguous social contexts. Devereux (1972) suggested that lack of competency to flexibly shift and modify role expectancies would be related to delay of internalized moral development.

Maltreated children have been reported to process subtle and complex relationships in social situations less efficiently, which may be related to inflexible role-taking.

Although social cognitive bias has been consistently reported in children with a history of childhood abuse, there were a few studies focusing on social cognitive bias in people with SMI who have a history of childhood abuse. Most of these studies included a social cognitive variable as a mediator in their model. Shahar, Chinman, Sells, and Davidson (2003) examined the mediating effects of suspiciousness and hostility in the relationship between childhood sexual and physical abuse and disruptive behaviors. The authors found using structural equation modeling that the link between self-reported childhood abuse and current disruptive behavior was fully mediated by individuals' suspicious and hostile attitudes. Additionally, Lysaker and colleagues (2002) found using stepwise regression that hopelessness was best predictive of attitudinal hostility in outpatients with SMI who have a history of CPA whereas executive functioning was related to behavioral hostility.

4. Social functioning deficits, childhood abuse, and SMI

Social functioning and its relationships with other levels of human functioning (e.g., neurocognition or social cognition) have been of interest in the field of SMI research. Lysaker, Meyer, Evans, Clements, and Marks (2001) explored the association between sexual abuse in childhood and the severity of psychosocial deficits in adults with schizophrenia. They found that participants who have a history of childhood sexual trauma had poorer role functioning, fewer of the psychological resources necessary for sustaining intimacy, and higher levels of emotional instability and turmoil. The authors suggested that limited ability to form attachments and to function in a socially defined

role due to early sexual trauma among individuals with schizophrenia may compromise their ability to have the quality of life they desire. Lysaker, Nees, Lancaster, and Davis (2004) examined whether history of childhood sexual abuse in schizophrenia spectrum disorders is linked with severity of vocational deficits. The results revealed that childhood sexual abuse in schizophrenia spectrum disorders may be an additional barrier to vocational function in adulthood, as evidenced by the fact that participants who reported childhood sexual abuse worked fewer hours over the first month of a work program and demonstrated poorer work performance, with a pattern of work performance that declined over time in contrast to the nonabuse group whose work performance improved. The authors argued based on these findings that traumatic experiences in general may be linked to emotional instability and difficulties processing social information when under stressful situation such as a work environment. These hypotheses were explored more explicitly in (Lysaker, Beattie, Strasburger, & Davis, 2005). They examined the relationship between reported childhood abuse, psychotic symptoms, and social dysfunction over 4 months of rehabilitation in a sample of 12 adults with schizophrenia or schizoaffective disorder and childhood sexual abuse and 31 with schizophrenia or schizoaffective disorder and no history of childhood sexual abuse. The results from the series of repeated-measures ANOVAs indicated that the abuse group had overall higher positive component scores without a significant time effect. In addition, the findings showed that the abuse group had overall higher emotional discomfort component scores without a time effect. Finally, the authors found that there was a significant group effect with the nonabuse group working more hours overall than the abuse group. A group by time effect was also found, with the nonabuse group showing a

relatively steady number of hours of work per week across the time period and the abuse group working fewer and fewer hours. The authors indicated that the results appear to strongly support previous findings by Read and Ross (2003) that a history of sexual abuse may represent a significant risk factor or even acquired vulnerability for grave social dysfunction.

Finally;, childhood abuse appears to be linked with risky behaviors in adults. van Dorn and colleagues (2005) examined the relationship in persons with SMI between CSA and adult risky sexual behaviors and tested the potential mediating effects of adult rape, substance use, and PTSD. The results revealed that there was a complex link between childhood sexual abuse and adult risky sexual behaviors in persons with SMI. Specifically, childhood sexual abuse in women was linked with having ever traded sex for money and having engaged in unprotected sex in the past 6 months. On the other hand, childhood sexual abuse was inversely associated with the number of times men had unprotected sex in the past 6 months.

5. Measures of Childhood Abuse in SMI

The literature review was conducted with a search of the PsycINFO database for the period of 2000 to the first week of July, 2008, restricted to peer reviewed journals. Through a systematic electronic search combined with this author's follow-ups from the reference lists, 30 empirical articles including measures of childhood abuse in SMI were finally selected. As shown in table 1, 50% (15 out of 30 studies) used self-report questionnaires, 30% (9 out of 30 studies) used an structured or semi-structured interview (by asking some related questions), and 10% (3 out of 30) quantified archival records. As such, half of studies used self-reported information to measure a history of childhood

abuse, even though there is controversy regarding using self-report measures of childhood abuse in SMI due to concerns about reliability. Collecting accurate information is sometimes difficult, especially for individuals in an acute phase, due to individuals' psychotic symptoms, intentional false report, confusion, or other neurocognitive functioning deficits.

Table 1. Summaries of Measures of Childhood Abuse

#	Authors	Year	Measures for Child Abuse
1	Lysaker et al.	2001	Childhood Abuse Questionnaire (CAQ; Levitan et al., 1998)
2	Goodman et al.	2001	Sexual Abuse Exposure Questionnaire (SAEQ; Rodriguez, Ryan, Van De Kemp, & Foy, 1997; Ryan, Rodriguez, Rowan, & Foy, 1992).
3	Lysaker et al.	2001	Childhood Abuse Questionnaire (CAQ; Levitan et al., 1998)
4	Irwin	2001	Childhood trauma Questionnaire (CTQ) (Bernstein et al., 1994).
5	Heasty et al.	2002	Semi-structured interview
6	Lysaker et al.	2002	Childhood Abuse Questionnaire (CAQ; Levitan et al., 1998)
7	Friedman et al.	2002	Questions imbedded in the Life History Questionnaire (LHQ; Helmreich et al., 1973)
8	Shahar et al.	2003	Physical/Sexual Abuse Survey (PSAS: Sells, Stryron, Shahar, Chinmab, and Davidson, June 2002).
9	Read et al.	2003	Chart records, Researchers' operational criterion
10	Holowka et al.	2003	Childhood Trauma Questionnaire (CTQ; Bernstein and Fink, 1998)
11	Berenbaum et al.	2003	Childhood Trauma Questionnaire (CTQ; Bernstein and Fink, 1998)
12	Pataro et al.	2004	Chart records, Researchers' operational criterion
13	Burnside et al.	2004	Childhood Experience of Care and Abuse (CECA) interview schedule (Bifulco, Brown, & Harris, 1994)
14	Lysaker et al.	2004a	Childhood Abuse Questionnaire (CAQ; Levitan et al., 1998)
15	Lysaker et al.	2004b	Childhood Abuse Questionnaire (CAQ; Levitan et al., 1998)
16	Compton et al.	2004	Childhood Trauma Questionnaire Short Form (CTQ-SF)
17	Janssen et al.	2004	Semistructured interview: whether or not, frequency
18	Lysaker et al.	2005	Childhood Abuse Questionnaire (CAQ; Levitan et al., 1998)
19	Lysaker et al.	2005	Trauma Assessment for Adults (TAA) (Brief revised version).
20	van Dorn et al.	2005	Asking questions created by the authors
21	Whitfield et al.	2005	Questions adapted from the conflict tactics scale (CTS; Straus & Gelles, 1990),
22	Schenkel et al.	2005	Chart records, Researchers' operational criterion
23	Spence et al.	2006	Self-report
24	Üçok and Bikmaz	2007	Childhood Abuse Questionnaire (CAQ; Levitan et al., 1998) for the presence of childhood abuse, Childhood Trauma Questionnaire (CTQ; Bernstein and Fink, 1998) for the severity of childhood abuse
25	Ford et al.	2007	Measure not specified
26	Shevlin et al.	2007	Questions imbedded in the National Comorbidity Survey (NCS) measuring PTSD
27	Giesbrecht et al.	2007	Women with a history of CSA were recruited through newspaper advertisements
28	Kauer-Sant'Anna et al.	2007	Grouped into 4 major categories (12, 14): sexual abuse, physical abuse, psychological abuse, and ‘other traumatic events’.
29	Houston et al.	2008	Asking questions created by the authors
30	Heim et al.	2008	Measure not specified

In addition, a systemic rating system for using archival data has not been employed in the recent literature. According to the current systemic literature review, only 10% of the studies used archival records, which were coded using the authors' own operational definition or depending upon a previous clinicians' decision (Read et al., 2003; Schenkel et al., 2005; Spataro et al., 2004). Also, according to the review, only Schenkel et al (2005)'s study includes severity and frequency in the ratings of archival records.

Use of archival data also has advantages and disadvantages compared to self-report measures. As Barnett and colleagues (1993) summarized in their book chapter, archival data such as Child Protective Services Records and hospital chart information include somewhat detailed information of maltreatment incidents collected from family members, victims, and/or other relevant mental health professionals. Another advantage to archival data is that any biased information or falsely denied or over-reported records could be compensated by comparing other sources of information such as other assessment data, court information, or reports from families. However, archival data also has disadvantages. If the operational definition of childhood abuse varies across institutions, some of the information, especially less dramatic incidents such as emotional maltreatment (EM) or lack of supervision (LOS), may be neglected. Also, archival data may not be available for every patient due to each hospital's record policy, or lack of experts who are adequately trained to investigate childhood abuse. Another disadvantage of using archival data is difficulty quantifying narrative reports. The variability of reports requires systematic classification criteria based on psychometrically valid evaluation. Thus, it is critical to utilize a psychometrically sound method to quantify archival records.

One such systemic rating system of archival data is the child abuse rating system described in Barnett and colleagues (1993). This rating system was originally developed to quantify Child Protective Records, but has been successfully utilized in an SMI study (Choi, Reddy, Liu, & Spaulding, 2009). This rating system provides thorough criteria and descriptions for each kind of childhood abuse for quantifying and categorizing archival information. This rating system produces measures of severity, frequency/chronicity, duration, developmental periods, placement, and perpetrator of subtypes of childhood abuse.

6. Statistical Methodology

According to the literature review conducted with a search of the PsycINFO database for the period of 2000 to the first week of July, 2008 with a restriction of peer reviewed journals, the majority of studies used statistical methods depending upon group means and group standard deviations (Table 2). However, it has been noted that childhood abuse is a heterogeneous problem (Cicchetti & Carlson, 1989), and SMI also cannot be understood without considering its heterogeneity (Brekke et al., 2007; Peer, Kupper, et al., 2007; Peer & Spaulding, 2007). Thus, there must be a huge variance in types and severity of childhood abuse in individuals with SMI. Thus, the assumption of sample homogeneity limits understanding of the effect of childhood abuse in SMI. Further, it has been reported that reciprocal relationships among different levels of human functioning in SMI could change in response to the phase of illness (e.g., acute phase, post-acute phase, or residual phase). However, of thirty empirical studies in the literature review, only two studies attempted to address longitudinal effects of childhood abuse in SMI. To

the knowledge of this author, none of the studies address variance in both between-person and within-person changes in their model. In order for developmental theories of SMI to explain why a given individual demonstrates deficits, differential response, or bias during treatment and/or non-treatment , it is critical to employ advanced longitudinal statistical methods such as latent growth modeling and multilevel modeling to better capture individual characteristics over time in different systems and contexts (Baltes & Nesselroade, 1979; Peer, Kupper, et al., 2007; Spaulding & Poland, 2001).

Table 2. Summaries of Main Statistics and Study Design

Number	Authors	Year	Main Statistics	Design
1	Lysaker et al.	2001	MANCOVAs and ANCOVAs	Cross-sectional
2	Goodman et al.	2001	Multivariate and univariate logistic regressions	Cross-sectional
3	Heasty et al.	2002	Chi-square test	Cross-sectional
4	Friedman et al.	2002	Chi-square, correlation, and t-test	Cross-sectional
5	Read et al.	2003	Chi-square test. Independent samples t-tests (two-tailed), Stepwise linear regression	Cross-sectional
6	Holowka et al.	2003	Correlation and partial correlation	Cross-sectional
7	Pataro et al.	2004	Chi-square test	Cross-sectional
8	Lysaker et al.	2004	Repeated measure ANOVAs	Longitudinal
9	Lysaker et al.	2005b	ANOVA and t-test	Longitudinal
10	Lysaker et al.	2005a	MANOVAs and ANOVAs	Cross-sectional
11	Van Dorn et al.	2005	Chi-square statistics converted to F statistics, and logistic models presented with McFadden's R^2, the log likelihood, the Akaike Information Criterion (AIC), and the alpha parameter	Cross-sectional
12	Spence et al.	2006	Chi-square test	Cross-sectional
13	Ford et al.	2007	Chi-square test	Cross-sectional
14	Shevlin et al.	2007	Hierarchical binary logistic regression	Cross-sectional
15	Giesbrecht et al.	2007	Stepwise binary logistic regression	Cross-sectional
16	Houston et al.	2008	An additive hierarchical binary logistic regression model	Cross-sectional
17	Heim et al.	2008	Unspecified	Cross-sectional
18	Kauer-Sant'Anna et al.	2007	ANOVA and regression (ANCOVA)	Cross-sectional
19	Lysaker et al.	2001	MANOVA and ANOVAs	Cross-sectional
20	Irwin	2001	Hierarchical Multiple Linear Regression	Cross-sectional
21	Lysaker et al.	2002	Stepwise multiple regression	Cross-sectional
22	Shahar et al.	2003	Structural Equation Modeling	Cross-sectional
23	Berenbaum et al.	2003	Correlation and structural equation modeling (SEM)	Cross-sectional
24	Burnside et al.	2004	ANOVAs and Multiple Regressions	Cross-sectional
25	Lysaker et al.	2004	Correlation	Cross-sectional
26	Compton et al.	2004	Mann-Whitney U-test	Cross-sectional
27	Janssen et al.	2004	Logistic regression	Cross-sectional
28	Whitfield et al.	2005	Logistic regression	Cross-sectional
29	Schenkel et al.	2005	T-tests, Chi-square tests, MANOVA, and linear trend analysis	Cross-sectional
30	Üçok and Bikmaz	2007	Mann–Whitney U-test, Chi-squared test, Spearman's correlation analyses	Cross-sectional

7. Conclusion

Over the past four decades, modest to strong linear associations between childhood abuse and symptomatology, neurocognition, social cognition, and social behaviors in people with SMI have been reported. However, there is still a gap between what we have learned about the effects of childhood abuse from other fields of study such as developmental psychopathology and neurobiology and what we have learned in the field of SMI.

First, little attention has been paid to mediating or moderating variables in the relationship between childhood abuse and other functioning even though interrelations among dynamic systems and processes are emphasized to better understand the complexity of the relationship between childhood abuse and SMI (A. Sameroff & Chandler, 1975). Thus far, if previous studies address "whether childhood abuse is linked with psychosis," or "whether persons with a history of childhood abuse show a different clinical presentation (e.g., poorer neurocognition) as a group," we need to move our attention towards "why and how someone with a history of childhood abuse develops psychotic symptoms while others with a history of childhood abuse do not," or "why and how some individuals with a history of childhood abuse achieve their recovery in different fashions during either community living, inpatient, or outpatient rehabilitation programs."

Second, as Cicchetti and Rizley (1981) suggested, it is necessary to explore both positive and negative risk factors, which will also facilitate understanding of both treatment and etiology of childhood abuse. Also, any finding on protective factors is expected to provide insight for preventing intergenerational transmission of maltreatment

in adults with SMI who have a history of childhood abuse. Given that few studies have focused on protective factors that decrease the effect of childhood abuse in SMI, special attention needs to be paid to this issue.

Third, childhood abuse is a heterogeneous problem (Cicchetti & Carlson, 1989). Thus, there must be great individual differences in the influence of types and severity of childhood abuse in individuals with SMI. However, statistical methods assuming homogeneity of between- and within-groups variability are limited in addressing complex mechanisms and heterogeneity of people with SMI. Thus, in order for developmental theories of SMI to better capture and explain individual differences in overall clinical presentation and longitudinal changes during treatment and rehabilitation, advanced statistical models should be employed (Baltes & Nesselroade, 1979; Peer & Spaulding, 2007; Spaulding & Poland, 2001).

Fourth, objective archival information needs to be incorporated in the assessment of types and severity of childhood abuse, as researchers and clinicians have reached the consensus that a comprehensive system for measuring childhood abuse in SMI is necessary. Archival data such as Child Protective Records and hospital chart information have several advantages including 1) information about maltreatment incidents collected from family members, victims, and/or relevant mental health professionals, and 2) unbiased and reliable information compensated by comparing diverse sources of information such as other assessment data, court information, or reports from families.

Even though use of archival data can be limited in some situations where the setting lacks an expert who is adequately trained on investigating childhood abuse or there is difficulty quantifying narrative reports, utilizing a psychometrically valid,

systematic coding guide allows optimal use of archival information, and compensates for these disadvantages.

Finally, little attention has been paid in the literature to social-cognitive bias related to a history of childhood abuse in adults with SMI. Given that social-cognitive bias is one of the core features found in SMI (Brekke et al., 2007; Penn et al., 1996; Penn, Corrigan, Bentall, Racenstein, & Newman, 1997; Sergi et al., 2007), and individuals who experienced childhood abuse have been reported to exhibit marked distortions in social judgment and social reasoning (Bronfenbrenner, 1967; Kohlberg et al., 1972; Shahar et al., 2003), special effort in this area should be made in future research.

Chapter 2

Study I

Hypotheses

The purpose of Study I is to examine the reliability and validity of the child abuse rating system described in Barnett, Manly, and Cicchetti (1993) in a sample of individuals with serious mental illness (SMI). For reliability, inter-rater reliability (intraclass correlation coefficient), and inter-item correlations were examined. For validity, the relationships between histories of child abuse, premorbid functioning (e.g., age of onset, number of previous hospitalizations, etc) and clinical variables (e.g., neurocognition, social-cognition, and psychiatric symptoms) were examined.

It is hypothesized, first, that the child abuse rating system (Barnett et al., 1993) will produce reliable ratings across raters, and each category of child abuse (e.g., CSA, CPA, FTP, LOS, EM, and MLEM) will be correlated with each other, but distinct. Second, individuals with a history of child abuse will have poorer premorbid functioning (e.g., less education, higher number of previous hospitalizations, earlier age of onset, etc). Third, individuals with a history of child abuse will demonstrate greater deficits in neurocognition and social cognition, higher overall psychiatric symptoms and lower social functioning while participating in an inpatient psychiatric rehabilitation program.

Methods

Institutional Approval

This study was approved by the Institutional Review Board (IRB) at the University of Nebraska-Lincoln (IRB#2002-05-302 EP). In addition, the study was reviewed and approved by the research committee at the Lincoln Regional Center.

Participants

A total of 196 participants' data collected between 1996 and 2009 at the Lincoln Regional Center's Psychiatric Rehabilitation Program were included. Participants' data were included if they met criteria for DSM-IV (American Psychiatric Association, 1994) diagnosis of schizophrenia spectrum disorders or bipolar disorder, as based on medical chart review at the Lincoln Regional Center. A diagnosis of schizophrenia spectrum disorders or bipolar disorder was discussed and confirmed by multidisciplinary treatment team in the course of psychiatric rehabilitation at the Lincoln Regional Center. Data were excluded from analysis given known organic brain pathology or mental retardation. Archival clinical data from 171 participants (age M = 37.04 years, SD = 12.11) in an inpatient psychiatric rehabilitation program were used in the present analyses (see Table 3).

Table 3. Demographic Information (*N*=171)

	n (%)	M	SD
Gender			
Female	85 (49.7)		
Male	86 (50.3)		
Age at Admission		37.04	12.11
Years of Education		12.42	1.96
Age of Onset		19.45	8.31
Axis I Diagnosis			
Schizophrenia	90 (52.6)		
Schizoaffective	58 (33.9)		
Bipolar	20 (11.7)		
Psychotic Disorder NOS	3 (1.8)		
Axis II Diagnosis			
Borderline	12 (7.0)		
Schizoid	3 (1.8)		
Paranoid	28 (16.4)		
Antisocial	9 (5.3)		
Personality Disorder NOS	18 (10.5)		
None	106 (59.0)		
Race			
Asian American	2 (1.2)		
Hispanic American	2 (1.2)		
African American	20 (11.7)		
European American	142 (83.0)		
Unidentified	5 (2.9)		
Marital Status			
Married	18 (10.5)		
Single	100 (58.5)		
Divorced	45 (26.3)		
Other	8 (4.7)		

Social Learning Based Inpatient Psychiatric Rehabilitation Program (PRP)

The psychiatric rehabilitation program (PRP) is a 40-bed unit in a state hospital, with a 15-bed transitional extension located in an apartment building in the community. Individuals participate in an average of 35 to 40 hours per week of structured treatment and rehabilitation activities. The PRP treats chronic, treatment-refractory individuals with severe mental disorders, primarily schizophrenia spectrum disorders including bipolar disorder. The therapeutic milieu of the PRP is generally not characterized as a specific intervention; rather it brings together two comparatively separate components that can be distinguished as specific interventions for specific problems: skills training (e.g., social skills training, occupational therapy, therapeutic recreation, medication management) and contingency management (e.g., behavior management program). Skills training addresses

specific problems at the socio-behavioral level of functioning, whereas contingency management focuses on specific problems in person-environment interactions (antecedents, behaviors, consequences). Thus, the therapeutic milieu is both rehabilitative and supportive. The average length of treatment varies considerably with three modal groups emerging: a large group of people whose length of stay is between 1 to 2 ½ years, a slightly smaller group whose length of stay is under a year, and a much smaller group of people whose length of stay is longer than 2 ½ years (Rothmann, 2005). Discharge destinations range from community-based residential programs to supported independent living to independent living.

Measures[1]

Ratings of the Severity of Child Abuse

Ratings of the severity of child abuse consist of two procedures: data collection and data coding. Histories of childhood maltreatment (e.g. child sexual abuse (CSA), child physical abuse (CPA), failure to provide (FTP), lack of supervision (LOS), emotional maltreatment (EM), moral/legal/educational maltreatment (MLEM)) are collected through medical chart reviews. Four graduate research assistants who were blind to the research hypotheses of this study reviewed individual charts including social history and related testing and interview information, and entered relevant information into the database according to data collection guidelines, which were developed by the author based on the child abuse rating system described in Barnett, Manly, and Cicchetti (1993) (See Appendix II for details).

[1] Measures chosen for this study reflect evolving consensus of the UNL SMI Research group

Two other graduate research assistants who did not participate in data collection and were blind to the research hypotheses of this study coded the severity of child abuse history separately based on the child abuse rating system described in Barnett, Manly, and Cicchetti (1993) (see Appendix I).

According to this system, "severity refers to the relative seriousness of the act with regard to the potential negative psychological impact that a caregiver's act may have on the child's socioemotional development" (Barnett et al., 1993, p. 52). Child abuse while the participant was a minor (i.e., less than age of 19 in Nebraska) is scored on a severity scale ranging from 1-5. The most severe occurrence reported in each category represented the severity score for that individual. For example, sexual abuse is coded when the medical chart indicates that a caregiver or responsible adult made, or attempted to make, sexual contact with the child for purposes of the caregiver's sexual gratification or financial benefit. The severity rating of “one” would apply when the adult exposes the child to explicit sexual stimuli, activities such as pornographic materials, or a discussion of sex explicitly in front of the child in a non-educational fashion. The severity rating of “two” is applied to events in which the caregiver makes direct requests for sexual contact or exposes his or her genitals. A severity rating of “three” is coded when the adult engages the child in mutual sexual touching or touches the child for sexual gratification. The severity rating of “four” is given when the caregiver attempts to penetrate the child or actually penetrates the child sexually; this includes coitus, oral sex, anal sex, or any other form of sodomy. A rating of “five” is coded when the adult has forced intercourse with the child, for example tying the child to a bed and raping them or sodomizing them at gunpoint, or when the caregiver prostitutes the child for pornography or to have forced

sex with other adults. Inter-rater reliability for CSA in SMI was reported in another study (ICC=.97) (Choi et al., 2009).

Symptomatology

Symptomatology is measured by the Extended Brief Psychiatric Rating Scale (BPRS; Lukoff et al., 1986). The BPRS is symptom scale consisting of 24 psychiatric symptom constructs, each rated on a 7-point scale of severity ranging from "not present" to "extremely severe." Items are rated based on a structured, 25-minute interview as well as available clinical records and collateral contacts. Interviewers receive structured training on conducting the interview and rating the individual items. Research suggests excellent inter-rater reliability (Ventura, Green, Shaner, & Liberman, 1993).

Four to six factors of the extended version of the BPRS were identified using principle component analysis or exploratory factor analysis (see Kopelowicz, Ventura, Liberman, & Mintz, 2008 for four factors; Ventura, Nuechterlein, Subotnik, Gutkind, & Gilbert, 2000 and Spaulding, Reed, Sullivan, Richardson, & Weiler, 1999 for five factors). A five factor model of the extended version of the BPRS was supported using confirmatory factor analysis (Burger, Calsyn, Morse, Klinkenberg, & Trusty, 1997). The five factors consist of Thinking Disorder (Grandiosity, Hallucinations, Unusual Thought Content, Conceptual Disorganization), Withdrawal (Disorientation, Blunted Affect, Emotional Withdrawal, Motor Retardation), Anxiety-Depression (Somatic Concerns, Anxiety, Depression, Guilt), Hostility-Suspicion (Hostility, Suspiciousness, Uncooperativeness), and Activity (Tension, Excitement, Mannerisms and Posturing). Internal consistency coefficients (Cronback alpha coefficients) for the five subscales were

as follows: Thinking Disorder=0.80, Withdrawal=0.74, Anxiety/Depression=0.73, Hostility/Suspicion=0.49, and Activity=0.81 (Burger et al., 1997).

More recently, a longitudinal factor structure of the 18-item version of the BPRS was examined using a multiple group confirmatory factor analysis (Long & Brekke, 1999). The results showed that the 16-item version of the BPRS was more invariant over 3-year period than 18-item version. The four factors of the 16-item version of the BPRS are as follows: Thought Disturbance (Grandiosity, Suspiciousness, Hallucinations, and Unusual Thoughts), Anergia (Emotional Withdrawal, Motor Retardation, Uncooperativeness, and Blunted Affect), Affect (Somatic Concern, Anxiety, Guilt, Depression, and Hostility), and Disorganized (Conceptual Disorganization and Tension).

Since the extended version of the BPRS contains the same 16 items that used in Long and Brekke (1999)'s longitudinal factor structure analysis, two versions of the factor scores (16-item version 4 factor model and 24-item version 5 factor model) will be used for testing a model fit to the data and the subsequent analyses of this study.

Neurocognition

Neurocognition is measured using separate measures including the Controlled Oral Word Association (COWA) FAS test, Clock Drawing Test (CDT), Letter-Number Sequencing, and Mazes.

1. Executive Functioning

The Controlled Oral Word Association (COWA) FAS test is a measure of word generation and production of spoken words (Benton, Hamsher, & Sivan, 1989). The COWA consists of three word-naming trials. The set of letters "F-A-S" was used in this

study. Participants were asked to say as many words as they can think of that begin with the given letter of the alphabet, excluding people's names, places, numbers, and the same word with a different suffix. The total numbers of words generated within 1-minute per letter is used. The COWA has proved to be a sensitive indicator of frontal lobe dysfunction (Lezak, 2004).

The Clock Drawing Test (CDT) is a measure of visual-spatial, constructional and executive difficulties (Strauss, Sherman, & Spreen, 2006). For this study, the free-drawing version was employed. Participants were given an unlined letter-size sheet of paper and a pencil and asked to draw the face of a clock with all the numbers on it. After completion of the clock face, participants were asked to set the time to 10 after 11. The 10-point scoring system (Libon, Swenson, Barnoski, & Sands, 1993; Sunderland et al., 1989) was used. Test-retest reliability for the CDT after 12 weeks was 0.78 for individuals with Alzheimer's disease (AD) (Mendez, Ala, & Underwood, 1992).

The Mazes is a supplemental subtest of the Wechsler Intelligence Scale for Children-the third edition (WISC-III) (Wechsler, 1997) and measures planning ability, visual-motor coordination, and perceptual-organizational ability . Participants were asked to draw a line from the center of each maze to the outside without crossing any of the lines that indicate walls (Wechsler, 1997). To complete the maze, the participant must avoid blind alleys or crossing walls while keeping their pencil on the paper (Wechsler, 1997). The participant is allowed to go backward. Also, to successfully complete the task, the participant must resist an implied need for speed. For the Mazes test, the average reliability coefficient across ages is .70, and ranges from .66 to .80 (Wechsler, 1997).

2. Working Memory

Letter-Number Sequencing (WAIS-III) (Wechsler, 1997) is a measure of attention and working memory. In this test, participants listen to lists of mixed numbers and letters of increasing spans from two to eight units, and then are asked to repeat numbers and letters from the lowest in each series with numbers always first. The span is increased until the participant fails all three items of one span (Lezak, 2004).

Social Cognition

Two scales are employed to measure social cognition: the Hinting Task and the Self-Efficacy and Externality Inventory. The Hinting Task was devised to measure both social inference and theory of mind abilities of people with SMI. This task consists of 10 vignettes of conversations between two people, one of whom provides a verbal hint at the end of each story. The examinee is asked to infer what the hint really means during the conversation. A correct response to the first hint is given 2 points. If the person fails to infer a reasonable meaning from the first hint, another more obvious hint is given, and 1 point is given if the second response is correct and 0 points if incorrect. The task is scored out of 20 possible points. Lower scores on the Hinting Task indicate more impaired social cognition. The Hinting Task has demonstrated predictive validity for overall social skills (Pinkham & Penn, 2006) and mentalizing deficits in psychosis (Bell, Bryson, Greig, Corcoran, & Wexler, 2001).

The Inventory for Self-Efficacy and Externality (I-SEE) (FKK, Fragebogen zu Kompetenz- und Kontrolluberzeugungen; Krampen, 1991) was used to assess a more

global attributional style (locus of control). This measure consists of 32 survey items regarding 4 primary scales: Internality, Self-Concept of Own Competence, Powerful Others' Control Beliefs and Chance Control Beliefs. It yields two composite scales: Self Efficacy and Externality. Items are rated on a six-point Likert scale and subscale scores range from 8 to 48.

Social Functioning

Social functioning was measured using the Nurses' Observation Scale for Inpatient Evaluation Total Positive Subscale (NOSIE-30) (Honigfeld, Gillis, & Klett, 1966). The NOSIE-30 is one of the most widely used instruments by clinical staff and has undergone significant psychometric development. It is a highly sensitive naturalistic ward behavior rating scale. Importantly, although developed as an indicator of acute psychosis and drug effects, it yields a quantitative assessment of behavioral change (Spaulding et al., 2003), thus providing a trajectory of progress in rehabilitation. The NOSIE-30 is a checklist of 30 behavioral items completed by staff members (one day-shift member and one night-shift member) who have observed the patient over the past three days. The items are rated on a five-point Likert type scale: Never = 0, Sometimes = 1, Often = 2, Usually = 3, and Always = 4. The ratings used in this study were made by direct care staff (psychiatric technicians) as a routine part of the rehabilitation assessment and treatment milieu. A total positive subscale is computed by summing the three positive subscales of the NOSIE-30: Social Competence (e.g., "refuses to do ordinary things expected of him or her"- reverse scored item), Social Interest (e.g., "tries to be friendly with others") and Personal Neatness (e.g., "keeps clothes neat"). Lower scores on the NOSIE-30 indicate

more impairment in social functioning. Pair-wise inter-rater reliability (Pearson's r) ranged from 0.68 to 0.71 (Spaulding et al., 1999). In this study, pair-wise inter-rater reliabilities (Pearson's r) at times 1, 2, 3 and 4 on the total positive subscale were 0.75, 0.77, 0.71 and 0.74, respectively.

Data Analyses

SPSS 17.0 was used to obtain inter-rater reliability (intraclass correlation coefficient) and inter-item correlations and to analyze a series of analyses of variance (ANOVAs).

Results

1. Child Abuse Rating System

1.1. Inter-rater reliability

Inter-rater reliability coefficients were calculated based on intraclass correlation (McGraw & Wong, 1996; Shrout & Fleiss, 1979). Inter-rater reliabilities for child sexual abuse (CSA), child physical abuse (CPA), failure to provide (FTP), lack of supervision (LOS), emotional maltreatment (EM), and moral/legal/educational maltreatment (MLEM) were .98, .96, .97, .86, .93, and .97, respectively. Ratings from the two separate raters were averaged for further analyses.

1.2. Frequency of Child Abuse

The severity of child abuse history was categorized into three categories; none, mild (less than 2.5), and severe (More than 3). The percentage of the 3 categories of severity ratings (none, mild, and severe) in the six domains of child abuse history were calculated (Table 4 and Figure 1).

Table 4. Severity Ratings in Six Domains of Child Abuse History (*N*=171).

	SA	PA	FTP	LOS	EM	MLEM
None	64.33%	71.93%	89.47%	67.25%	62.57%	84.80%
Mild (<3)	15.20%	23.39%	8.19%	30.41%	25.15%	6.43%
Severe (≥3)	20.47%	4.68%	2.34%	2.34%	12.28%	8.77%

As seen in Figure 1, 35.67%, 28.07%, 10.53%, 32.75%, 37.43%, and 15.20% of participants were reported to have a history of CSA, CPA, FTP, LOS, EM, and MLEM, respectively.

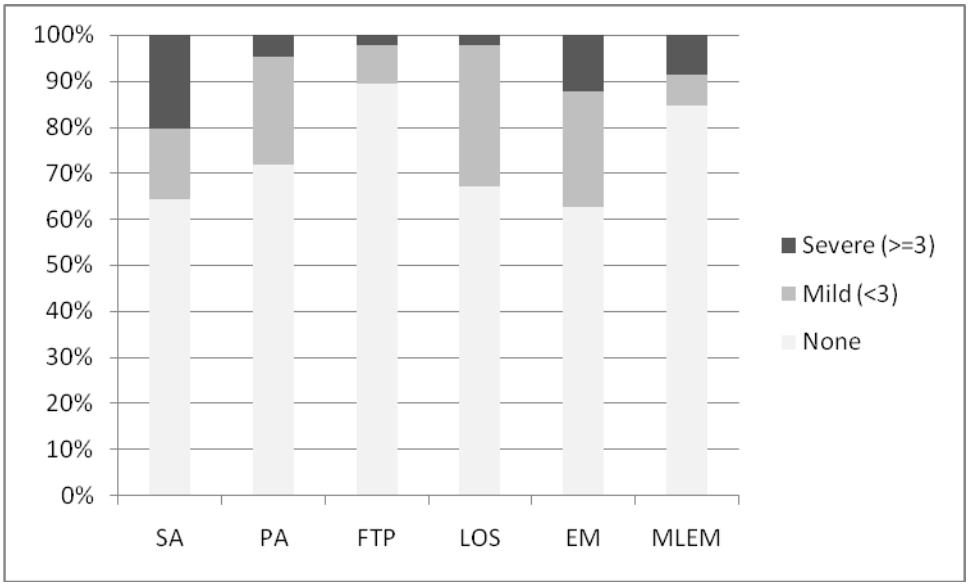


Figure 1. Severity Ratings of Six Domains of Child Abuse History.

1.3. Inter-relationships Between Severity of Child Abuse Histories

Since distributions of domains of child abuse history were positively skewed (Table 4), Spearmans' rho and Kendall's tau were calculated to examine the rank order relationship and rank order concordance between variables. Correlations between severities of child abuse history in six domains are shown in Table 5 and Table 6.

Table 5. Correlations between Severity Ratings in Six Domains of Child Abuse History (Spearman's *rho*) (*N*=171)

	1.CSA	2. CPA	3. FTP	4.LOS	5. EM	6. MLEM
1. CSA	1.00					
2. CPA	.37**	1.00				
3. FTP	.19*	.23**	1.00			
4. LOS	.43**	.41**	.46**	1.00		
5. EM	.36**	.62**	.36**	.42**	1.00	
6. MLEM	.20**	.30**	0.04	.41**	.32**	1.00

** p≤.05. ** p≤.01.*

*Note: Bonferroni adjusted alpha level for an alpha level of 0.05 is 0.002.

Table 6. Correlations between Severity Ratings in Six Domains of Child Abuse History (Kendall's *tau*) (*N*=171)

	1.CSA	2. CPA	3. FTP	4.LOS	5. EM	6. MLEM
1. CSA	1.00					
2. CPA	.33**	1.00				
3. FTP	.17*	.21**	1.00			
4. LOS	.39**	.38**	.43**	1.00		
5. EM	.32**	.56**	.33**	.38**	1.00	
6. MLEM	.18**	.28**	.03	.38**	.29**	1.00

** p≤.05. ** p≤.01.*

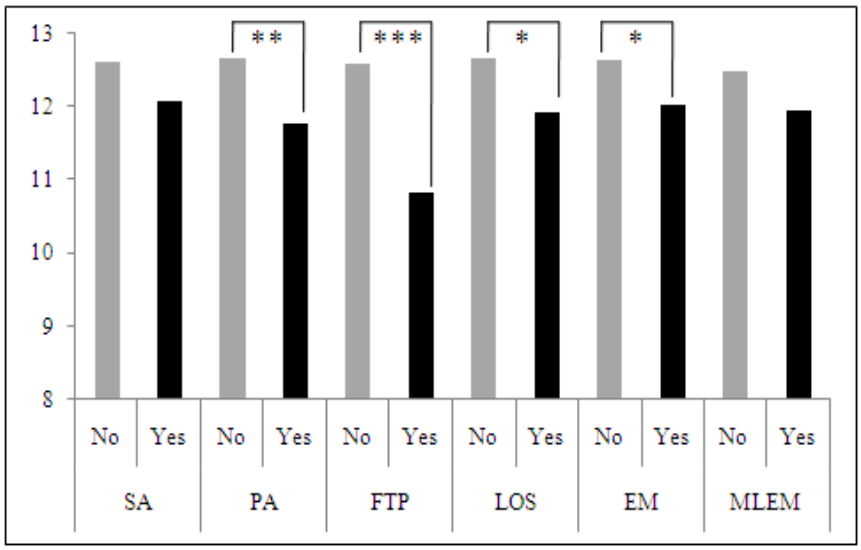
**Note*: Bonferroni adjusted alpha level for an alpha level of 0.05 is 0.002.

As shown in Table 5 and Table 6, severities of child abuse in six domains were positively correlated each other, except that FTP was not correlated with MLEM (*rho*=.04, *p*>.05, and *tau*=.03, *p*>.05). Specifically, CSA has a small to large positive relationship with other types of child abuse (small to medium for FTP and MLEM, and medium to large for CPA, LOS, and EM). CPA also has a small to large positive relationship with other types of child abuse (small to medium for FTP and MLEM, and medium to large for CSA, LOS, and EM). FTP has a medium to large positive

relationship with CSA, CPA, LOS and EM, but no relationship with MLEM. LOS and EM have a medium to large positive relationship with all other types of child abuse. MLEM has a small to medium positive relationship with CSA, CPA, LOS, and EM (Table 5 and Table 6). However, none of the positive relationships between child abuse severities were not significant at Bonferroni's adjusted alpha level, p=0.002 .

1.4. Relationships with Demographic Variables

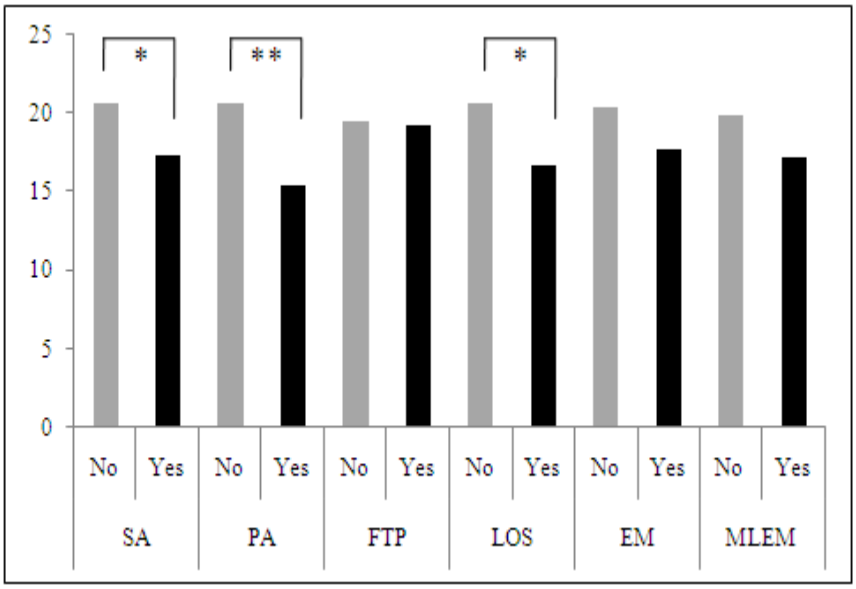
Relationships with demographic variables (e.g., age, gender, race, etc) were examined (Table 7). As shown in Table 7 and Figure 2, individuals with SMI who have a history of CPA, FTP, LOS, or EM had lower levels of education than those without a history of CPA, FTP, LOS or EM ($F(1,169)$=7.54, $p\leq.01$ for CPA; $F(1,169)$=14.14, $p\leq.001$ for FTP; $F(1,169)$=5.32, $p\leq.05$ for LOS; and $F(1,169)$=4.05, $p\leq.05$ for EM).



**** p≤05. ** p≤01. *** p≤001.***

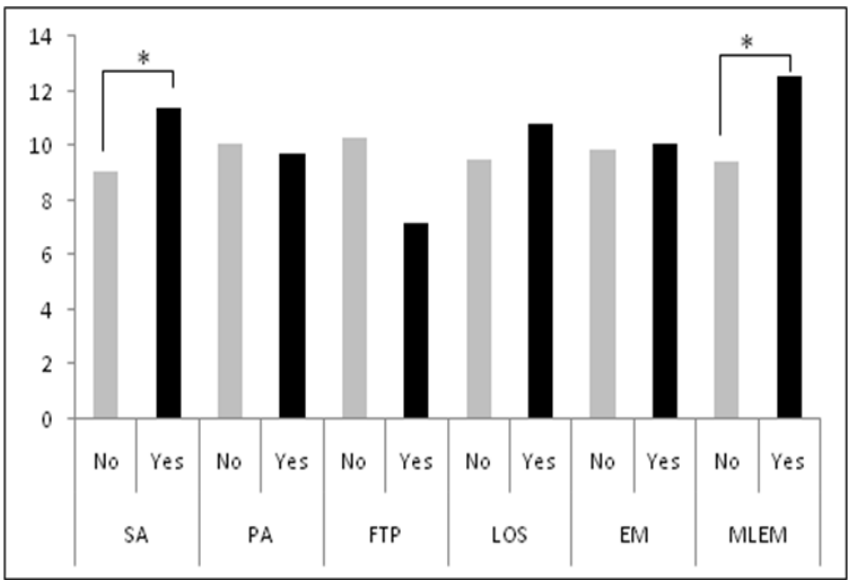
Figure 2. Child Abuse History and Years of Education.

Individuals with SMI who have a history of CSA, CPA or LOS had an earlier age of onset than those without a history of CSA, CPA or LOS ($F(1,131)$=4.63, $p \leq .05$ for CSA; $F(1,131)$=10.01, $p \leq .01$ for CPA; $F(1,131)$=6.66, $p \leq .05$ for LOS) (Figure 3). Also, individuals with SMI who have a history of CSA or MLEM had a greater number of previous hospitalizations ($F(1,150)$=4.13, $p \leq .05$ for CSA; $F(1,150)$=4.24, $p \leq .05$ for MLEM) (Figure 4). It should be noted that missing data for age onset and number of previous hospitalization due to unavailability reduced sample sizes for ANOVAs.



**** p≤05. ** p≤01. *** p≤001.***

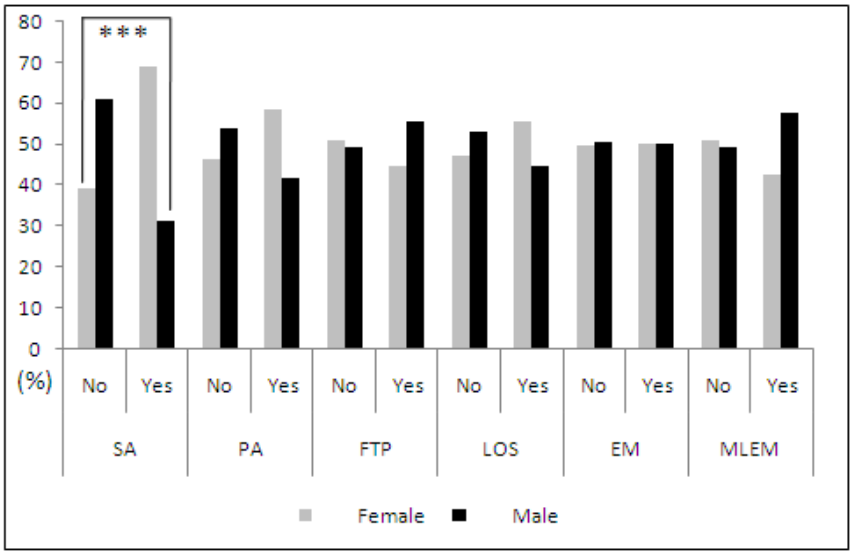
Figure 3. Child Abuse History and Age of Onset



p≤05. ** p≤01. *** p≤001.

Figure 4. Child Abuse History and the Number of Previous Hospitalizations

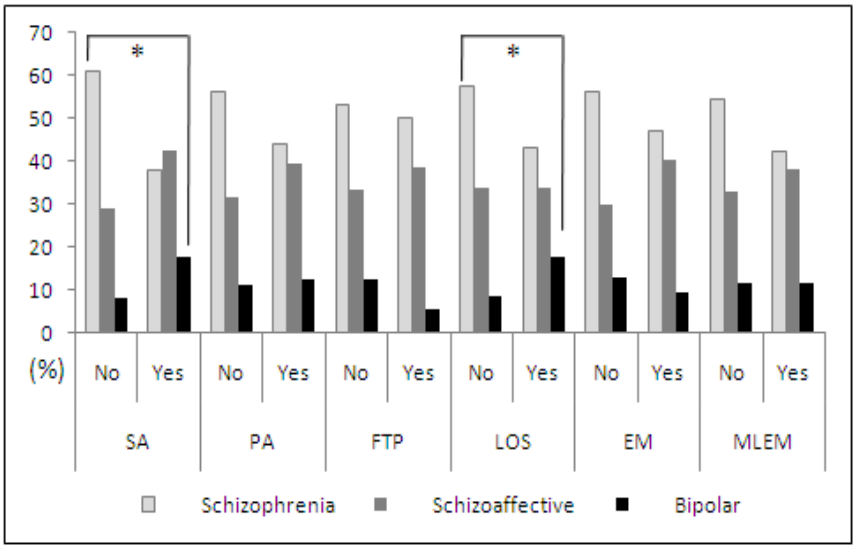
As shown in Table 7 and Figure 5, women with SMI had higher rates of CSA than men with SMI ($\chi^2(1,N=171)$=13.90, $p\leq$.001).



**** p≤05. ** p≤01. *** p≤001.***

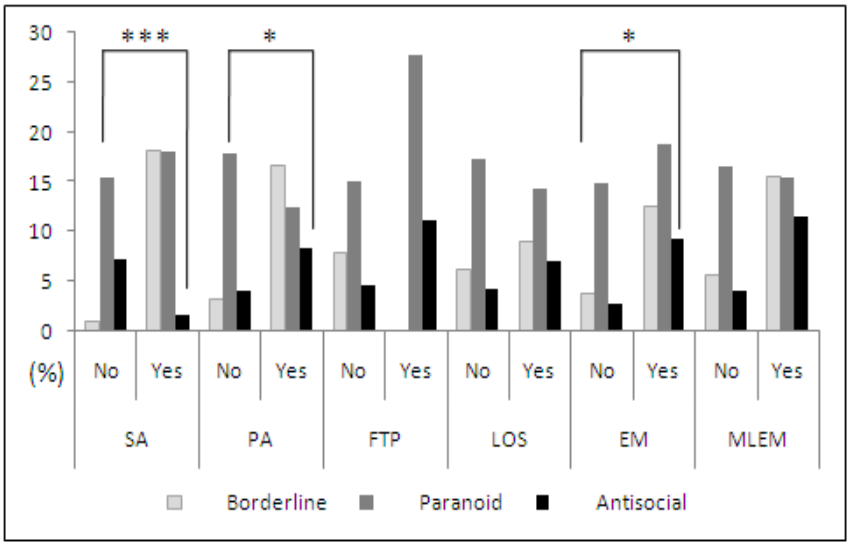
Figure 5. Child Abuse History and Gender Ratio

Individuals with SMI who have a history of CSA or LOS were more likely to have schizoaffective disorder or bipolar disorder than those without ($\chi^2(3,N=171)$=9.40, $p\leq.05$ for CSA; $\chi^2(3,N=171)$=10.38, $p\leq..05$ for LOS) (Table 7 and Figure 6). Also, individuals with SMI who have a history of CSA were more likely to have a diagnosis of borderline personality disorder ($\chi^2(5,N=171)$=22.11, $p\leq.001$) (Table 7 and Figure 7). Individuals with SMI who have a history of CPA or EM were more likely to have a diagnosis of borderline personality disorder or antisocial personality disorder ($\chi^2(5,N=171)$=14.44, $p\leq.05$ for CPA; $\chi^2(5,N=171)$=12.77, $p\leq.05$ for EM) (Table 7 and Figure 7). However, there were no relationships between child abuse history and age, race, or marital status (Table 7).



**** p≤05. ** p≤01. *** p≤001.***

Figure 6. Child Abuse History and DSM-IV Axis I Diagnoses



p≤05. ** p≤01. *** p≤001.

Figure 7. Child Abuse History and DSM-IV Axis II Diagnoses

Table 7. Relationships Between Histories of Child Abuse and Demographic Information (N=171)

	Sexual Abuse			Physical Abuse			Failure to Provide			Lack of Supervision			Emotional Maltreatment			MLEM		
	No	Yes	*F* or χ^2	No	Yes	*F* or χ^2	No	Yes	*F* or χ^2	No	Yes	*F* or χ^2	No	Yes	*F* or χ^2	No	Yes	*F* or χ^2
Age	38.26	34.81	3.23	37.99	34.58	2.76	37.17	35.87	0.19	37.33	36.43	0.2	38.01	35.42	1.83	36.84	38.09	0.23
Education	12.61	12.07	3.11	12.67	11.77	7.54**	12.6	10.83	14.14***	12.66	11.93	5.32*	12.65	12.03	4.05*	12.5	11.94	1.81
Age of Onset	20.56	17.35	4.63*	20.67	15.45	10.01**	19.48	19.17	0.02	20.65	16.68	6.66*	20.36	17.67	3.19	19.86	17.15	1.82
# of Previous Hosp.	9.03	11.37	4.13*	10.06	9.71	0.08	10.3	7.17	3.06	9.49	10.81	1.22	9.86	10.1	0.04	9.43	12.5	4.24*
Gender																		
Female	43	42	13.90***	57	28	1.98	78	8	0.28	54	31	1.06	53	32	0.01	74	11	0.67
Male	67	19		66	20		75	10		61	25		54	32		71	15	
Race																		
Asian American	1	1		2	0		2	0		2	0		2	0		2	0	
Hispanic American	1	1		1	1		1	1		1	1		1	1		2	0	
African American	12	8	1.07	12	8	4.64	16	4	6.32	13	7	3.98	9	11	6.99	16	4	1.98
European American	92	50		103	39		129	13		94	48		90	52		120	22	
Unidentified	4	1		5	0		5	0		5	0		5	0		5	0	
Marital Status																		
Married	8	10		11	7		17	1		9	9		11	7		15	3	
Single	65	35		68	32		91	9		70	30		62	38		84	16	
Divorced	29	16	7.56†	36	9	6.38	37	8	4.17	28	17	7.19†	26	19	5.26	38	7	1.52
Other	8	0		8	0		8	0		8	0		8	0		8	0	
Axis I																		
Schizophrenia	67	23		69	21		81	9		66	24		60	30		79	11	
Schizoaffective	32	26	9.40*	39	19	3.88	51	7	2.48	39	19	10.38*	32	26	3.57	48	10	6.97
Bipolar	9	11		14	6		19	1		10	10		14	6		17	3	
Psychotic Disorder NOS	2	1		1	2		2	1		0	3		1	2		1	2	
Axis II Diagnosis																		
Borderline	1	11		4	8		12	0		7	5		4	8		8	4	
Schizoid	1	2		1	2		3	0		2	1		1	2		2	1	
Paranoid	17	11	22.11***	22	6	14.44*	23	5	5.39	20	8	2.16	16	12	12.77*	24	4	7.69
Antisocial	8	1		5	4		7	2		5	4		3	6		6	3	
Other	33	12		13	12		42	3		33	12		34	11		41	4	
None	50	24		58	16		66	8		48	26		49	25		64	10	

† $p \leq .07$. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

1.5. Relationships with Clinical Variables

Relationships between a history of child abuse and other psychological variables were examined (Table 8). Psychological variables were obtained during the first month after participants were admitted to the psychiatric rehabilitation program. Results revealed that individuals with SMI who have a history of CSA demonstrated lower self-efficacy and higher disorganization ($F(1, 92) = 5.83$, $p = 0.02$ for self-efficacy; $F(1, 92) = 4.65$, $p = 0.04$ for disorganization). Individuals with SMI who have a history of CPA demonstrated more maladaptive behaviors than those without a history of CPA ($F(1,132) = 6.62$, $p = .01$). Also, participants with SMI who experienced a history of FTP showed higher external attribution, poorer reading skills, and poorer working memory than those without ($F(1,93) = 4.95$, $p = .03$ for external attribution; $F(1,78) = 4.76$, $p = .03$ for reading skills; $F(1,52) = 4.43$, $p = .03$ for working memory). Individuals with SMI who have a history of EM showed higher Anergia than those without ($F(1,93) = 5.99$, $p = .02$). Finally, individuals with SMI who have a history of MLEM demonstrated poorer reading skills than those without ($F(1,78) = 9.96$, $p = .002$). It should be noted that missing data varied across clinical measures, and reduced sample sizes for ANOVAs.

Table 8. Relationships Between Histories of Child Abuse and Psychological Variables at Admission

	Child Sexual Abuse			Child Physical Abuse			Failure to Provide			Lack of Supervision			Emotional Maltreatment			MLEM		
	No	Yes	*F*	No	Yes	*F*	No	Yes	*F*	No	Yes	*F*	No	Yes	*F*	No	Yes	*F*
Social Functioning																		
Adaptive Functioning	36.83	37.11	0.37	37.58	35.24	2.18	37.19	34.78	1.2	37.17	36.41	0.26	36.62	37.47	0.35	36.87	37.28	0.04
Maladaptive Functioning	6.75	7.34	0.42	6.28	8.77	6.62*	6.83	7.93	0.62	6.71	7.47	0.66	5.08	5.1	0.02	6.68	8.74	2.62
Neurocognition																		
COWA (FAS)	28.36	33.18	3.37	28.54	33.54	3.34	30.81	25.71	2.08	30.22	29.71	0.04	28.85	31.94	1.41	29.62	32.46	0.63
Mazes	16.56	17.28	0.19	16.17	18.07	1.27	17.06	15.45	0.53	16.96	16.56	0.06	16.32	17.75	0.7	16.56	18.09	0.52
WRAT2 Reading	59	61.36	0.35	61.18	56.94	1.06	61.57	50.17	4.76*	61.44	56.91	1.29	60.54	58.83	0.19	62.37	46.88	9.96**
Clock Drawing	6.16	6	0.19	6.06	6.24	0.23	6.11	6.09	0.01	6.28	5.74	2.2	5.96	6.38	1.45	6.11	6.11	0
Letter-Number Sequencing	7.91	8.7	0.97	8.31	3.03	0.93	8.54	6.14	4.43*	8.53	7.73	0.97	8.31	8.14	0.05	8.33	7.57	0.41
Social Cognition																		
Hinting Task	14.67	15.45	1.12	14.87	15.31	0.25	15.02	14.5	0.22	14.8	15.3	0.44	15.06	14.8	0.12	15.03	14.5	0.27
FKK-SE	68.96	64.13	5.83*	67.79	64.71	1.81	66.99	67.13	0.01	67.68	65.81	0.8	67.96	65.59	1.35	67.11	66.47	0.05
FKK-EX	47.82	51.93	1.68	48.07	53.58	2.39	48.17	58.42	4.95*	48.63	50.96	0.51	48.4	50.99	0.66	49.37	49.97	0.02
BPRS 24-Items 5 Factors																		
Thought Disorder	8.44	9.84	0.97	8.45	10.61	1.86	8.39	13.14	5.65*	8.69	9.65	0.42	7.83	10.73	4.40*	8.81	10.32	0.52
Anergia	8.92	8.76	0.03	9.08	8.23	0.58	8.7	9.93	0.73	9.39	7.79	2.48	9.3	8.22	1.21	8.94	8.29	0.2
Anxiety / Depression	8.49	11	5.45*	8.99	10.98	2.59	9.55	9.11	0.07	9.45	9.6	0.02	9.33	9.74	0.13	9.24	11.25	1.51
Hostility / Suspicion	6.79	6.49	0.13	6.39	7.46	1.37	6.56	7.39	0.47	6.87	6.26	0.49	6.36	7.11	0.83	6.51	7.71	0.99
Activity	4.39	5.18	1.61	4.43	5.56	2.62	4.53	5.86	2.22	4.47	5.19	1.21	4.55	4.94	0.39	4.7	4.75	0.01
BPRS 16-Items 4 Factors																		
Thought Disturbance	37.02	41.56	1.91	37.32	43.4	2.68	37.81	45.43	2.61	38.87	38.69	0.01	37.38	41.01	1.21	38.21	43.58	1.11
Affective	9.17	8.86	0.09	9.34	8.2	1.01	8.9	10	0.53	9.61	7.92	2.61	9.7	8.09	2.56	9.06	8.96	0.01
Anergia	8.81	10.01	0.6	5.59	11.32	2.54	8.84	12.36	2.46	9.25	9.36	0.01	7.83	11.46	5.99*	9.02	11.07	0.81
Disorganization	10.86	13.48	4.65*	11.4	13.41	2.07	11.96	11.91	0.04	11.87	11.99	0.01	11.74	12.16	0.11	11.62	13.93	1.59

* $p \leq .05$. ** $p \leq .01$.

Discussion

The reliability and validity of the child abuse rating system (Barnett et al., 1993) were examined in Study I. The child abuse rating system produces severity scores in six domains of childhood abuse including CSA, CPA, FTP, LOS, EM, and MLEM.

In accordance with the first hypothesis, the child abuse rating system produced reliable ratings across raters (ICC= .98 for CSA, .96 for CPA, .97 for FTP, .86 for LOS, .93 for EM, and .97 for MLEM). Inter-relationships between severities of child abuse variables were also examined. Rank order relationship and rank order concordance between variables revealed that most of the child abuse variables were positively correlated with each other, except that FTP was not correlated with MLEM. Especially, severity of CSA had a strong positive relationship with severity of CPA, LOS, and EM, indicating that individuals with a history of CSA are more likely to have suffered from CPA, LOS, and EM. Also, severity of CPA had a strong relationship with severity of CSA, LOS, and EM, indicating that individuals with a history of CPA are more likely to have suffered from CSA, LOS and EM. The severity of FTP was strongly related to those of CSA, CPA, LOS, and EM, indicating that individuals with a history of FTP are more likely to have experienced CSA, CPA, LOS, and EM. Finally, LOS and EM were strongly related to severities of all of other types of child abuse. The results indicated that individuals who experienced any kind of child abuse were more vulnerable to other types of child abuse. However, while EM and LOS are involved in almost all other child abuse variables, CSA is relatively less related to FTP and MLEM, and MLEM is also less related to FTP. These findings support the finding that pure subtypes of child abuse are very rare (Barnett et al., 1993). Thus, As Barnett et al. (1993) suggested, a systematic,

comprehensive method must be utilized so that the influence of each type of child abuse can be investigated in conjunction with other types of child abuse.

Averaged ratings from the two separate raters revealed that 35.67%, 28.07%, 10.53%, 32.75%, 37.43%, and 15.20% of participants had a history of CSA, CPA, FTP, LOS, EM, and MLEM, respectively. Although the rates of child abuse history found in this sample of individuals with SMI using the archival record rating system are lower than some (e.g., 45 to 92%) of the previous reports (Goodman et al., 1997; Read, 1997; Read et al., 2001; Shaw et al., 2002), the rates are consistent or somewhat lower than other reports (34% to 60% for CSA or CPA(Darves-Bornoz et al., 1995; Greenfield et al., 1994; Ross et al., 1994), and 36% for sexual assault and 57% for physical assault (Mueser et al., 2004)). Also, in a recent study conducted using medical chart information in the UNL SMI laboratory, Schenkel et al. (2005) found that 45% (*n*=18 out of 40) of participants had a history of CSA, CPA, or child neglect. Thus, the rates of child abuse history in this study replicate the Schenkel et al. (2005) result using a comprehensive child abuse coding system in a larger sample (*n*=171) of individuals with SMI. It is noted that both Schenkel et al. (2005)'s study and the current study used medical chart information, and found somewhat lower rates of child abuse in a sample of individuals with SMI than some previous studies that used clients' self-report (Goodman et al., 1997; Read, 1997; Read et al., 2001; Shaw et al., 2002). It is conjectured that the lowered rates reflect the nature of archival information. That is, the rates might be lowered because of being under-investigated, under-reported, or under-recorded. However, given that information concerning maltreatment incidents recorded in medical charts from diverse disciplines is corrected by multiple informants including family members, victims, and/or

mental health professionals, the lower rates may reflect more accuracy. Inability to examine these two ratings (i.e., self-report vs. archival information) is a limitation of this study, and future research should address these discrepancies by including both self-reported information and archival data.

The second hypothesis was partially supported, as some subtypes of child abuse history were related to poorer premorbid functioning (e.g., less education, higher number of previous hospitalizations, earlier age of onset, etc.), but the relationships varied across different types of child abuse. Specifically, individuals with a history of CSA had an earlier age of onset and a greater number of previous hospitalizations, and they were more likely to have Axis I diagnoses of schizoaffective disorder or bipolar disorder and an Axis II diagnosis of borderline personality disorder, as compared to those without CSA. Individuals with a history of CPA had lower education and an earlier age of onset, and they were more likely to have Axis II diagnoses of borderline personality disorder or antisocial personality disorder, as compared to those without CPA. Also, individuals with a history of FTP had lower education than those without. Individuals with a history of LOS had lower education and an earlier age of onset, and they were more likely to have an Axis I diagnosis of schizoaffective disorder or bipolar disorder, as compared to those without LOS. Individuals with a history of EM had lower education, and they were more likely to have Axis II diagnoses of borderline personality disorder or antisocial personality disorder, as compared to those without EM. Finally, individuals with a history of MLEM had a greater number of previous hospitalizations than those without MLEM. However, age at admission, race, and marital status were not related to any types of child abuse. These results replicate previous studies, revealing strong associations between

child abuse history, premorbid functioning, and cluster B personality disorders of individuals with SMI (Lysaker, Wickett et al., 2004; Schenkel et al., 2005), and expand on the results by including all subtypes of child abuse in the analysis.

The findings that women with SMI had higher rates of CSA than men with SMI and CSA has strong relationship with borderline personality disorder led us to infer that women with SMI and a history of CSA may be more likely to meet criteria for Axis II diagnosis of borderline personality disorder. However, the inference should be made with caution because it may cause gender stereotypes of women with SMI and a history of CSA. In addition, a previous study indicates that women with a history of CSA may show distinct and more complex features than borderline personality disorder (McLean & Gallop, R, 2003). Thus, the relationship between gender, CSA and personality disorder in SMI should be further investigated, and individualized decision making for treatment should be employed.

In partial support of the third hypothesis, some of the child abuse histories were related to deficits in neurocognition and social cognition, higher overall psychiatric symptoms, and lower social functioning in participants of the PRP, but the relationships varied across different types of child abuse. As results revealed, CSA was related to lower self-efficacy and higher disorganization. CPA was related to maladaptive social behaviors. Also, FTP was related to higher external attribution, poorer reading skills, and working memory. EM was related to higher Anergia. Finally, MLEM was related to poorer reading skills. However, it should be noted that none of the relationships between different types of child abuse and clinical variables did reach at p-value of 0.01.

Although some of the linear relationships between subtypes of child abuse and clinical features (e.g., CSA and lower self-efficacy and higher disorganization, CPA and maladaptive social behaviors, etc.) found in this study are consistent with previous findings in samples of abused children, adolescents, and adults with and without SMI (Barahal et al., 1981; Diehl & Prout, 2002; Farber & Joseph, 1985; Gold, 1986; Thompson, 1997), the results are more complex for several reasons. First, the linear associations between subtypes of child abuse and clinical features are more precise because this study includes all of the subtypes of child abuse, as compared to those focusing on only one or two subtypes of child abuse or one general category (e.g., child maltreatment). Second, the linear associations are complexified by the interaction between the heterogeneity of child abuse and of SMI. Thus, the current findings should be replicated in another study using the same subtypes of child abuse. Furthermore, it should be noted that the linear relationships between subtypes of child abuse and clinical features may be further complicated with a number of other factors such as moderators or mediators. Thus, linear relationships obtained in this study should be interpreted with caution because they cannot capture more complex and dynamic relationships.

The important findings revealed in this study illuminate several questions for future research. First, as described above, the severity of child abuse history was coded using only medical chart information. Even though advantages of using archival information have been documented (Barnett et al., 1993), it is still possible to underestimate the rates of child abuse history in adults with SMI. This is due to several reasons, including under-investigation or under-report. In order to minimize false-negatives, the coding guide weighs more on clients' report than family members' and

others' when there are discrepancies. Additionally, it should be noted that the PRP is a research-oriented setting, which is designed to provide intensive and regular staff trainings to maintain fidelity of clinical information and assessments. Social workers have been trained to ask specific questions related to childhood abuse while interviewing. In addition, other sources of information (e.g., clinical assessment, family interview, etc) have been systemically incorporated in archival records. However, the current findings using six subtypes of child abuse in SMI should be replicated with both archival information and clients' self-report in a future study. Second, due to complexity of data analyses and limited information in medical charts, some of the factors (e.g., frequency/chronicity, developmental period, and perpetrator) were not included in the current analyses. As Cicchetti and Valentino (2007) indicates, the influence of child abuse is dependent upon both environmental factors (e.g., perpetrator and chronicity) and within-person factors (e.g., developmental period). Thus, the current findings should be replicated including these other factors. Third, as Barnett and colleagues (1993) indicates, pure subtypes of child abuse are very rare. The strong correlations between subtypes of child abuse were also replicated in the current study in a sample of adults with SMI. Thus, future investigations should control the influence of other subtypes of child abuse while examining the linear associations between each subtype of child abuse and premorbid and/or clinical features. Fourth, it should be noted that multiple comparisons were made in this study in order to examine linear relationships between six subtypes of child abuse, premorbid functioning, and clinical variables, which increases the risk for type I error (rejecting H_0 while H_0 is true). However, reduced power caused by correction techniques (e.g., conventional or sequential Bonferroni correction) is also a

major concern (Nakagawa, 2004). Given that child abuse history has been neglected in treatment and assessment for individuals with SMI, concerns about reduced power outweigh inflated type I error for the purpose of this study. To be balanced, a universal p-value of 0.01 was chosen to interpret significant relationships in this study. However, the current finding should be replicated with limited tests or comparisons.

In sum, despite the limitations listed above, the child abuse rating system appears to provide reliable and valid estimation of subtypes of child abuse history of individuals with SMI, and the results support previous findings that individuals with SMI suffer higher rates of child abuse.

One of the major goals of psychopathology research is to better understand individual differences, and our comprehension of multiple aspects of human functioning including neurophysiology, neurocognition, social cognition, and social behaviors has recently accumulated. Thus, the complexity and heterogeneity of the influence of child abuse in individuals with SMI is a primary concern. With this in mind, Study II will address longitudinal features of SMI and each type of child abuse history in neurocognition, social cognition, social behaviors and psychiatric symptoms during the 12-month psychiatric rehabilitation program. Study III further investigates dynamic and complex relationships among child abuse history, neurocognition, social cognition and psychiatric symptoms.

Chapter 3

Study II

Hypotheses

Longitudinal measurement invariance is a fundamental part of examining the trajectory of change in latent growth curve modeling (Brown, 2006). Thus, the first purpose of Study II is to examine the longitudinal factor pattern invariance of measures such as NOSIE-30, BPRS, and FKK (e.g., self-efficacy and externality). Thus, measures with confirmed longitudinal factor invariance here are used for the subsequent longitudinal analyses in Study II and Study III. Further, it was tested whether the curve-of-factors model fits a growth curve to factor scores representing what the factors of subscales (e.g., NOSIE-30 subscales, 4- and 5- factor BPRS subscales, FKK Self-Efficacy subscales, and FKK Externality subscales) have in common at each time point.

The second purpose of Study II is to examine the effects of a history of different types of child abuse on neurocognition, social-cognition, psychiatric symptoms, and social functioning in participants of a 12-month intensive inpatient psychiatric rehabilitation program.

Specifically, it is hypothesized that factor structures of social functioning, neurocognition, social cognition, and psychiatric symptoms are invariant over time. Also, it is hypothesized that social functioning, neurocognition, and social cognition improve over time, and psychiatric symptoms decrease over time during intensive inpatient psychiatric rehabilitation. Furthermore, it is hypothesized that histories of childhood abuse are a significant predictor of change in social functioning, neurocognition, social cognition, and psychiatric symptoms during intensive inpatient psychiatric rehabilitation:

that is, histories of childhood abuse are related to lower social functioning, neurocognition, and social cognition at admission and more gradual rates of improvement over time. Also, it is hypothesized that histories of childhood abuse are associated with higher psychiatric symptoms at admission and more gradual rates of decrease in psychotic symptoms over time.

Methods

Participants

Archival clinical data from 161 participants (age M = 38.57 years, SD = 12.53) in an inpatient psychiatric rehabilitation program were used in the present analyses (Table 9).

Table 9. Demographic Information (*N*=161)

	n (%)	M	SD
Gender			
Female	80 (49.7)		
Male	81 (50.3)		
Age at Admission		38.57	12.53
Years of Education		12.45	1.99
Age of Onset (n=124)		19.48	8.44
Axis I Diagnosis			
Schizophrenia	81 (50.3)		
Schizoaffective	55 (34.2)		
Bipolar	20 (12.4)		
Psychotic Disorder NOS	5 (3.3)		
Axis II Diagnosis			
Borderline	12 (7.5)		
Schizoid	3 (1.9)		
Paranoid	27 (16.8)		
Antisocial	8 (5.0)		
Personality Disorder NOS	18 (10.5)		
None	93 (51.3)		
Race			
Asian American	2 (1.2)		
Hispanic American	1 (0.6)		
African American	18 (11.2)		
European American	135 (83.9)		
Unidentified	5 (3.1)		
Marital Status			
Married	18 (11.2)		
Single	92 (57.1)		
Divorced	43 (26.7)		
Other	8 (5.0)		

Measures

Ratings of the Severity of Child Abuse

Ratings of the severity of child abuse were coded based on the child abuse rating system described in Barnett, Manly, and Cicchetti (1993) (see Appendix I).

Symptomatology

Symptomatology is measured by the Extended Brief Psychiatric Rating Scale (BPRS; Lukoff et al., 1986).

Neurocognition

Neurocognition was measured using Letter-Number Sequencing.

Social Cognition

Social cognition is measured by two measures: the Hinting Task and the Self-Efficacy and Externality Inventory.

Social Functioning

Social functioning was measured using the Nurses' Observation Scale for Inpatient Evaluation (NOSIE-30) (Honigfeld et al., 1966).

Data Analyses

Mplus v. 5.1. (Muthén & Muthén, 2007) was used to examine the longitudinal factor pattern invariance (i.e., longitudinal measurement invariance) of measures such as NOSIE-30, BPRS, and FKK, and to perform the curve-of-factors LGMs (McArdle, 1988). The observed variables scores (e.g., NOSIE-30 subscale scores) at each time point (e.g., at admission, at 6 months, and at 12 months) were factor analyzed to compute each factor score for the purpose of modeling growth curves. (e.g., NOSIE-30 subscales, FKK Self-Efficacy subscales, FKK Externality subscales, BPRS subscales, and individual measures of neurocognition). Furthermore, structural parameters (i.e., histories of childhood abuse) were included in the curve-of-factors model in order to examine the effects of childhood abuse on the intercepts and the slopes of social functioning, neurocognition, social cognition, and psychiatric symptoms.

Second, Linear mixed models were estimated using SAS PROC MIXED in order to specify unconditional polynomial models with a random intercept only for social cognition, as measured by the Hinting task, and working memory, as measured by Letter-Number Sequencing, over three occasions (at admission, 6 months, and 12 months). Restricted maximum likelihood (REML) was used in reporting model parameters and to assess the significance of random effects. Degrees of freedom were estimated using the Satterthwaite method. The 95% confidence interval (CI) for random variation around each fixed effect was calculated as ± 2 standard deviations of its accompanying random variance term. Time was centered at the first occasion (at admission), such that the intercept represented the level of working memory and social cognition at admission in all models.

Furthermore, predictors (i.e., severity of childhood abuse history) were included in conditional polynomial models with a random intercept in order to examine the effects of childhood abuse on the intercepts and slopes of social cognition and working memory.

Results

1.1. Longitudinal Factor Pattern Invariance for Social Functioning (NOSIE-30)

The longitudinal factor pattern invariance of social functioning was conducted on Confirmatory Factor Analysis (CFA) model to examine the equality of construct measurement over time. In fitting the CFA model, unique factor covariances for each variable over time (e.g., schedule competence 1 (COM1) to schedule competence 3 (COM3), representing schedule competence from Time 1 to Time 3) were allowed to covary, and were included mainly to improve model fit. The longitudinal factor pattern invariance evaluation includes three steps: 1) configural invariance, 2) metric invariance, and 3) scalar invariance. From the configural invariance test of NOSIE-30, it is predicted that a unidimensional measurement model of NOSIE-30 is viable at three assessment points (at admission, at 6 months and at 12 months) (χ^2 =292.51, *df*=114, *p*<.0001; CFI=.91, TLI=.88, RMSEA=.10). Reliability coefficients (Omega) per each time point were .86, .88, and .87, respectively. All freely estimated factor loadings were statistically significant at *p*-value of .001 (Figure 8).

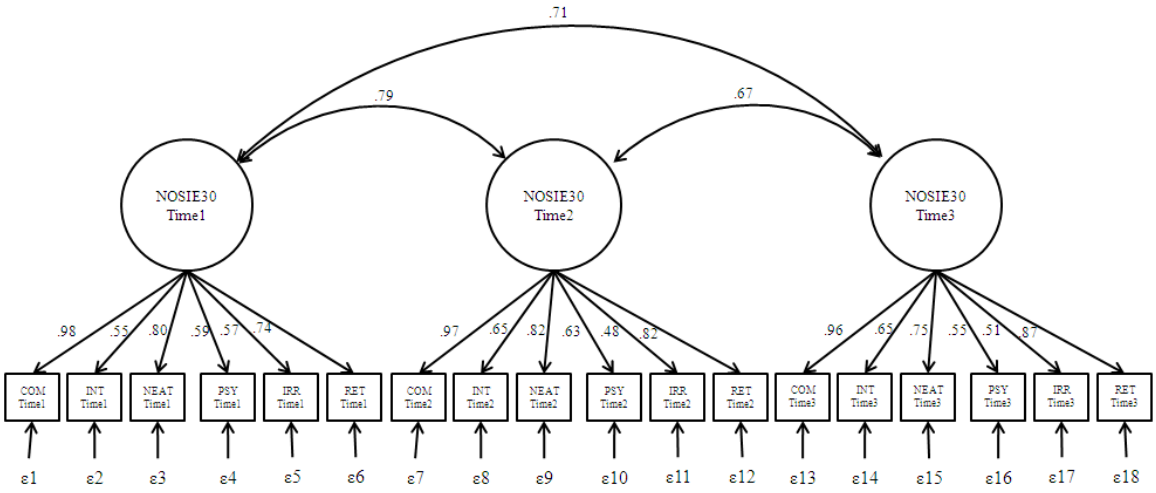


Figure 8. Longitudinal Measurement Model of Social Functioning (NOSIE-30).

**Note: COM: Schedule Competence, INT: Interpersonal Interest, NEAT: Neatness, PSY: Psychoticism, IRR: Irritability, RET: Motor Retardation. PSY, IRR, and RET were reverse coded with multiplying by -1.*

For the next step, metric invariance was evaluated whether the factor loadings of the NOSIE-30 indicator were equivalent across three assessment time points. The test of partially equal factor loading model showed an overall good fit to the data and did not significantly degrade fit relative to the equal form model, χ^2_{diff} (8) = 10.58, ns (Table 10). For the final step, scalar invariance was tested whether the factor indicator intercepts of the NOSIE-30 were equivalent across three assessment time points. The test of partially equal indicator intercepts model did not result in a significant degradation of fit relative to the equal factor loading model, χ^2_{diff} (7) = 12.56, ns (Table 10). Since the constraint of equal factor loading and indicator intercepts are invariant across time, comparison of means of NOSIE-30 across time is meaningful, indicating that temporal change observed in NOSIE-30 is due to true change, not to changes in the structure or measurement of the construct over time (Brown, 2006).

Table 10. Model Summary of the Longitudinal Factor Pattern Invariance Test for Social Functionig.

Model	χ^2	*df*	CFI	RMSEA	Δ $\chi 2$	Δ *df*	*p*-value
Equal Form (Configural Invariance)	292.51	114	0.91	0.102			
Partial Equal Factor Loading (Metric Invariance)	303.09	122	0.91	0.09	10.58	8	0.23
Partial Equal Indicator Intercept (Scalar Invariance)	315.65	129	0.91	0.09	12.56	7	0.08

1.2. Curve-of-factors latent growth model (LGM) for Social Functioning

The curve-of-factors LGM for social functioning was estimated based on the partial equal indicator intercept model (Figure 9). Fitting the curve-of-factors LGM for social functioning resulted in the following indices of fit: χ^2 (129, *N*=151)=315.17, $p \leq .0001$, CFI=0.91, RMSEA=0.09, AIC=9003.26, and BIC=9184.30. Parameter estimates for the curve-of-factors model were presented in Table 11.

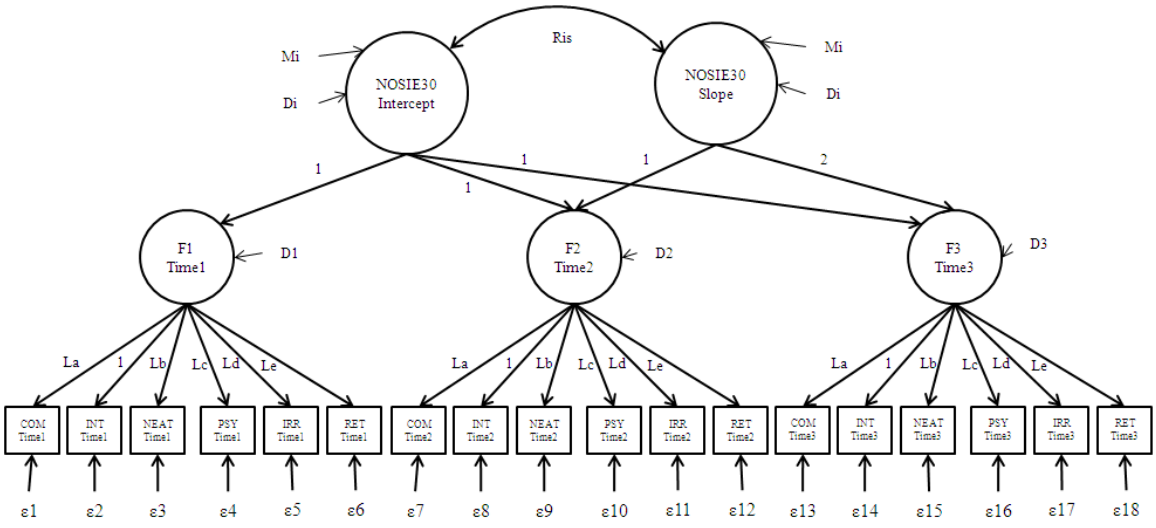


Figure 9. Representation of the Curve-of-factors LGM for Social Functioning

**Note: COM: Schedule Competence, INT: Interpersonal Interest, NEAT: Neatness, PSY: Psychoticism, IRR: Irritability, RET: Motor Retardation*

Table 11. Parameter Estimates From the Curve-of-Factors LGM of Social Functioning

	Effect	SE	t Value
Means			
Intercept (*Mi)*	5.71	18.50	0.31
Slope (*Ms)*	0.62	0.11	6.14***
Variance			
Intercept (*Di)*	4.14	0.97	4.25***
Slope (*Ds)*	0.36	0.29	1.22
Covariance	-0.53	0.14	-3.83***

*** $p \leq .001$.

Significant mean levels existed for the growth trajectory, *Ms*=16.16, *t*=62.33, of the higher order slope factors, indicating a significant increase in social functioning over time. Individual differences in the higher order growth factors were significant, with estimated variances of *Di*=4.14, *t*=4.25, but not *Ds*=0.36, *t*=0.29, suggesting that significant variation existed about the higher order intercept, but not the higher order slope factor means.

Common factor loadings (unstandardized) were significant at *p*-value of 0.0001, *La*=1.59, *Lb*=0.96, *Lc*=0.93, *Ld*= 0.48, and *Le*=0.72. The higher order factors accounted for approximately 90%, 67%, and 75% of the variation in the first-order *F1, F2,* and *F3* social functioning, respectively. The curve-of-factors LGM accounted for approximately 95%, 40%, 63%, 35%, 26%, and 66% of the variation in observed schedule competence, interpersonal interest, neatness, psychoticism, irritability, and motor retardation were accounted for by the curve-of-factors LGM, respectively.

The regression effects of the child abuse histories were included for the higher order growth factors (i.e., intercept and slope factors). Table 11 shows the regression coefficients, standard errors, and test statistics. As can be seen from the Table 12,

significant effects of CPA and EM for the NOSIE-30 common intercept, and the significant effect of EM for the NOSIE-30 common slope were found in the higher order models.

Table 12. Summary of Specific Effects for the Covariate

	NOSIE30 Intercept			NOSIE30 Slope		
	Effect	SE	t Value	Effect	SE	t Value
CSA	-0.02	0.11	-0.19	0.01	0.05	0.19
CPA	-0.48	0.23	-2.07*	-0.01	0.10	-0.13
FTP	-0.40	0.31	-1.29	0.14	0.13	1.14
LOS	0.12	0.28	0.42	-0.16	0.13	-1.28
EM	0.35	0.18	1.97*	-0.14	0.08	-1.83†
MLEM	0.00	0.19	0.00	0.14	0.09	1.63

† $p \leq .07$. * $p \leq .05$.

Note: CSA: Child Sexual Abuse, CPA: Child Physical Abuse, FTP: Failure to Provide, LOS: Lack of Supervision, EM: Emotional Maltreatment, MLEM: Moral/Legal/Educational Maltreatment.

The results indicate that individuals with SMI who have more severe history of CPA demonstrated poorer social functioning at admission, but showed no difference in the rate of improvement in their social functioning during 12-month psychiatric rehabilitation after controlling for the effects of other types of child abuse histories, as compared to those with no or a less severe history of CPA.

Also, individuals with SMI who have a more severe history of EM demonstrated a higher social functioning at admission, but showed less improvement in social functioning during 12-months of psychiatric rehabilitation after controlling for the effects of other types of child abuse histories , as compared to those with no or a less severe history of EM (Figure 10).

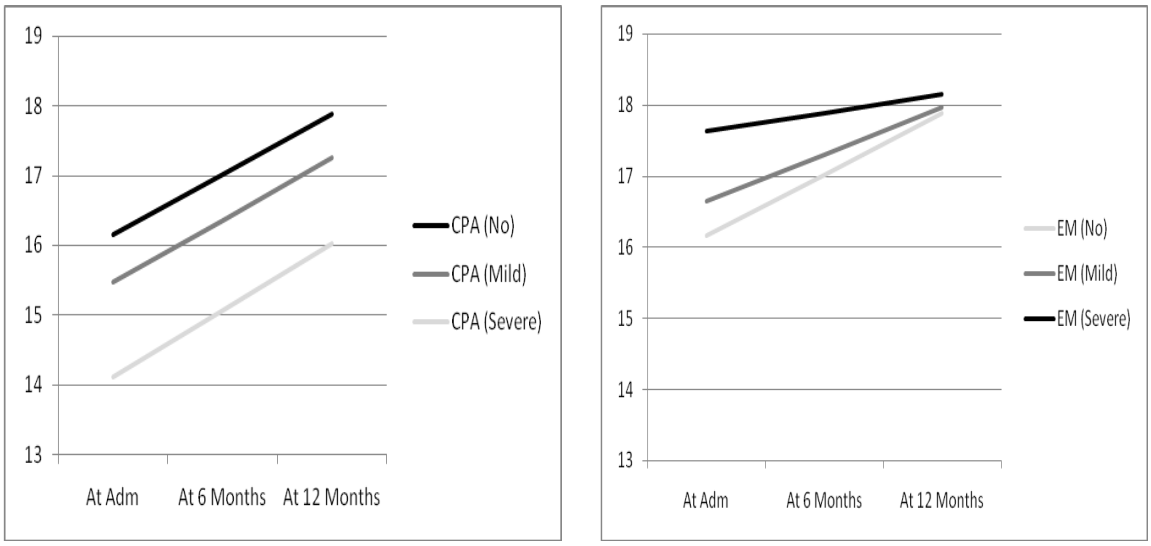


Figure 10. The Effects of Child Physical Abuse (CPA) and Emotional Maltreatment (EM) in Social Functioning Trajectories during Inpatient Psychiatric Rehabilitation

2.1. *Longitudinal Factor Pattern Invariance of Externality*

The longitudinal factor pattern invariance of externality was conducted on Confirmatory Factor Analysis (CFA) model to examine the equality of construct measurement over time. From the configural invariance test of externality, it is predicted that a unidimensional measurement model of externality is viable at three assessment points (at admission, at 6 months and at 12 months) (χ^2 =21.00, *df*=6, *p*<.001; CFI=.95, TLI=.88, RMSEA=.14). Reliability coefficients (Omega) per each time point were .84, .80, and .82, respectively. All freely estimated factor loadings were statistically significant at *p*-value of .001 (Figure 11).

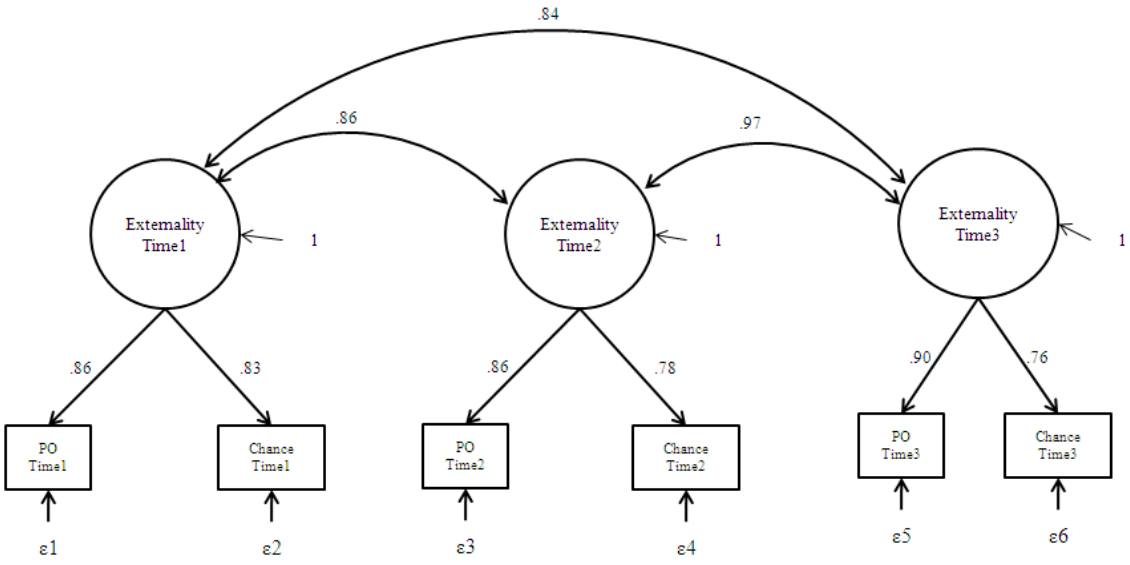


Figure 11. Longitudinal Measurement Model of Externality

For the next step, metric invariance was evaluated whether the factor loadings of the externality indicator were equivalent across three assessment time points. The test of partially equal factor loading model showed an overall good fit to the data and did not significantly degrade fit relative to the equal form model, χ^2_{diff} (2) = 4.21, ns (Table 13). For the final step, scalar invariance was tested whether the factor indicator intercepts of the externality were equivalent across three assessment time points. The test of partially equal indicator intercepts model did not result in a significant degradation of fit relative to the equal factor loading model, χ^2_{diff} (2) = 0.25, ns (Table 13). Since the constraint of equal factor loading and indicator intercepts are, at least, partially invariant across time, comparison of means of externality across time is meaningful, indicating that temporal change observed in externality is due to true change, not to changes in the structure or measurement of the construct over time (Brown, 2006).

Table 13. Model Summary of the Longitudinal Factor Pattern Invariance Test.

Model	χ^2	df	CFI	RMSEA	Δ χ2	Δ df	p-value
Equal Form (Configural Invariance)	21.00	6	0.95	0.14			
Equal Factor Loading (Metric Invariance)	25.22	8	0.95	0.13	4.21	2	0.12
Partial Equal Indicator Intercept (Scalar Invariance)	25.47	10	0.95	0.11	0.25	2	0.88

2.2. *Curve-of-factors latent growth model (LGM) for Externality*

The curve-of-factors LGM for externality was estimated based on the partial equal indicator intercept model (Figure 12). Fitting the curve-of-factors LGM for externality resulted in the following indices of fit: χ^2 (9, *N*=138)=25.46, $p \leq .01$, CFI=0.95, RMSEA=0.12, AIC=3554.72, and BIC=3607.41. Parameter estimates for the curve-of-factors model were presented in Table 14.

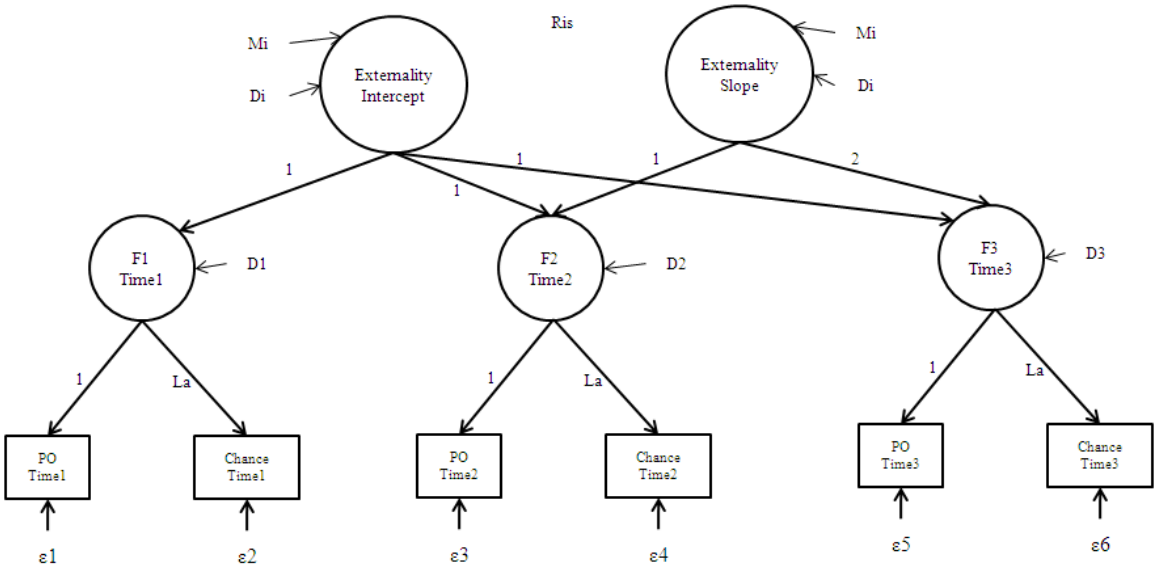


Figure 12. Representation of the Curve-of-factors LGM for Externality
**Note: PO: Power Other's Control Beliefs, and Chance: Chance Control Beliefs.*

Table 14. Parameter Estimates From the Curve-of-Factors LGM of Externality

	Effect	SE	t Value
Means			
Intercept (*Mi)*	0.00	0.00	-
Slope (*Ms)*	0.03	0.41	0.08
Variance			
Intercept (*Di)*	50.33	11.07	4.55***
Slope (*Ds)*	4.47	4.86	0.92
Covariance	-0.24	0.24	-0.98

*** $p \leq .001$.

Non-significant mean levels existed for the intercept and growth trajectory of the higher order intercept and slope factors, indicating non-significant initial level and change in externality over time. Individual differences in the higher order growth factors were also significant, with estimated variances of *Di*=50.33, *t*=11.07, but not *Ds*=4.47, *t*=4.86, suggesting significant variation existed about the higher order intercept, but not the higher order slope factor means.

Common factor loadings were significant, *La*=0.78, *t*=12.11. The higher order factors accounted for approximately 88% and 91% of the variation in the first-order *F1 and F2*. However, the variance in the first-order *F3* externality was not estimated. Approximately 77%, and 62% of the variation in observed Powerful Others and Chance Control were accounted for by the curve-of-factors LGM, respectively.

The regression effects of the child abuse histories were included for the higher order growth factors (i.e., intercept and slope factors). Table 15 shows the regression coefficients, standard errors, and test statistics. As can be seen from the Table 15, a significant effect of CPA for the externality common intercept was found. Also, significant effects of a history of LOS and a history of EM for the externality common slope were found in the higher order models.

Table 15. Summary of Specific Effects for the Covariate

	Externality Intercept			Externality Slope		
	Effect	SE	t Value	Effect	SE	t Value
CSA	0.74	0.47	1.59	-0.16	0.23	-0.68
CPA	1.72	0.95	1.80†	0.21	0.42	0.49
FTP	0.09	1.40	0.07	-0.65	0.63	-0.56
LOS	-1.79	1.09	-1.64	1.18	0.58	2.04*
EM	0.20	0.74	0.28	-0.79	0.36	-2.16*
MLEM	-0.98	0.82	-1.18	0.06	0.41	0.15

† $p<.07$. * $p\leq.05$.

Note: CSA: Child Sexual Abuse, CPA: Child Physical Abuse, FTP: Failure to Provide, LOS: Lack of Supervision, EM: Emotional Maltreatment, MLEM: Moral/Legal/Educational Maltreatment.

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The results indicate that individuals with SMI who have a more severe history of CPA demonstrated higher externality at admission, but no difference in the rates of changes in externality during 12 months of psychiatric rehabilitation after controlling for the effects of other types of child abuse histories, as compared to those with no or a less severe history of CPA.

Individuals with SMI who have a more severe history of EM showed no difference in externality at admission, but showed higher rates of decrease in externality during 12 months of psychiatric rehabilitation after controlling for the effects of other types of child abuse histories, as compared to those with no or a less severe history of EM.

Individuals with SMI who have a more severe history of LOS showed no difference in externality at admission, but showed higher rates of increase in externality during 12 months of psychiatric rehabilitation after controlling for the effects of other types of child abuse histories, as compared to those with no or a less severe history of LOS (Figure 13).

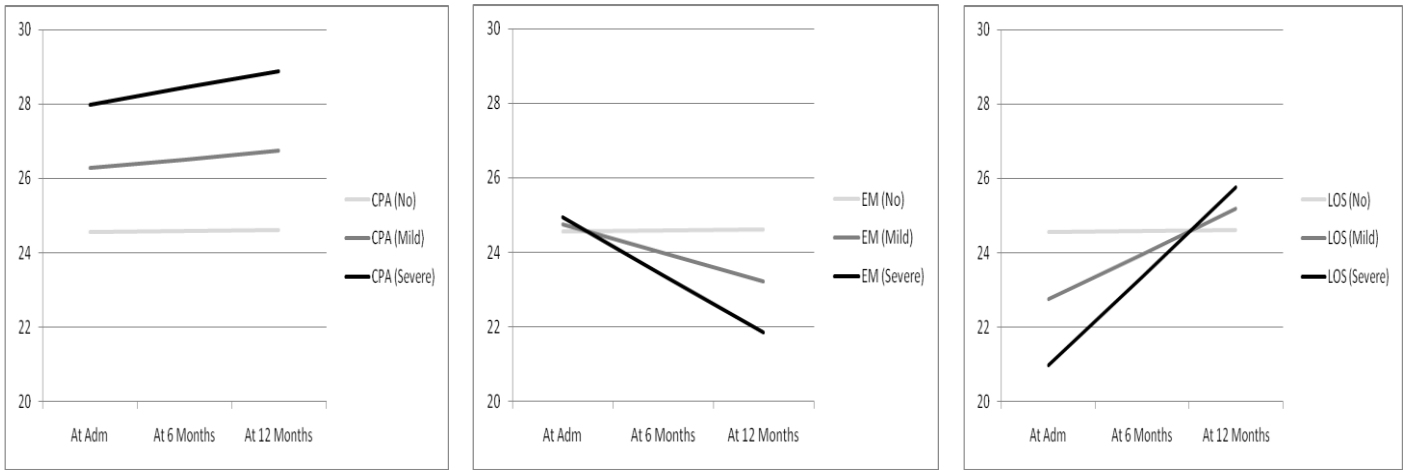


Figure 13. The Effects of CPA, EM, and LOS in Externality Trajectories during Inpatient Psychiatric Rehabilitation

3.1. Longitudinal Factor Pattern Invariance for Psychiatric Symptoms

The longitudinal factor pattern invariance of psychiatric symptoms was conducted on Confirmatory Factor Analysis (CFA) model to examine the equality of construct measurement over time. From the configural invariance test of externality, it is predicted that a unidimensional measurement model of psychiatric symptoms is viable at three assessment points (at admission, at 6 months and at 12 months) (χ^2 =45.47, *df*=39, *p*= .22; CFI=.97, TLI=.95, RMSEA=.03). Reliability coefficients (Omega) per each time point were .53, .53, and .56, respectively. All freely estimated factor loadings were statistically significant at *p*-value of .05 execpt Affect at Time 3 (estimate= 0.08, *p*= .60) (Figure 14).

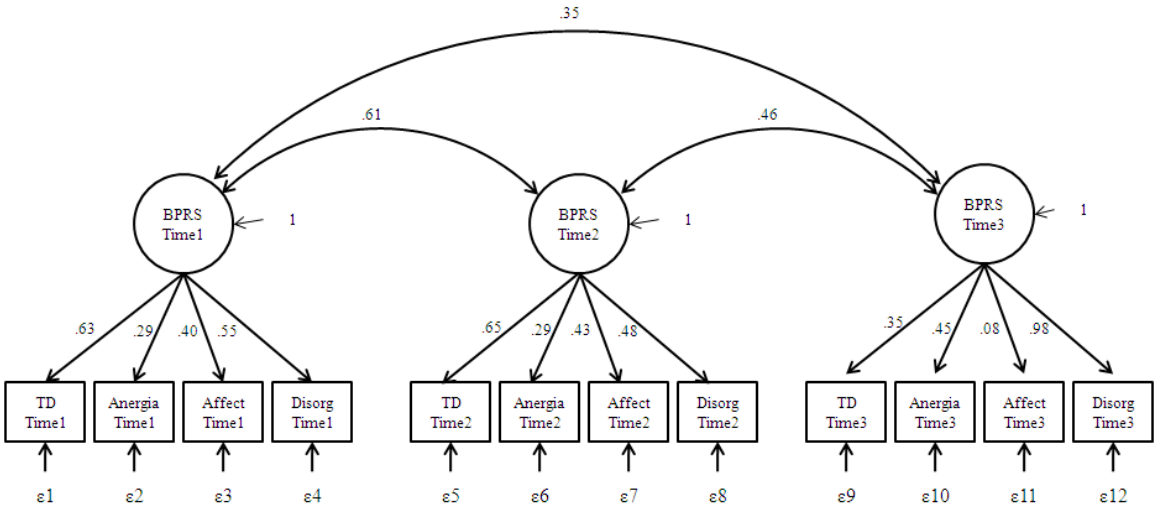


Figure 14. Longitudinal Measurement Model of Psychiatric Symptoms (16-item BPRS)

**Note: TD: Thought Disturbance, Disorg: Disorganization*

For the next step, metric invariance was evaluated whether the factor loadings of the psychiatric symptoms indicator were equivalent across three assessment time points. The test of partially equal factor loading model showed an overall good fit to the data and did not significantly degrade fit relative to the equal form model, χ^2_{diff} (6) = 10.81, ns (Table 16). For the final step, scalar invariance was tested whether the factor indicator intercepts of the psychiatric symptoms were equivalent across three assessment time points. The test of partially equal indicator intercepts model did not result in a significant degradation of fit relative to the equal factor loading model, χ^2_{diff} (8) = 11.59, ns (Table 16). Since the constraint of equal factor loading and indicator intercepts are invariant over time, comparison of means of psychiatric symptoms across time is meaningful, indicating that temporal change observed in psychiatric symptoms is due to true change, not to changes in the structure or measurement of the construct over time (Brown, 2006).

Table 16. Model Summary of the Longitudinal Factor Pattern Invariance Test for Psychiatric Symptoms (16-item BPRS).

Model	χ^2	df	CFI	RMSEA	Δ χ2	Δ df	p-value
Equal Form (Configural Invariance)	45.47	39	0.97	0.03			
Equal Factor Loading (Metric Invariance)	56.28	45	0.95	0.04	10.81	6	0.09
Partial Equal Indicator Intercept (Scalar Invariance)	67.87	53	0.93	0.04	11.59	8	0.17

3.2. Curve-of-factors latent growth model (LGM) for Psychiatric Symptoms

The curve-of-factors LGM for psychiatric symptoms was estimated based on the equal indicator intercept model (Figure 15). Fitting the curve-of-factors LGM for psychiatric symptoms resulted in the following indices of fit: χ^2 (52, *N*=142)=60.29, *p*=.20, CFI=0.96, RMSEA=0.03, AIC=4873.99, and BIC=4986.31. Parameter estimates for the curve-of-factors model were presented in Table 17.

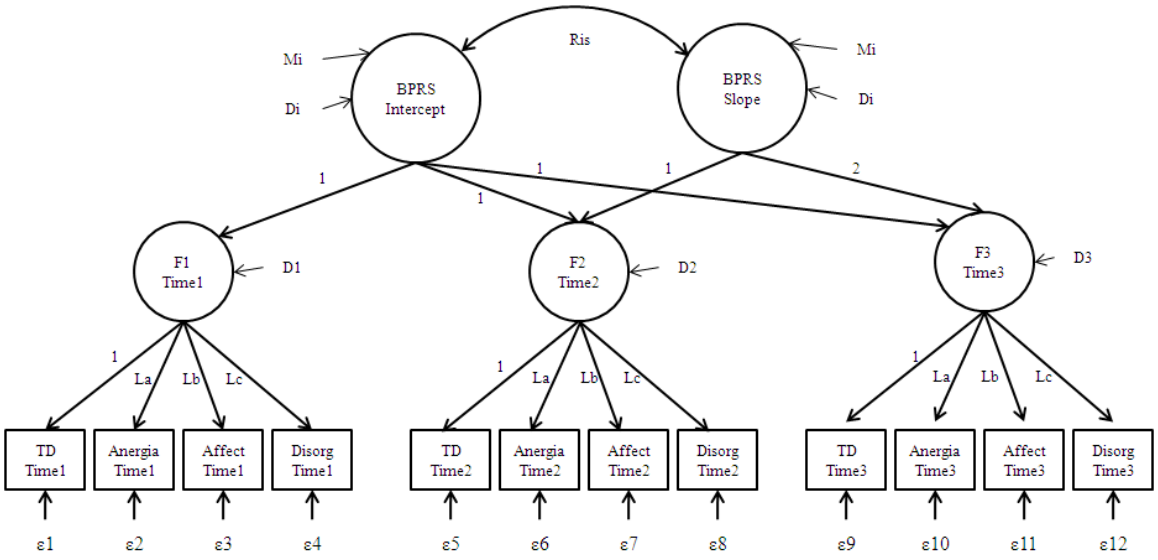


Figure 15. Representation of the Curve-of-factors LGM for Psychiatric Symptoms (16-item BPRS)

**Note: TD: Thought Disturbance, Disorg: Disorganization*

Table 17. Parameter Estimates From the Curve-of-Factors LGM of Psychiatric Symptoms

	4-Factor 16 Item BPRS Model		
	Effect	SE	t Value
Means			
Intercept (*Mi*)	0.00	0.00	-
Slope (*Ms*)	-0.76	0.29	-2.65**
Variance			
Intercept (*Di*)	6.14	4.96	1.24
Slope (*Ds*)	0.93	2.01	0.45
Covariance	-0.56	0.40	-1.40

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

For the 4-factor BPRS Curve-of-factors LGM, a significant mean level existed for the growth trajectory, *Ms*=-0.76, *t*=-2.65, of the higher order slope factors, indicating a significant decrease in psychiatric symptoms over time. Individual differences in the higher order growth factors were not significant, with estimated variances of *Di*=6.14, *t*=1.24, but not *Ds*=0.93, *t*=2.01, suggesting non-significant variation existed about the higher order intercept and the higher order slope factor means.

Common factor loadings were significant at p-value of 0.002, *La*=0.48, *Lb*=0.52, and *Lc*=0.39 for Anergia, Affect, and Disorganization, respectively. The higher order factors accounted for approximately 36%, 41%, and 33% of the variation in the first-order *F1, F2*, and *F3*. Approximately 70%, 84%, 90%, and 60% of the variation in observed Thought Disturbance, Anergia, Affect, and Disorganization were accounted for by the curve-of-factors LGM, respectively.

The regression effects of the covariate (e.g., severities of child abuse histories) were included for the higher order growth factors (i.e., intercept and slope factors). Table 18 shows the regression coefficients, standard errors, and test statistics. As can be seen from Table 18, the effect of the severity of child abuse history was not significant for psychiatric symptoms (4-factor BPRS) common intercept and slope in the higher order

models, after controlling for the effects of other types of child abuse.

Table 18. Summary of Specific Effects for the Covariate

	Executive Functioning Intercept			Executive Functioning Slope		
	Effect	SE	t Value	Effect	SE	t Value
CSA	0.16	0.30	0.52	0.07	0.18	0.38
CPA	0.02	0.77	0.03	0.09	0.45	0.20
FTP	-0.09	0.99	-0.09	-0.20	0.54	-0.38
LOS	-0.94	0.99	0.94	0.65	0.53	1.23
EM	0.21	0.60	0.36	-0.17	0.37	-0.46
MLEM	0.31	0.61	0.51	-0.51	0.38	-1.32

** $p \leq .01$.

Note: CSA: Child Sexual Abuse, CPA: Child Physical Abuse, FTP: Failure to Provide, LOS: Lack of Supervision, EM: Emotional Maltreatment, MLEM: Moral/Legal/Educational Maltreatment.

4. Multilevel model (MLM) for Working Memory and Social Inference

The intraclass correlations (ICCs) from the empty model (i.e., intercept only) for working memory, as measured by the LNS, and social inference, as measured by the Hinting task were calculated as .61 for working memory and .58 for social inference, indicating that approximately 61% of the variance in working memory and 58% of the variance in social inference across the three occasions occurred between persons. Unconditional (i.e., without predictors) polynomial models were estimated to describe change across the three time points, as presented next.

To test the second hypothesis, unconditional polynomial models for working memory and social inference were specified with a random intercept only. A fixed linear slope of time was significant (estimate = 0.62, $p < .001$ for working memory; and estimate = 0.56, $p < .01$ for social inference), such that average scores on working memory and social inference increased 0.62 (raw scores) and 0.56 (raw scores) per 6-month interval, respectively. The addition of a random linear slope (as well as its covariance with the random intercept) for working memory and social inference did not

improve model fit, REML deviance difference (3) = 0.3, $p > .10$ for working memory. However, the addition of a random linear slope (as well as its covariance with the random intercept) for social inference improved model fit, REML deviance difference (3) =6.7, $p < .05$.

To test hypotheses 3, the effects of child abuse history were then examined for working memory and social inference. Significant effects of a history of child abuse were found for neither working memory intercept nor slope in the model. However, a significant effect of a history of CSA was found for the social inference intercept in the model Table 19.

Table 19. Summary of Specific Effects of the Covariate for Social Inference (Hinting Task)

	Social Inference Intercept			Social Inference Slope		
	Effect	SE	t Value	Effect	SE	t Value
CSA	0.47	0.22	2.09*	-0.11	0.15	-0.71
CPA	-0.08	0.45	-0.17	-0.05	0.29	-0.15
FTP	-0.73	0.81	-0.90	0.42	0.29	-0.16
LOS	0.54	0.54	1.01	-0.05	0.42	-0.13
EM	-0.21	0.36	-0.60	-0.10	0.26	-0.39
MLEM	-0.11	0.38	-0.30	0.04	0.28	0.15

* $p \leq .05$. * $p \leq .01$.

Note: CSA: Child Sexual Abuse, CPA: Child Physical Abuse, FTP: Failure to Provide, LOS: Lack of Supervision, EM: Emotional Maltreatment, MLEM: Moral/Legal/Educational Maltreatment.

The results indicate that individuals with SMI who have a more severe history of CSA demonstrated higher social inference (Hinting task scores) at admission, but showed no difference in changes of social inference during 12 months of inpatient psychiatric rehabilitation after controlling for the effects of other types of child abuse histories, as compared to those with no or a less severe history of CSA (Figure 16).

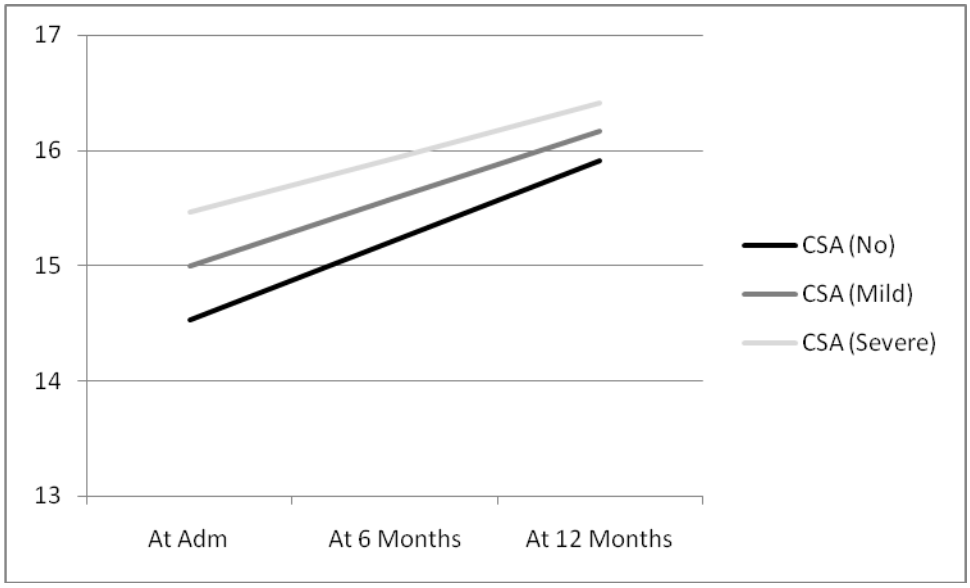


Figure 16. The Effects of CSA on Social Inference Trajectories during Inpatient Psychiatric Rehabilitation

Discussion

Longitudinal factor pattern invariance of social functioning (NOSIE-30), externality, and psychiatric symptoms (BPRS) was examined in participants of a 12-month intensive inpatient psychiatric rehabilitation program. In concordance with the first hypothesis, the 6-factor model of NOSIE-30, 2-factor model of externality, and 4-factor model of the 16-item BPRS were invariant across 3 time points (e.g., at admission, at 6 months, and at 12 months).

Histories of childhood abuse were included in the analyses in order to examine the effects of childhood abuse on the longitudinal course of psychiatric symptoms and social functioning. In concordance with the second hypothesis, social functioning, neurocognition (e.g., working memory), and social cognition (e.g., Hinting task) improved over time, and psychiatric symptoms decrease over time during 12 months of

intensive inpatient psychiatric rehabilitation. Also, there were significant individual differences at admission in social functioning, externality, and working memory, indicating heterogeneity of individuals with SMI in multiple aspects of human functioning at admission to the inpatient psychiatric rehabilitation program. However, contrary to the second hypothesis, externality did not change as a group over time. Also, there was no significant individual difference at admission and changes across time in psychiatric symptoms. The results indicate most individuals achieve recovery of their diverse functioning during psychiatric rehabilitation even though they showed heterogeneity in different functioning (e.g., social functioning, externality, social inference and psychiatric symptoms) at admission. Thus, the results replicate the effects of inpatient psychiatric rehabilitation for individuals with heterogeneous features of SMI (Peer & Spaulding, 2007).

Furthermore, the influence of the severity of each subtype of childhood abuse on social functioning, neurocognition, social cognition, and psychiatric symptoms was examined. In partially support of the third hypothesis, the linear associations between subtypes of child abuse and each level of assessment of human functioning varied across models (Figure 17).

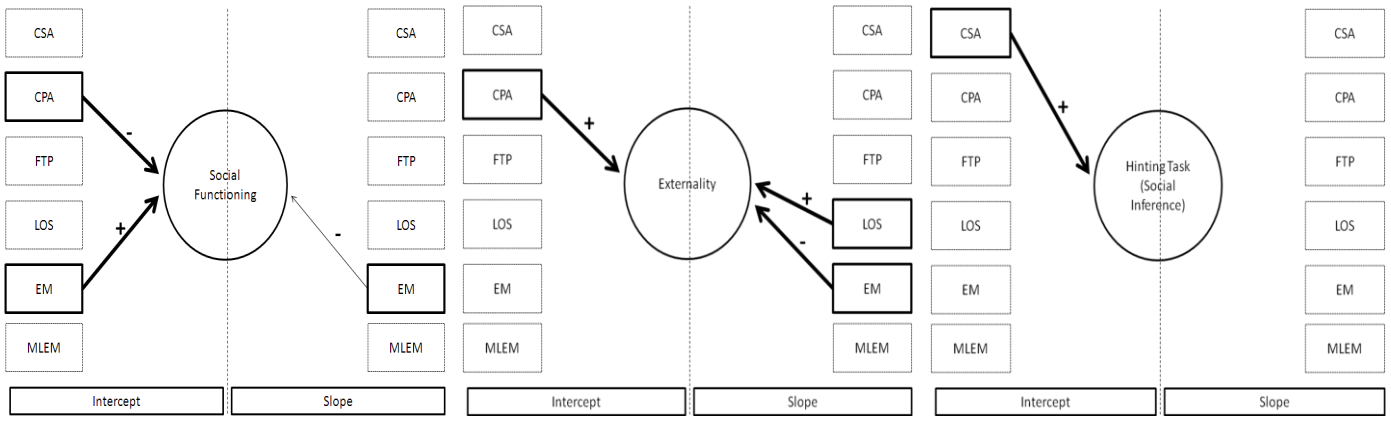


Figure 17. Graphical Representations of Linear Associations between Subtypes of Child Abuse and Intercepts and Slopes of Social Functioning, Executive Functioning, Self-efficacy, Externality, Social Inference, and Psychiatric Symptoms

As summarized in Figure 17, individuals with a more severe history of CSA demonstrated higher social inference (Hinting task scores) at admission during 12 months of psychiatric rehabilitation after controlling for the effects of other types of child abuse histories, as compared to those with no or a less severe history of CSA.

Interestingly, individuals with SMI who were sexually abused as children showed higher social inference abilities than those without CSA after controlling for the influence of other subtypes of child abuse. Previous studies in samples of sexually abused children and adolescents, and adults with CSA history have indicated that sexually abused children are more likely to overestimate the amount of danger or adversity in the world and others (Diehl & Prout, 2002; Thompson, 1997). It is conjectured that the increased attention to environment and others is reflected in higher social inference in participants with SMI in this study. However, there are very few studies examining the influence of CSA on social inference (Walker, 1999), and no studies exploring this relationship in a sample of individuals with SMI. Given the very limited number of studies examining the influence of CSA on social inference, the result of the current study can be interpreted

with some hypotheses. Walker (1999) found that there was no group difference in empathy between abused and non-abused children. In SMI, social cognition, including social inference, is highly related to neurocognition. Thus, it is conjectured that higher social inference or empathy found in individuals with CSA may be mediated by higher neurocognition. Thus, this study should be replicated with a complex model including severity of CSA, social inference and neurocognition to explore and control for potential mediating or moderating effects.

A number of studies have documented the linear associations between CSA and neurocognitive deficits in individuals with SMI (Lysaker et al., 2002; Schenkel et al., 2005). However, in the current study, no association between working memory and CSA severity was found, after considering the influence of other types of child abuse. This finding appears to be inconsistent from the previous findings (Lysaker et al., 2001). Lysaker et al. (2001) found that CSA is associated with more severe working memory deficits, after controlling for age and premorbid IQ. However, it should be noted that Lysaker et al. (2001) measured working memory using Wisconsin Card Sorting Test (WCST) and Letter-Number Sequencing (LNS), and CSA was more strongly related to performance on the WCST (*Cohen's d*=0.73 *and,* 0.72 for preservative errors and categories correct, respectively) than the LNS (*Cohen's d*=0.54*).* Also, it should be noted that there were some factors influencing on differences in findings between the current study and Lysaker et al. (2001). First, the current study includes the severity of six subtypes of child abuse in the model to control for the influence of the rest of child abuse variables. Thus, the results in this study may reflect purer effects of CSA in working memory than other studies only including CSA in their model. Second, participants in

Lysaker et al.(2001)'s study were outpatients whereas participants in the current study were inpatient. Third, there were differences in demographic variables (e.g., age, and age of onset) between the two studies. Since no studies examined the association between each subtypes of child abuse and neurocognition in individuals with SMI after controlling for the influence of other types of child abuse, the current findings should be replicated in a future study.

Individuals with a more severe history of CPA demonstrated poorer social functioning and higher externality at admission, but showed no differences in the rate of improvement in their social functioning and externality during 12 months of psychiatric rehabilitation after controlling for the effects of other types of child abuse histories, as compared to those with no or a less severe history of CPA. The current findings support previous findings in a sample of abused children. Barahal and colleagues (1981) found that maltreated children used more external locus of control than internal locus of control, which indicate little confidence in their power especially in unpleasant and frustrating situations, compared to non-maltreated children. The external locus of control found in maltreated children is related to overcompliance, slow development of self-confidence, and hypervigilance to external cues rather than internal thoughts reported in clinical settings (Beezley et al., 1976; Martin & Beezley, 1977; Rodeheffer & Martin, 1976). Also, it has been reported that external locus of control is associated with behavioral problems such as poor impulse control (Montgomery & Finch Jr, 1975). Finally, the current findings are consistent with previous findings in a sample of individuals with SMI, indicating that individuals with SMI who experience more severe CPA demonstrated higher antisocial personality traits (Lysaker, Wickett et al., 2004) and behavioral hostility

(Lysaker et al., 2002).

Individuals with a more severe history of EM demonstrated a higher social functioning at admission, but showed less steep improvement in social functioning, a tendency for steeper rates of improvement in their executive functioning, and higher rates of decrease in externality during 12 months of psychiatric rehabilitation after controlling for the effects of other types of child abuse histories, as compared to those with no or a less severe history of EM. The findings suggest a unique role of EM in the functioning of individuals with SMI. However, to my knowledge, no previous studies in SMI include history of EM as a child abuse variable. Thus, the current findings should be replicated.

Some limitations of the current study may influence the results. First, it should also be noted that multiple tests were conducted in this study to examine linear relationships between six subtypes of child abuse, clinical variables, and this increases type I error (rejecting H_0 while H_0 is true). For the same reason described in the Study I, (i.e., concerns about reduced power) the results were reported without correction. Thus, in the future research, the current findings should be replicated with limited tests or comparisons. A second limitation is that, due to relatively small sample size (N=161), the influence of clinical variables (e.g., executive functioning, and psychiatric symptoms, etc.) could not be controlled in the model at the same time while examining the linear associations between severity of each type of child abuse and each clinical variable. For example, the negative relation between CPA severity and social functioning could be mediated or moderated by social cognition, as demonstrated by Shahar et al. (2003) and Lysaker et al. (2002). Thus, the linear associations found in the Study II should be replicated with potential mediators or moderators.

Overall, despite some limitations noted above, the results of Study II support a unique role for each subtype of child abuse in diverse human functioning after considering the influence of other types of child abuse during 12 months of psychiatric rehabilitation. It is conjectured from the findings that, even though there are linear associations between subtypes of child abuse and clinical variables (e.g., social cognition, social functioning, and psychiatric symptoms), dynamic and complex relationships (e.g., mediating or moderating effects) should be further investigated in order to better grasp complex features of the influence of child abuse in SMI. Thus, in Study III, moderating effects of social cognition in the relationships between subtypes of child abuse and social functioning will be investigated using multilevel modeling.

Chapter 4

Study III

Hypotheses

As emphasized by Sameroff and Chandler (1975), the purpose of the Study III is to examine complex relationships among child abuse history and clinical variables such as social-cognition and psychiatric symptoms during inpatient psychiatric rehabilitation. Previsous studies suggest that a stronger relationship with social functioning is observed for social cognition than for neurocognition (Sergi et al., 2007). Measures of social cognition uniquely predict social functioning (Penn et al., 1996). The relationship between impairments in neurocognition and social functioning is mediated by impairments in social cognition (Brekke, Kay, Lee, & Green, 2005; Corcoran, 2001; Frith, 1992). The results from the Study II indicate a linear relationship between child abuse severity and social cognition. Thus, moderating effects of social cognition (e.g., social inference and attributional styles) in the relationship between the severity of child abuse history and social functioning during 12 months of inpatient psychiatric rehabilitation was examined to identify protective and therapeutic factors.

It is hypothesized that social cognition (e.g., Hinting task and externality) is a moderator in the relationship between the severity of childhood abuse and changes in social functioning during intensive inpatient psychiatric rehabilitation: that is, higher improvement in social cognition during 12 months of inpatient psychiatric rehabilitation moderates for the influence of severity of childhood abuse in social functioning.

Methods

Participants

Archival clinical data from 150 participants (age M = 38.47 years, SD = 12.55) in an inpatient psychiatric rehabilitation program were used in the present analyses (Table 20).

Table 20. Demographic Information (N=143)

	n (%)	M	SD
Gender			
Female	73 (51.0)		
Male	70 (49.0)		
Age at Admission		38.47	12.55
Years of Education		12.48	2.03
Age of Onset (n=113)		19.73	8.74
Axis I Diagnosis			
Schizophrenia	73 (51.1)		
Schizoaffective	49 (34.3)		
Bipolar	17 (11.9)		
Psychotic Disorder NOS	4 (2.8)		
Axis II Diagnosis			
Borderline	10 (7.0)		
Schizoid	3 (2.1)		
Paranoid	25 (17.5)		
Antisocial	8 (5.6)		
Personality Disorder NOS	14 (9.8)		
None	83 (42.0)		
Race			
Asian American	2 (1.4)		
Hispanic American	1 (0.7)		
African American	17 (11.9)		
European American	118 (82.5)		
Unidentified	5 (3.5)		
Marital Status			
Married	17 (11.9)		
Single	81 (56.6)		
Divorced	37 (25.9)		
Other	8 (5.6)		

Measures

Ratings of the Severity of Child Abuse

Ratings of the severity of child abuse were coded based on the child abuse rating system described in Barnett, Manly, and Cicchetti (1993) (see Appendix I).

Symptomatology

Symptomatology was measured by the Extended Brief Psychiatric Rating Scale (BPRS; Lukoff et al., 1986). Based on the findings from the curve-of-factors LGMs in the Study II, overall psychiatric symptom scores that were summed to create the relevant components (e.g., 16-item BPRS 4 factors).

Social Cognition

Social cognition is measured by two measures: the Hinting task and the Externality. Based on the findings from the curve-of-factors LGMs in the Study II, the externality scores that were summed from the relevant components (e.g power other's control beliefs and chance control beliefs for externality) were created.

Social Functioning

Social functioning was measured using the Nurses' Observation Scale for Inpatient Evaluation (NOSIE-30) (Honigfeld et al., 1966). Based on the findings from the curve-of-factors LGMs in the Study II, overall social functioning scores that were summed from the relevant components (e.g., schedule competence, interpersonal interests, neatness, irritability, psychoticism, and motor retardation) were created.

Data Analyses

Linear mixed models were estimated using SAS PROC MIXED to specify unconditional polynomial models with a random intercept only for social functioning over three occasions (at admission, 6 months, and 12 months). Restricted maximum likelihood

(REML) was used in reporting model parameters and to assess the significance of random effects; Degrees of freedom were estimated using the Satterthwaite method. The 95% confidence interval (CI) for random variation around each fixed effect was calculated as ± 2 standard deviations of its accompanying random variance term. Time was centered at the first occasion (at admission), such that the intercept represented the level of social functioning at admission in all models. The intraclass correlations (ICCs) from the empty model (i.e., intercept only) were calculated in order to indicate how much of the variance in social functioning across three time points occurred between persons. Unconditional (i.e., without predictors) polynomial models were also estimated to describe change across the four time points.

Furthermore, predictors (i.e., histories of childhood abuse) and moderators (e.g., working memory, social inference, and externality) were included in unconditional polynomial models with a random intercept in order to examine the effects of moderators in the relationship between child abuse history and social functioning.

Results

1. Unconditional Models for Social Functioning

The intraclass correlation (ICC) from the empty model (i.e., intercept only) was calculated as .63, indicating that approximately 63% of the variance in social functioning across the four occasions occurred between persons. Unconditional (i.e., without predictors) polynomial models were estimated to describe change across the three time points, as presented next.

Unconditional polynomial models were specified with a random intercept only. A fixed linear slope of time was significant (estimate = 2.58, $p < .0001$), such that average scores on social functioning increased by 2.58 units per 6-month interval. The addition of a random linear slope (as well as its covariance with the random intercept) resulted in no improvement to the model, REML deviance difference (2) = 0.1, $p > .05$. The assumption of no remaining residual covariance across occasions was tested by comparing a random linear model without residual correlations to a random linear model with residual correlations. A first-order auto-regressive correlation resulted in no improvement in model fit, and thus the fixed linear, random intercept model without residual correlations was retained.

Table 21. *Parameter Estimates and Model Fit Statistics for Social Functioning (N=143)*

	Unconditional Model		
	Estimate	Standard Error	*p*-value
Fixed Effects			
Intercept (β_{00})	126.22	0.97	<.0001
Time (per 6 month interval) (β_{10})	2.58	0.43	<.0001
Variance Components			
Residual Variance (e_{ti})	96.32	13.32	<.0001
Intercept Variance (u_{0i})	37.95	3.59	<.0001

The model parameters are given in Table 21. As shown, the predicted level of social functioning at admission (i.e., fixed intercept) was 126.22. The 95% random effects confidence interval for the intercept indicates that 95% of the sample is predicted to have social functioning scores from 106.59 to 145.85 at admission. The mean

instantaneous linear rate of change at admission was 2.25. The results indicate that most individuals improved social functioning, as compared to their baseline at admission during inpatient psychiatric rehabilitation while there was significant heterogeneity in social functioning at admission (Figure 18).

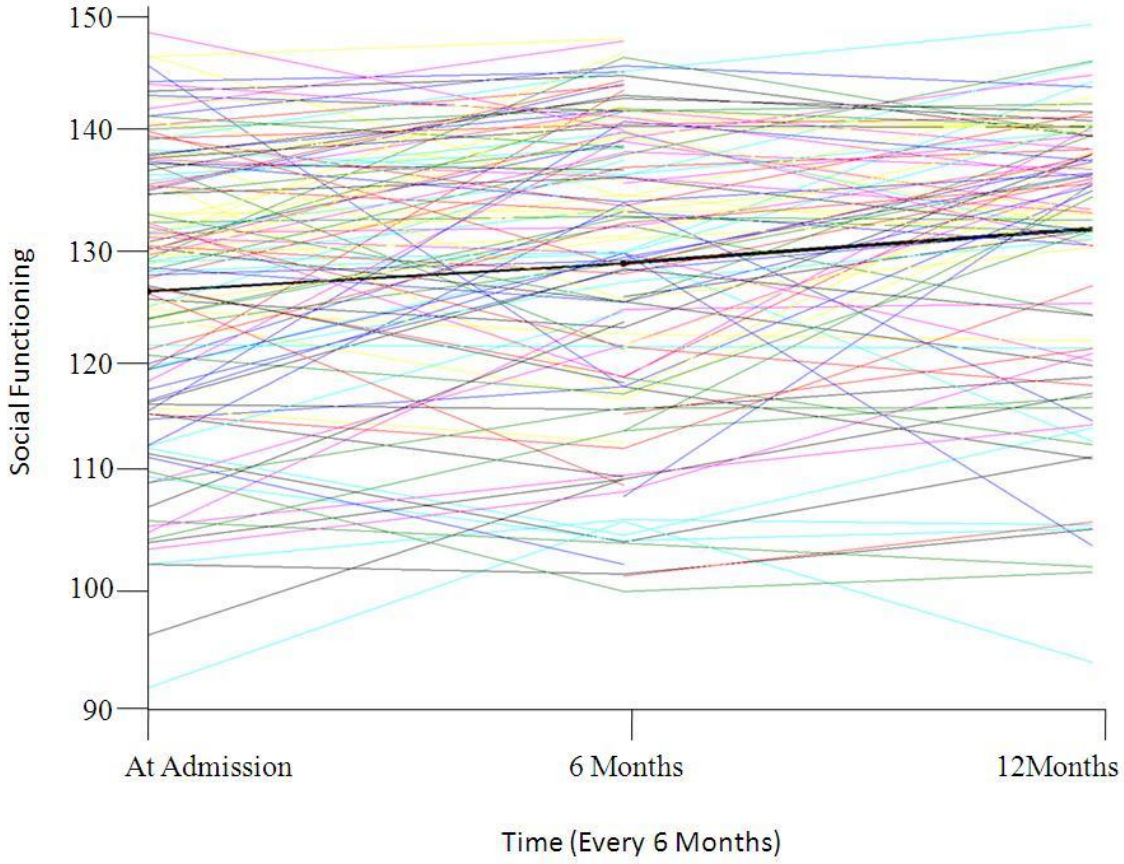


Figure 18. Individual Trajectories of Social Functioning during 12 Months of Inpatient Psychiatric Rehabilitation

2. Moderating Effects of Social-Cognition in the Relationship Between Social Functioning and Child Abuse History

In order to examine moderating effects of social cognition in the relationship between social functioning and child abuse history, the time-invariant effects of severity of child abuse history (e.g., child sexual abuse (CSA), child physical abuse (CPA), failure to

provide (FTP), lack of supervision (LOS), emotional maltreatment (EM), and moral/legal/educational maltreatment (MLEM)) and the time-varying effects of social cognition (e.g., Hinting task and externality) were then examined. Also, to control for the between-person and within person effects of psychiatric symptoms, the time-varying effects of psychiatric symptoms were included in the model. Intraclass correlations for the time-varying predictors as calculated from an empty model were 0.58 for Hinting task and 0.73 for externality such that approximately 42% and 27% of the variance in each predictor was within-persons over time, respectively. The time-varying predictors were then recoded to capture their separate between-person and within-person effects. First, the person mean was calculated across time and centered such that 0 was a meaningful value (15 for Hinting task and 47 for externality). These centered person means then became level-2 predictors that represent the between-person effects in the model. Second, a within-person deviation predictor was created by subtracting the person mean from the observed predictor at each occasion. These within-person-centered deviations then became level-1 predictors that represent the within-person effects in the model.

3.1. Child Physical Abuse (CPA) and Social Inference (Hinting Task)

Results showed that the fixed linear slope for time was significant (estimate = 1.73, $p < .05$), indicating improvement over time for persons with a mean level of social inference and psychiatric symptoms. For social inference, the within-person effect was significant (estimate = 0.96, $p< .01$), and the between-person effect was non-significant (estimate = 0.36, $p= .11$). The interaction between the severity of CPA and within-person effect of social inference was non-significant (estimate = 0.35, $p=. 18$). However, there

was a significant interaction effect between the severity of CPA and between-person effect of social inference (estimate=0.75, $p< .05$). Also, a three-way interaction between the severity of CPA, between-person and within-person effects of social inference was significant (estimate = 0.29, $p< .01$) (Table 21).

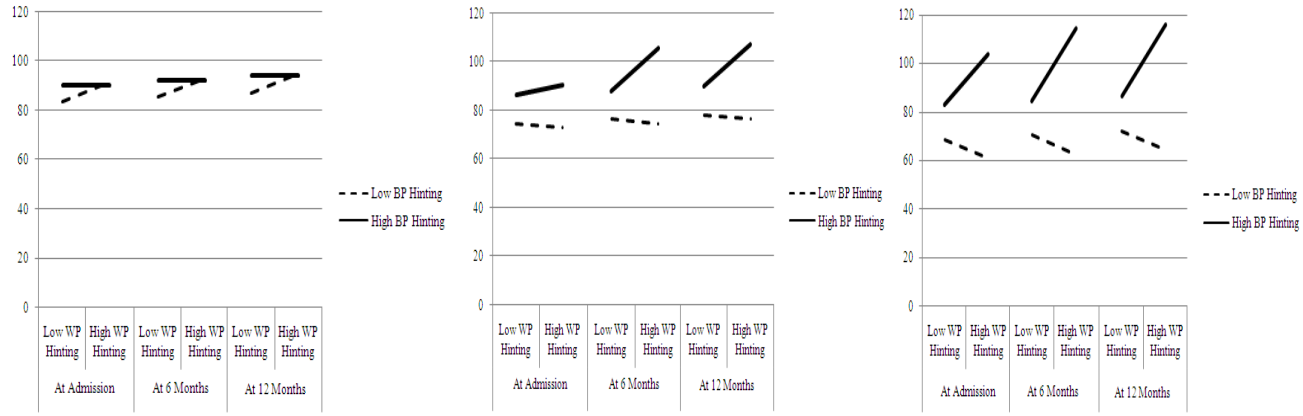
Table 21. *Parameter Estimates and Model Fit Statistics for Social Functioning (N=102)*

	Conditional Model		
	Estimate	SE	*p*-value
Fixed Effects			
Intercept (β_{00})	89.01	25.07	0.0005
Time (per 6 month interval) (β_{10})	1.73	0.83	0.04
CSA (β_{01})	0.24	0.52	0.64
CPA (β_{02})	-1.54	1.01	0.13
FTP (β_{03})	-1.46	1.37	0.29
LOS (β_{04})	1.24	1.51	0.42
EM (β_{05})	0.19	0.76	0.79
MLEM (β_{06})	-0.78	0.98	0.43
BP Effect of BPRS (β_{07})	-0.88	0.41	0.03
WP Effect of BPRS (β_{20})	-0.66	0.42	0.12
BP Effect of Hinting (β_{08})	0.36	0.22	0.11
WP Effect of Hinting (β_{30})	0.96	0.38	0.01
BP Effect of Hinting×WP Effect of Hinting (β_{40})	-0.25	0.17	0.14
CPA×WP Effect of Hinting (β_{50})	0.35	0.26	0.18
CPA×BP Effect of Hinting (β_{09})	0.75	0.31	0.02
CPA×BP Effect of Hinting×WP Effect of Hinting (β_{60})	0.29	0.11	0.009
Variance Components			
Residual Variance (e_{ti})	35.89	6.48	<.0001
Intercept Variance (u_{0i})	33.15	9.65	0.0003

** Note: CSA: Child Sexual Abuse, CPA: Child Physical Abuse, FTP: Failure to Provide, LOS: Lack of Supervision, EM: Emotional Maltreatment, MLEM: Moral/Legal/Educational Maltreatment, WP Effect of Hinting: Within-person effect of Hinting task scores, BP Effect of Hinting: Between-person effect of Hinting task scores.*

These results indicate that after controlling for the between-person and within-person effects of social inference, the between-person effect of psychiatric symptoms, and the effects of the severities of other types of child abuse, within-person improvement

in social inference resulted in social functioning improvement. However, the between-person changes in social inference moderate the influence of the within-person effect of social inference on the relationship between the severity of CPA and social functioning during 12 months of inpatient psychiatric rehabilitation. That is, for persons with a more severe history of CPA and lower overall social inference, within-person improvement of social inference did not play as a therapeutic factor. However for persons with a higher overall social inference, despite a more severe history of CPA, showed steeper improvement in social functioning when improving their social inference during 12 months of inpatient psychiatric rehabilitation, as compared to those with a less severe history of CPA. (Figure 19).



(No CPA) (Mild CPA) (Severe CPA)

Figure 19. Moderating Effects of Within-Person and Between-Person Changes in Social Inference (Hinting Task) in the Relationship between Severity of CPA and Social Functioning

** Note: WP Hinting: Within-person Hinting task scores, BP Hinting: Between-person Hinting task scores*

3.2. Child Physical Abuse (CPA) and Externality

Results showed that the fixed linear slope for time was significant (estimate = 2.05, $p < .01$), indicating improvement over time for persons with a mean level of externality and psychiatric symptoms. For externality, the between-person and within-

person effects were non-significant (estimate = -0.13, p= .08 for between-person effect; estimate = -0.19, p= .11 for within-person effect). The interaction between the severity of CPA and the within-person effect of externality was significant (estimate = 0.35, p<. 01). However, the interaction effect between the severity of CPA and the between-person effect of externality was non-significant (estimate = -0.05, p= .31). Also, the 3-way interaction between the severity of CPA, and the between-person and the within-person effect of externality was non-significant (estimate = 0.01, p= .57) (Table 22).

Table 22. *Parameter Estimates and Model Fit Statistics for Social Functioning (N=102)*

	Conditional Model		
	Estimate	SE	*p*-value
Fixed Effects			
Intercept (β_{00})	84.95	25.78	0.001
Time (per 6 month interval) (β_{10})	2.05	0.76	0.008
CSA (β_{01})	0.61	0.54	0.26
CPA (β_{02})	0.61	1.45	0.68
FTP (β_{03})	-1.87	1.45	0.21
LOS (β_{04})	1.78	1.59	0.27
EM (β_{05})	-0.82	0.81	0.32
MLEM (β_{06})	-0.99	1.03	0.33
BP Effect of BPRS (β_{07})	-0.96	0.41	0.02
WP Effect of BPRS (β_{20})	-0.72	0.44	0.09
BP Effect of EX (β_{08})	-0.13	0.08	0.08
WP Effect of EX (β_{30})	-0.19	0.12	0.11
BP Effect of Hinting×WP Effect of EX (β_{40})	-0.01	0.01	0.66
CPA×WP Effect of EX (β_{50})	0.35	0.12	0.005
CPA×BP Effect of EX (β_{09})	-0.05	0.06	0.31
CPA×BP Effect of EX×WP Effect of EX (β_{60})	0.01	0.01	0.57
Variance Components			
Residual Variance (e_{ti})	35.53	6.46	<.0001
Intercept Variance (u_{0i})	39.55	10.63	<.0001

** Note: CSA: Child Sexual Abuse, CPA: Child Physical Abuse, FTP: Failure to Provide, LOS: Lack of Supervision, EM: Emotional Maltreatment, MLEM: Moral/Legal/Educational Maltreatment, EX: Externality.*

These results indicate that after controlling for the between-person and within-person effects of externality, the between-person effect of psychiatric symptoms, and the effects of severities of other types of child abuse, within-person changes in externality moderate the relationship between the severity of CPA and social functioning during 12 months of inpatient psychiatric rehabilitation. That is, when persons with a more severe history of CPA increased in externality, they showed steeper improvement in social functioning during 12 months of inpatient psychiatric rehabilitation, as compared to those with a less severe history of CPA. However, persons with no history of CPA showed a decrease in social functioning when externality increased during 12 months of inpatient psychiatric rehabilitation (Figure 20).

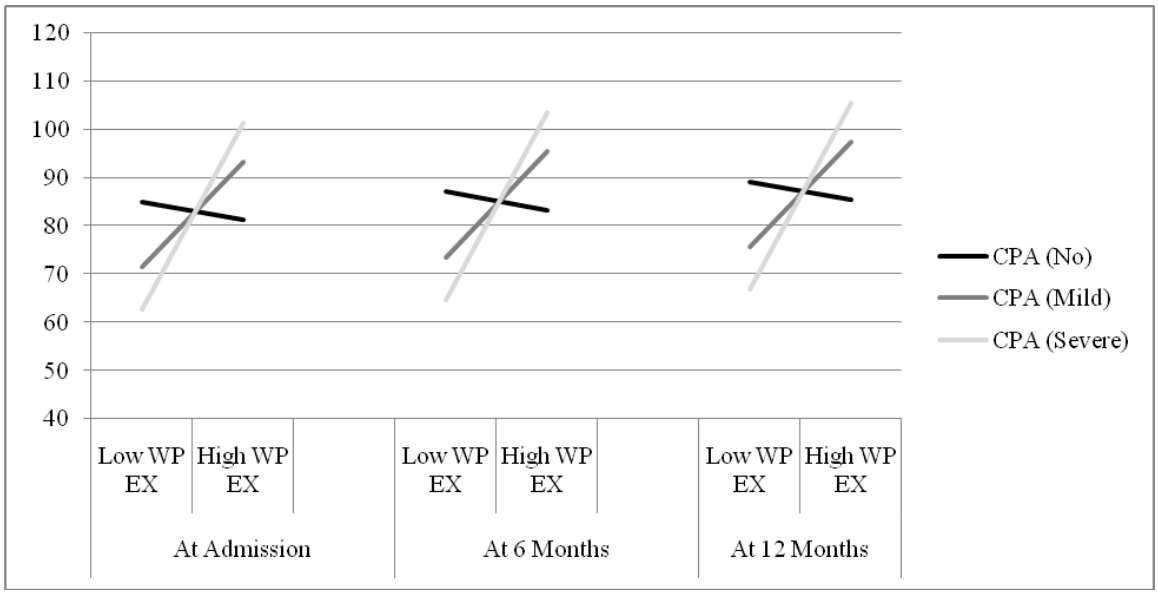


Figure 20. Moderating Effects of Within-Person Changes in Externality in the Relationship between Severity of CPA and Social Functioning
** Note*: *WP EX: Within-person Externality*

Discussion

In order to identify protective and therapeutic factors against the adverse effects of child abuse, moderating effects of social cognition in the relationship between the severity of child abuse history and social functioning during 12 months of inpatient psychiatric rehabilitation were examined. First, as hypothesized, social functioning of individuals with SMI as a group improved over time. However, as reported in the previous studies (Kupper & Hoffmann, 2000; Peer & Spaulding, 2007), extreme individual differences in social functioning were found.

In support for the second hypothesis, social inference, as measured by the Hinting task and attributional style (e.g., externality) moderated the relationship between CPA and social functioning. Specifically, after controlling for the between-person and within-person effects of social inference, the between-person and within-person effects of psychiatric symptoms and the effects of severities of other types of child abuse, between-person and within-person changes in social inference moderated the relationship between the severity of CPA and social functioning during 12 months of inpatient psychiatric rehabilitation. That is, within-person improvement in social inference generalized into improvement in social functioning only if individuals have no or less severe history of CPA, or individuals have overall higher level of social inference despite a more severe history of CPA. It is conjectured from the findings that higher baseline social inference, despite a more severe history of CPA, plays a protective role in improving social functioning through further improving social inference during psychiatric rehabilitation.

Second, after controlling for the between-person and within-person effects of externality, the between-person and within-person effects of psychiatric symptoms and

the effects of severities of other types of child abuse, within-person changes in externality moderated the relationship between the severity of CPA and social functioning during 12 months of inpatient psychiatric rehabilitation. That is, when persons with a more severe history of CPA increase in externality, they showed steeper improvement in social functioning during 12 months of inpatient psychiatric rehabilitation, as compared to those with a less severe history of CPA. However, persons with no history of CPA showed a decrease in social functioning when externality increased during 12 months of inpatient psychiatric rehabilitation.

The finding supports Barnett et al. (1993)'s comments that the experience of child abuse may have different consequences for different people. That is, the same range of social cognition (e.g., social inference and attributional style) scores should have different implications for individuals with different ranges of severity and types of child abuse. For example, levels of externality had different implications for individuals with versus without CPA. For individuals without CPA, higher externality has been shown to be a marker for poorer prognosis during psychiatric rehabilitation (Hoffmann, Kupper, & Kunz, 2000). However, for individuals with a more severe history of CPA, higher externality appeared to be a protective factor. The current finding could make sense because the external locus of control found in maltreated individuals is considered to be a consequence of adaptation to distressing circumstances (Barnett et al., 1993). On the other hand, the finding of a moderating effect of social cognition indicate that individuals with a similar range of child abuse severity may need different treatment approaches based on their social cognition to optimally assist their path to achieve recovery during inpatient psychiatric rehabilitation (Lysaker et al., 2002). For instance, Lysaker et al.

(2002) suggested that cognitive behavioral interventions targeting social cognitive biases (e.g., hopelessness) or targeting impulse control mitigated by executive functioning deficits should be included in psychiatric rehabilitation for assisting individuals with SMI and a history of CPA to address hostile attitude and behaviors.

Some limitations of the current study should be noted. First, multiple tests were conducted in this study to examine the moderating effects of neurocognition and social cognition in the relationships between six subtypes of child abuse and social functioning, which may increase the risk for type I error (rejecting H_0 while H_0 is true). Due to the same reason described in the Study I and Study II, (i.e., concerns about reduced power), the results were reported without correction. Thus, in future research, the current findings should be replicated with limited tests or comparisons. A second limitation is that, due to relatively small sample size, the influence of neurocognition could not be controlled for in the model at the same time while examining the moderating effect of social cognition in the relationship between severity of each type of child abuse and social functioning. Also, previous studies suggest that episodic memory is lowered for individuals with child maltreatment, possibly because chronically heightened cortisol levels leads to hippocampal damage (Woolley, Gould, & McEwen, 1990), which is linked with episodic memory deficits. A moderating effect of memory in the relationship between CSA severity and maladaptive social functioning in individuals with SMI has been identified in a cross-sectional design (Choi et al., 2009). Thus, in future research, episodic memory should be included in order to examine its effect in CSA severity and social functioning trajectories during inpatient psychiatric rehabilitation.

In spite of the limitations listed above, the current study is the first longitudinal analysis examining the impact of child abuse severity in social functioning trajectories and exploring the moderating effects of social cognition in the relationship between child abuse severity and social functioning trajectories. Considering the extreme heterogeneity in both SMI and child maltreatment, the current finding sheds light on providing individualized treatment and assessment planning for individuals with SMI and a history of child abuse.

CHAPTER 5

General Discussion

As a strong influence of childhood abuse history in SMI has been consistently reported, most researchers and clinicians have reached the consensus that a systemic incorporation of assessment of childhood abuse into the standard clinical care for people with SMI is necessary. Also, the need for providing specialized and individualized treatment for individuals who have a history of childhood abuse is growing (Agar et al., 2002; Dill et al. 1991; Lysaker, 2001a, 2001b; Read & Fraser, 1998; Read & Ross, 2003; Schenkel et al., 2005). Even though there is a paucity of empirically supported treatment for individuals with SMI who had a history of child maltreatment (Rosenberg et al., 2001), there is enough evidence that trauma related problems in individuals with SMI can be identified and addressed with comprehensive services, such as case management, psychoeducation, cognitive restructuring and skills training (Mueser et al., 2007; Rosenberg et al., 2001). Furthermore, we have learned from the past that the effects of childhood abuse on adults with SMI can only be understood as a reciprocal inter-relationship among different levels of human functioning. Thus, treatment and rehabilitation should be individualized to target different levels of human functioning deficits deficits, including symptom exacerbation and deficits in social functioning, which are influenced by history of childhood abuse and their possible relationships. Despite evidence that trauma related problems in individuals with SMI can be identified and addressed with comprehensive services, there is a paucity of empirically supported treatment for individuals with SMI who have a history of child maltreatment (Rosenberg

et al., 2001). The findings from the current study are expected to provide greater insight for developing psychiatric rehabilitation and treatment for people with SMI and a history of childhood abuse.

Additionally, these relationships should be considered in the different phases of illness (e.g., acute phase, post-acute phase, or residual phase) during both inpatient and outpatient rehabilitation settings. Based on the current longitudinal study, it is expected that we may gain more insight on the way in which different levels of severity of childhood abuse influence recovery of different levels of human functioning in individuals with SMI over the course of illness during inpatient psychiatric rehabilitation. Also, the findings from the current study are expected to provide insight for developing psychiatric rehabilitation and treatment for people with SMI and a history of childhood abuse.

References

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders*. Washington, DC: American Psychiatric Association.

Baltes, P. B., & Nesselroade, J. R. (1979). History and rationale of longitudinal research. In J. R. Nesselroade, & P. B. Baltes (Eds.), *Longitudinal research in the study of behavior and development* (pp. 1-39). New York: Academic Press. doi:10.1037/0022-006X.49.4.508

Barahal, R. M., Waterman, J., & Martin, H. P. (1981). The social cognitive development of abused children. *Journal of Consulting and Clinical Psychology, 49*(4), 508-516.

Barnett, D., Manly, J. T., & Cicchetti, D. (1993). Child abuse, child development, and social policy. In D. Cicchetti, & S. L. Toth (Eds.), *Defining child maltreatment: The interface between policy and research (pp. 7-74)* (). NY: Ablex publishing corporation.

Beezley, P., Martin, H. P., & Kempe, R. (1976). The abused child: A multidisciplinary approach to developmental issues and treatment. In H. P. Martin (Ed.), *Psychotherapy* () Ballinger Cambridge, Mass.

Bell, M., Bryson, G., Greig, T., Corcoran, C., & Wexler, B. (2001). *Neurocognitive enhancement therapy with work therapy effects on neuropsychological test performance* Am Med Assoc.

Benton, A. L., Hamsher, K., & Sivan, A. B. (1989). Multilingual aphasia examination.

Birchwood, M., Iqbal, Z., Chadwick, P., & Trower, P. (2000). Cognitive approach to depression and suicidal thinking in psychosis 2. testing the validity of a social ranking model. *The British Journal of Psychiatry, 177*(6), 522-528. doi:10.1192/bjp.177.6.522

Brekke, J. S., Hoe, M., Long, J., & Green, M. F. (2007). How neurocognition and social cognition influence functional change during community-based psychosocial rehabilitation for individuals with schizophrenia. *Schizophrenia Bulletin, 33,* 1247-1256;doi:10.1093/schbul/sbl072

Brekke, J. S., Kay, D. D., Lee, K. S., & Green, M. F. (2005). Biosocial pathways to functional outcome in schizophrenia. *Schizophrenia Research, 80*(2-3), 213-225. doi:10.1016/j.schres.2005.07.008

Bronfenbrenner, U. (1967). Response to pressure from peers vs adults among soviet and american school children. *International Journal of Psychology, 2*(3), 199-207. doi:10.1080/00207596708247216

Brothers, L. (1990). The social brain: A project for integrating primate behavior and neurophysiology in a new domain. *Concepts in Neuroscience, 1*, 27-61.

Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. New York: NY: Guilford Press.

Burger, G. K., Calsyn, R. J., Morse, G. A., Klinkenberg, W. D., & Trusty, M. L. (1997). Factor structure of the expanded brief psychiatric rating scale. *Journal of Clinical*

Psychology, 53(5). doi:10.1002/(SICI)1097-4679(199708)53:5<451::AID-JCLP5>3.0.CO;2-Q

Choi, K. H., Reddy, L. F., Liu, N. H., & Spaulding, W. D. (2009). Memory as a moderator in the relationship between child sexual abuse and maladaptive functioning in people with severe mental illness. *The Journal of Nervous and Mental Disease, 197*(4), 282-286. doi:10.1097/NMD.0b013e31819dc316

Cicchetti, D., & Carlson, V. (1989). *Child maltreatment: Theory and research on the causes and consequences of child abuse arid neglect*. Cambridge: Cambridge University Press.

Cicchetti, D., & Valentino, K. (2007). Toward the application of a multiple-levels-of - analysis perspective to research in development and psychopathology. In A. S. Masten (Ed.), *Multilevel dynamics in developmental psychopathology* (pp. 243-284)

Cohen, A., & Farley, F. H. (1973). An exploratory study of individual differences in perceptual centering and decentering. *The Journal of Psychology, 84*(1st Half), 133-136.

Corcoran, R. (2001). Theory of mind and schizophrenia. In P. W. Corrigan, & D. L. Penn (Eds.), *Social cognition and schizophrenia* (pp. 149-174). Washington, DC: American Psychological Association. doi:10.1037/10407-005

Darves-Bornoz, J. M., Lemperiere, T., Degiovanni, A., & Gaillard, P. (1995). Sexual victimization in women with schizophrenia and bipolar disorder. *Social Psychiatry and Psychiatric Epidemiology, 30*(2), 78-84. doi:10.1007/BF00794947

Diehl, A. S., & Prout, M. F. (2002). Effects of posttraumatic stress disorder and child sexual abuse on self-efficacy development. *American Journal of Orthopsychiatry, 72*(2), 262-265. doi:10.1037/0002-9432.72.2.262

Farber, E. D., & Joseph, J. A. (1985). The maltreated adolescent: Patterns of physical abuse. *Child Abuse & Neglect, 9*(2), 201-206. doi:10.1016/0145-2134(85)90012-2

Frith, C. D. (1992). *The cognitive neuropsychology of schizophrenia*. Hove, England: Lawrence Erlbaum.

Gold, E. R. (1986). Long-term effects of sexual victimization in childhood: An attributional approach. *Journal of Consulting and Clinical Psychology, 54*(4), 471-475. doi:10.1037/0022-006X.54.4.471

Goodman, L. A., Rosenberg, S. D., Mueser, K. T., & Drake, R. E. (1997). Physical and sexual assault history in women with serious mental illness: Prevalence, correlates, treatment, and future research directions. *Schizophrenia Bulletin, 23*(4), 685-696. PMid:9366004

Greenfield, S. F., Strakowski, S. M., Tohen, M., Batson, S. C., & Kolbrener, M. L. (1994). Childhood abuse in first-episode psychosis. *British Journal of Psychiatry, 164*(JUN), 831-834. doi:10.1192/bjp.164.6.831

Hoffmann, H., Kupper, Z., & Kunz, B. (2000). Hopelessness and its impact on rehabilitation outcome in schizophrenia-an exploratory study. *Schizophrenia Research, 43*(2), 147-158. doi:10.1016/S0920-9964(99)00148-6

Honigfeld, G., Gillis, R. D., & Klett, C. J. (1966). NOSIE-30: A treatment-sensitive ward behavior scale. *Psychol Rep, 19*(1), 180-2. PMid:5942082

Janssen, I., Krabbendam, L., Bak, M., Hanssen, M., Vollebergh, W., Graaf, R., & Os, J. (2004). Childhood abuse as a risk factor for psychotic experiences. *Acta Psychiatrica Scandinavica, 109*(1), 38-45. doi:10.1046/j.0001-690X.2003.00217.x

Joe, V. C. (1971). Review of the internal-external control construct as a personality variable. *Psychological Reports, 28*(2), 619-640. PMid:4932156

Kohlberg, L., LaCrosse, J., & Ricks, D. (1972). The predictability of adult mental health from childhood behavior. In B. B. Wolman (Ed.), *Manual of child psychopathology* (pp. 1217-1284) McGraw Hill.

Kopelowicz, A., Ventura, J., Liberman, R. P., & Mintz, J. (2008). Consistency of brief psychiatric rating scale factor structure across a broad spectrum of schizophrenia patients. *Psychopathology, 41*(2), 77-84. doi:10.1159/000111551

Kupper, Z., & Hoffmann, H. (2000). Course patterns of psychosocial functioning in schizophrenia patients attending a vocational rehabilitation program. *Schizophrenia* Bulletin, 26(3), 681-698. PMid:10993406

Lezak, M. D. (2004). *Neuropsychological assessment*. New York, NY: Oxford University Press.

Libon, D. J., Swenson, R. A., Barnoski, E. J., & Sands, L. P. (1993). Clock drawing as an assessment tool for dementia. *Archives of Clinical Neuropsychology, 8*(5), 405-415. PMid:14589710

Long, J. D., & Brekke, J. S. (1999). Longitudinal factor structure of the brief psychiatric rating scale in schizophrenia. *Psychological Assessment, 11*(4), 498-506. doi:10.1037/1040-3590.11.4.498

Lysaker, P. H., Beattie, N. L., Strasburger, A. M., & Davis, L. W. (2005). Reported history of child sexual abuse in schizophrenia: Associations with heightened symptom levels and poorer participation over four months in vocational rehabilitation. *The Journal of Nervous and Mental Disease, 193*(12), 790-795. doi:10.1097/01.nmd.0000188970.11916.76

Lysaker, P. H., Meyer, P., Evans, J. D., & Marks, K. A. (2001). Neurocognitive and symptom correlates of self-reported childhood sexual abuse in schizophrenia spectrum disorders. *Annals of Clinical Psychiatry, 13*(2), 89-92. doi:10.3109/10401230109148953

Lysaker, P. H., Meyer, P. S., Evans, J. D., Clements, C. A., & Marks, K. A. (2001). Childhood sexual trauma and psychosocial functioning in adults with schizophrenia. *Psychiatric Services, 52*(11), 1485-1488. doi:10.1176/appi.ps.52.11.1485

Lysaker, P. H., Nees, M. A., Lancaster, R. S., & Davis, L. W. (2004). Vocational function among persons with schizophrenia with and without history of childhood sexual trauma. *Journal of Traumatic Stress, 17*(5), 435-438. doi:10.1023/B:JOTS.0000048957.70768.b9

Lysaker, P. H., Wickett, A. M., Lancaster, R. S., & Davis, L. W. (2004). Neurocognitive deficits and history of childhood abuse in schizophrenia spectrum disorders:

Associations with cluster B personality traits. *Schizophrenia Research, 68*(1), 87-94. doi:10.1016/S0920-9964(03)00195-6

Lysaker, P. H., Wright, D. E., Clements, C. A., & Plascak-Hallberg, C. D. (2002). Neurocognitive and psychosocial correlates of hostility among persons in a post-acute phase of schizophrenia spectrum disorders. *Comprehensive Psychiatry, 43*(4), 319-324. doi:10.1053/comp.2002.33493

Martin, H. P., & Beezley, P. (1977). Behavioral observations of abused children. *Developmental Medicine & Child Neurology, 19*(3), 373-387. doi:10.1111/j.1469-8749.1977.tb08374.x

McArdle, J. J. (1988). Dynamic but structural equation modeling of repeated measures data. In R. B. Cattell, & J. Nesselroade (Eds.), *Handbook of multivariate experimental psychology* (2nd ed., pp. 561–614). New York: Plenum.

McGraw, K. O., & Wong, S. P. (1996). Forming inferences about some intraclass correlation coefficients. *Psychological Methods, 1*(1), 30-46. doi:10.1037/1082-989X.1.1.30

McLean, L.M., & Gallop, R. (2003). Implications of childhood sexual abuse for adult borderline personality disorder and complex posttraumatic stress disorder. *American Journal of Psychiatry, 160*, 369-371. doi:10.1176/appi.ajp.160.2.369

Mendez, M. F., Ala, T., & Underwood, K. L. (1992). Development of scoring criteria for the clock drawing task in alzheimer's disease. *Journal of the American Geriatrics Society, 40*(11), 1095-1099. PMid:1401692

Montgomery, L. E., & Finch Jr, A. J. (1975). Reflection-impulsivity and locus of conflict in emotionally disturbed children. *Journal of Genetic Psychology, 126*(1), 89-92. PMid:1120945

Mueser, K. T., Bolton, E., Carty, P. C., Bradley, M. J., Ahlgren, K. F., DiStaso, D. R., Gilbride, A., & Liddell, C. (2007). The trauma recovery group: A cognitive-behavioral program for post-traumatic stress disorder in persons with severe mental illness. *Community Mental Health Journal, 43*(3), 281-304. doi:10.1007/s10597-006-9075-2

Mueser, K. T., Salyers, M. P., Rosenberg, S. D., Goodman, L. A., Essock, S. M., Osher, F. C., Swartz, M. S., & Butterfield, M. I. (2004). Interpersonal trauma and posttraumatic stress disorder in patients with severe mental illness: Demographic, clinical, and health correlates. *Schizophrenia Bulletin, 30(1),* 45-57. PMid:15176761

Nakagawa, S. (2004). A farewell to bonferroni: The problems of low statistical power and publication bias. *Behavioral Ecology, 15*(6), 1044-1045. doi:10.1093/beheco/arh107

Palmer, R. L., Bramble, D., Metcalfe, M., Oppenheimer, R., & Smith, J. (1994). Childhood sexual experiences with adults: Adult male psychiatric patients and general practice attenders. *The British Journal of Psychiatry, 165*(5), 675-679. doi:10.1192/bjp.165.5.675

Peer, J. E., & Spaulding, W. D. (2007). Heterogeneity in recovery of psychosocial functioning during psychiatric rehabilitation: An exploratory study using latent

growth mixture modeling. *Schizophrenia Research, 93*(1-3), 186-193. doi:10.1016/j.schres.2007.03.002

Penn, D. L., Corrigan, P. W., Bentall, R. P., Racenstein, J. M., & Newman, L. (1997). Social cognition in schizophrenia. *Psychological Bulletin, 121*(1), 114-132. doi:10.1037/0033-2909.121.1.114

Penn, D. L., Spaulding, W. D., Reed, D., & Sullivan, M. (1996). The relationship of social cognition to ward behavior in chronic schizophrenia. *Schizophrenia Research, 20*(3), 327-335. doi:10.1016/0920-9964(96)00010-2

Piers, E. V. (1977). Children's self-esteem, level of esteem certainty, and responsibility for success and failure. *Journal of Genetic Psychology, 130*, 295-304.

Pinkham, A. E., & Penn, D. L. (2006). Neurocognitive and social cognitive predictors of interpersonal skill in schizophrenia. *Psychiatry Research, 143*(2-3), 167-178. doi:10.1016/j.psychres.2005.09.005

Read, J. (1997). Child abuse and psychosis: A literature review and implications for professional practice. *Professional Psychology Research and Practice, 28*, 448-456. doi:10.1037/0735-7028.28.5.448

Read, J., Agar, K., Argyle, N., & Aderhold, V. (2003). Sexual and physical abuse during childhood and adulthood as predictors of hallucinations, delusions and thought disorder. *Psychology and Psychotherapy, 76*(Pt 1), 1-22. doi:10.1348/14760830260569210

Read, J., Perry, B. D., Moskowitz, A., & Connolly, J. (2001). The contribution of early traumatic events to schizophrenia in some patients: A traumagenic neurodevelopmental model. *Psychiatry, 64*(4), 319-345. doi:10.1521/psyc.64.4.319.18602

Read, J., & Ross, C. A. (2003). Psychological trauma and psychosis: Another reason why people diagnosed schizophrenic must be offered psychological therapies. *Journal of the American Academy of Psychoanalysis and Dynamic Psychiatry, 31*(1), 247-268. doi:10.1521/jaap.31.1.247.21938

Rodeheffer, M., & Martin, H. P. (1976). Special problems in developmental assessment of abused children. In H. P. Martin (Ed.), *The abused child: A multidisciplinary approach to developmental issues and treatment* (pp. 113) Ballinger Pub. Co.

Rosenberg, S. D., Mueser, K. T., Friedman, M. J., Gorman, P. G., Drake, R. E., Vidaver, R. M., Torrey, W. C., & Jankowski, M. K. (2001). Developing effective treatments for posttraumatic disorders among people with severe mental illness. *Psychiatric Services, 52*, 1453-1461. doi:10.1176/appi.ps.52.11.1453

Ross, C. A., Anderson, G., & Clark, P. (1994). Childhood abuse and the positive symptoms of schizophrenia. *Hospital & Community Psychiatry, 45*(5), 489-491. PMid:8045548

Rothmann, T. L. (2005). *An evaluation of the community transition program: Psychiatric rehabilitation for people with severe, disabling, and treatment resistant psychiatric conditions in Nebraska's health & human services system.* Unpublished manuscript.

Salomon, G., & Perkins, D. N. (1989). Rocky roads to transfer: Rethinking mechanism of a neglected phenomenon. *Educational Psychologist, 24*(2), 113-142. doi:10.1207/s15326985ep2402_1

Sameroff, A., & Chandler, M. (1975). Reproductive risk and the continuum of caretaking causality. In F. Horowitz (Ed.), *Review of child development research (vol. 4)* (). Chicago, IL: University of Chicago Press.

Sameroff, A. J., & Chandler, M. J. (1974). Reproductive risk and the continuum of caretaking casualty. In F. Horowitz (Ed.), *Review of child development research (vol. 4)* (pp. 187). Chicago, IL: University of Chicago Press.

Schenkel, L. S., Spaulding, W. D., DiLillo, D., & Silverstein, S. M. (2005). Histories of childhood maltreatment in schizophrenia: Relationships with premorbid functioning, symptomatology, and cognitive deficits. *Schizophrenia Research, 76*(2-3), 273-286. doi:10.1016/j.schres.2005.03.003

Sergi, M., Rassovsky, Y., Widmark, C., Reist, C., Erhart, S., Braff, D., Marder, S., & Green, M. (2007). Social cognition in schizophrenia: Relationships with neurocognition and negative symptoms. *Schizophrenia Research, 90*(1-3), 316-324. doi:10.1016/j.schres.2006.09.028

Shahar, G., Chinman, M., Sells, D., & Davidson, L. (2003). An action model of socially disruptive behaviors committed by persons with severe mental illness: The role of self-reported childhood abuse and suspiciousness-hostility. *Psychiatry, 66*(1), 42-52. doi:10.1521/psyc.66.1.42.20286

Shaw, K., McFarlane, A. C., Bookless, C., & Air, T. (2002). The aetiology of postpsychotic posttraumatic stress disorder following a psychotic episode. *Journal of Traumatic Stress, 15*(1), 39-47. doi:10.1023/A:1014331211311

Shevlin, M., Dorahy, M. J., & Adamson, G. (2007). Trauma and psychosis: An analysis of the national comorbidity survey. *American Journal of Psychiatry, 164*(1), 166-169. doi:10.1176/appi.ajp.164.1.166

Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing rater reliability. *Psychol Bull, 86*(2), 420-428. doi:10.1037/0033-2909.86.2.420

Spataro, J., Mullen, P. E., Burgess, P. M., Wells, D. L., & Moss, S. A. (2004). Impact of child sexual abuse on mental health prospective study in males and females. *The British Journal of Psychiatry, 184*(5), 416-421. doi:10.1192/bjp.184.5.416

Spaulding, W. D., & Poland, J. S. (2001). Cognition rehabilitation for schizophrenia: Enhancing social cognition by strengthening neurocognition functioning. In P. W. Corrigan, & D. S. Penn (Eds.), *Social cognition and schizophrenia* (pp. 217–247). Washington, DC: American Psychological Association. doi:10.1037/10407-008

Spaulding, W. D., Reed, D., Sullivan, M., Richardson, C., & Weiler, M. (1999). Effects of cognitive treatment in psychiatric rehabilitation. *Schizophrenia Bulletin, 25*(4), 657-676. PMid:10667738

Spaulding, W. D., Sullivan, M. E., & Poland, J. S. (2003). *Treatment and rehabilitation of severe mental illness*. New York: The Guilford Press.

Strauss, E., Sherman, E. M. S., & Spreen, O. (2006). *A compendium of neuropsychological tests: Administration, norms, and commentary* (3rd ed.). New York, NY: Oxford University Press.

Sunderland, T., Hill, J. L., Mellow, A. M., Lawlor, B. A., Gundersheimer, J., Newhouse, P. A., & Grafman, J. H. (1989). Clock drawing in alzheimer's disease. A novel measure of dementia severity. *Journal of the American Geriatric Society, 37*, 725-729. PMid:2754157

Thompson, L. B. A. (1997). Childhood sexual abuse: An investigation of its impact on children's coping, self-efficacy, emotion regulation and perceptions of self and others. ProQuest Information & Learning). *Dissertation Abstracts International: Section B: The Sciences and Engineering, 57*(12), 7745-7745. (1997-95012-111)

Ucok, A., & Bikmaz, S. (2007). The effects of childhood trauma in patients with first-episode schizophrenia. *Acta Psychiatrica Scandinavica, 116*(5), 371-377. doi:10.1111/j.1600-0447.2007.01079.x

van Dorn, R. A., Mustillo, S., Elbogen, E. B., Dorsey, S., Swanson, J. W., & Swartz, M. S. (2005). The effects of early sexual abuse on adult risky sexual behaviors among persons with severe mental illness. *Child Abuse & Neglect, 29*(11), 1265-1279. doi:10.1016/j.chiabu.2005.06.004

Ventura, J., Green, M. F., Shaner, A., & Liberman, R. P. (1993). Training and quality assurance with the brief psychiatric rating scale: the drift busters. *International Journal of Methods in Psychiatric Research, 3*(4), 221–244.

Ventura, J., Nuechterlein, K. H., Subotnik, K. L., Gutkind, D., & Gilbert, E. A. (2000). Symptom dimensions in recent-onset schizophrenia and mania: A principal components analysis of the 24-item brief psychiatric rating scale. *Psychiatry Research, 97*(2-3), 129-135. doi:10.1016/S0165-1781(00)00228-6

Walker, K. A. (1999). Empathy in sexually abused and non-abused clinic populations. ProQuest Information & Learning). *Dissertation Abstracts International Section A: Humanities and Social Sciences, 60*(4), 1031-1031. (1999-95019-120)

Wechsler, D. (1997). *Wechsler adult intelligence scale*. New York: NY: The Psychological Corporation.

Whitfield, C. L., Dube, S. R., Felitti, V. J., & Anda, R. F. (2005). Adverse childhood experiences and hallucinations. *Child Abuse & Neglect, 29*(7), 797-810. PMid:16051353

Woolley, C. S., Gould, E., & McEwen, B. S. (1990). Exposure to excess glucocorticoids alters dendritic morphology of adult hippocampal pyramidal neurons. *Brain Research, 531*(1-2), 225-231. doi:10.1016/0006-8993(90)90778-A

Appendix I

System for quantifying child protectie service records subtype definitions and severity scales: (see Barnett, Manly, & Cicchetti, 1993, pp. 54-73 for the whole rating system)

Subtypes

1. Physical Abuse (PA)
2. Sexual Abuse (SA)
3. Failure to Provide (FTP, Physical Neglect)
4. Lack of Supervision (LOS, Physical Neglect)
5. Emotional Maltreatment (EM)
6. Moral/Legal/Educational Maltreatment (MLE)

Please note: Throughout the scales, 1=least sever, 5=most severe.

1. Child Physical Abuse (CPA)

Physical abuse is coded when a caregive or responsible adult inflicts a physical injury upon a child by other than accidental means. Injury does not include culturally sanctioned physical alterations such as circumcision and ear piercing. There are some situations in which the distinction between Phsycial Abuse and other subtpes becomes ambiguous. The following criteria are provided as guidelines to assit coders in making these distinctions. Physical restraint is typically scored under Emotional Maltreatment. However, in cases in which a child incurs physical injuries when the parent is attempting to restrain the child (e.g., rope burns), then the injury would be scored as Physical Abuse, and the restraint would also be scored under Emotional Maltreatment. If the caregiver thtreatens the child but there is no physical contact with the child, Emotional Maltreatment would be scored rather than Physical Abuse. Please see the Emotional Maltreatment scale for further elaboration of these points.

Physical injuries that occur as a direct result of sexual interaction (e.g., vaginal or rectal tears) are coded solely under Sexual Abuse. Other injuries that may accompany sexual acts in an efforts to force a child to engage in sexual relations (e.g., beatings, burning) are scored under both Physical Abuse and Sexual Abuse.

Severity Rating

1= The caregiver inflicted minor marks on the child's body during a spanking; there were no marks to the neck or head.

Reports indicated that the caregiver had beaten the child; no other in formation was given.

The child received injuries that were documented to have occurred by nonaccidental means. The details of the report were not specific enough to warrant a higher rating.

The caregiver was reported to have spanked the child with an open hand or an object likely to inflict only minor marks in most cases (e.g., a switch, a soft belt, a ruler, a paddle), with the child sustaining marks on or below the shoulders.

Examples:

The child received a bruise on the arm after being hit with an open hand.

Minor bruises on the child's bottom were reported following a spanking with a belt.

2= The caregiver inflicted numerous or nonminor marks to the child's body from any incident.

The caregiver spanked the child with an object likely to leave a non-minor mark (e.g., a hair brush, a belt buckle, an electrical cord), or kicked or punched the child with a fist, leaving marks on the child's body below the neck.

Example:

The child sustained welts on the back after being beaten with a hair brush

The child was beaten with an electrical cord, resulting in numerous marks.

3= The caregiver inflicted marks on the child's head, face, or neck (e.g., a black eye).

The caregiver's rough handling of the child resulted in serious bruises or minor lacerations (e.g., required stitches or minor medical attention).

The caregiver inflicted minor burns (e.g., minor cigarette burns) to the child's body.

Example:

The child received a hand print on the neck after the parent grabbed him

The child ahd a black eye resulting from being punched in the face

Small circular burns on the child's hands were identified as cigarette burns.

4= The caregiver hit the child with an object (e.g., a baseball bat, a telephone) likely to result in serious injury (e.g., nonminor lacerations, second-degree burns, fracture, or concussion), or threw the child against the wall, but injuries that were sustained did not require hospitalization, according to available medical information.

The caregiver attempted to choke or smother the child, but no emergency medical are was required.

The caregiver inflicted serious burns (second degree) to the child's body, but the injury did not require hospitalization.

The caregiver inflicted an injury that required some hospital care, such as treatment in the Emergency Room, but did not require hospitalization for more than 24 hours (e.g., stitches, fractures, non-minor sprain).

Examples:

The child was beated with a board that had mails in it. The child received bruises and cuts.

The child was thrown down the stairs, and fractured one arm.

The child was severely burned bythe parent and was treated in the Emergency Room.

5= The caregiver inflicted an injury to the child that required hospitalization (e.g., severe/multiple burns, internal injuries), and/or that was permanently physically damaging, or disfiguring (e.g., resulting in brain damage, severe scarring, crippling). The caregiver inflicted a fatal injury.

Example:

The child was set on fire, resulting in severe burns that were permanentaly disfiguring.

The child was hospitalized for one week for internal injuries and evidence of a shaken infant syndrome.

2. Child Sexual Abuse (CSA)

Sexual abuse is coded when any sexual contact or attempt at sexual contact occurs between a caregiver or other responsible adult and a child, for purposes of the caregiver's sexual gratification or financial benefit. In cases of sexual abuse, caregiver or responsible adult refers to any family member or friend who has a relationship with the child, or is in a position of authority over the child (e.g., babysitter). Because this system assessed Child Protective records only, there are instances of sexual abuse that are not available in the Child Protective records. For example, sexual abuse that occurs outside of the home perpetrated by nonfamily members typically is investigated solely by criminal courts, and consequently, may not be accessible. Any relevant information in the records related to sexual abuse should be scored. Researchers should be aware of this issue, and we encourage investigators to use additional methods for exploring issue, and we encourage investigators to use additional methods for exploring extrafamilial maltreatment that may not be available through Child Protective records.

Please note that caregivers may use physical or psychological coercion in their attempts to engage a child in sexual relations. In cases where the caregiver verbally threatens a child in an effort to have sexual relations, then Emotional Maltreatment and Sexual Abuse would both be scored. As noted under Physical Abuse, physical injuries that occur as a direct result of sexual interaction (e.g., vaginal or rectal tears) are coded solely under Sexual Abuse. Other injuries that may accompany sexual acts in an effort to force a child to engage in sexual relations (e.g., beating, burning) are scored under both Physical Abuse and Sexual Abuse.

Severity Rating

1= The caregiver expose the child to explicit sexual stimuli or activities, although the child is not directly involved.

Example:

The caregiver exposes the child to pornographic materials.

The caregiver makes no attempt to prevent the child from being exposed to sexual activity

The caregiver discuss sex explicitly in front of the child in a non-educational fashion. Non-educational discussion of sex includes graphic depiction of parents' sexual activity or fantasies to the child. These discussions are held without any attempt to prevent the child from exposure to such descriptions.

2= The caregiver makes direct requests for sexual contact with the child.

The caregiver exposes his or her genitals to the child for the purposes of adult sexual gratification or in an attempt to sexually stimulate the child.

Example:

The caregiver asks the child to engage in sexual relations, but no physical contact is involved.

The caregiver invites the child to watch him masturbate.

3= The caregiver engages the child in mutual sexual touching, or has the child touch the caregiver for sexual gratification.

The caregiver touches the child for sexual gratification.

Example:

The caregiver fondles the child for sexual gratification.

The caregiver engages in mutual masturbation with the child

4= The caregiver physically attempts to penetrate the child or actually penetrates the child sexually. This includes coitus, oral sex, and sex, or any other form of sodomy.

Example:

The caregiver molests the child

The caregiver engages or attempts intercourse with the child

The child has venereal disease. No information regarding the sexual contact is known.

A mother has oral sex with her son.

5= The caregiver has forced intercourse or other forms of sexual penetration. Force includes the use of manual or mechanical restraint, for the purpose of engaging the child in sexual relations. Force also includes use of weapons, physical brutality, and physically overpowering the child, specifically for engaging in sexual relations. Note that Physical Abuse may be scored in addition to Sexual

Abuse in cases in which the child is injured as a result of physical force, and the injury is not a direct result of the sexual penetration.

The caregiver prostitutes the child. This includes using the child for pornography, allowing, encouraging or forcing the child to have sex with other adults.

Example:

The caregiver ties the child to the bed and rapes the child. (Note that Emotional Maltreatment would also be scored.)

The caregiver sodomizes the child a gunpoint.

The caregiver forces the child to participate in the filming of pornographic movies.

The caregiver invites one or more other partners to have sexual relations with the child

3. Physical Neglect, Failure to Provide (FTP)

Physical Neglect, Failure to Provide, is coded when a caregiver or responsible adult fails to exercise a minimum degree of care in meeting the child's physical needs. When families are below the poverty level, physical neglect is scored if children's physical needs are not met because the parents fail to access available community resources for the well-being of their children. For example, parents are unable to provide food for their children; however, they have not taken the necessary steps to apply for food stamps or to seek alternate sources of emergency sustenance.

Failure to provide includes not meeting children's physical needs in any of the following domains:

a. supplying the child with adequate food,

b. ensuring that the child has clothing that is sanitary, appropriate for the weather and permits the child freedom of movement,

c. providing adequate shelter,

d. ensuring adequate medical, dental, and mental health care,

e. ensuring the child's adequate hygiene.

As with each of the severity scales, the 5-point range for Failure to Provide is meant to be a helpful guideline in making judgements about the seriousness of the impact of the incident on the child's development. However, as with each subtype

of maltreatment, there will be occurrences in which the specific nature of the incident dictates to the coder that an event requires a higher rating than indicated by the guidelines of the system. For example, parental failure to follow through with treatment for a low to moderate elevation in the child's blood lead level would typically be given a code fo 3. However, if the child has extremely high lead levels that remain untreated through parental negligence, a 4 or a 5 could be scored, depending on the severity of the impairment to the child. In general, when in doubt, coders should stay within the guidelines of the system. Only when a situation clearly goes beyond the nature of the example, should a coder adjust the level of severity.

1= The caregiver does not ensure that food is available for regular meals. The child (less than age 10) often had had to fix his or her own supper and/or occasionally misses meals because of parental negligence.

The caregiver fails to provide clothing for the child that is adequately clean and that allows freedom of movement (e.g., the clothing is so small that its restricts movement or so large the child often trips or has difficulty keeping the clothing on).

The caregiver does not attempt to clean the house. Garbage has not been removed, dirty dishes are encrusted with food, and floors and other surfaces are very dirty. An unpleasant ordor from garbage and debris permeates living quarters.

The caregiver has missed several of the child's medical or dental appointments, and often fails to take the child to the doctor or dentist for "checkups" or "well baby" appointments. The caregiver does not ensure that the child is taken to the doctor or health clinic for adequate immunizations, and medical personnel have expressed concern.

The caregiver does not attend to a mild behavior problem about which professionals or paraprofessionals have commented (e.g., the child exhibits some symptomatology, but displays relatively mild impairment in social or school functioning).

The caregiver does not attempt to keep the child clean. The caretaker bathes the child and/or washes the child's hair very infrequently. The child brushes teeth only infrequently or not at all, and signs of tooth decay or discoloration are evident.

Examples:

A 9-year-old child fixes dinner several times per week because the caregivers are sleeping.

The child always wears clothing that is so small it restricts movement.

The caregiver has failed to sign papers for evaluation of a behavior problem that has been reported at school.

The child is dirty and frequently scratches matted hair.

Clothing is dirty and smells of urine.

2= The caregiver does not sure that any food is available. The house is without food often, and two or more consecutive meals are missed 2-3 times per week. The caregiver does not feed the child for 24 hours.

The caregiver does not dress the child in clothing that is appropriate for the weather (e.g., lightweight clothing during the winter).

The caregiver is aware that the house is infested with roaches or other vermin and has not attempted to improve the conditions.

The caregiver does not ensure adequate sleeping arrangements for the child (e.g., there are no beds or mattresses, or the mattresses are filthy and sodden with urine or other substances likely to promote the growth of mold or mildew).

The caregiver seeks medical attention but does not follow-through consistently with medical recommendations for a minor illness or infection (e.g., prescribed medicine is not administered for mild infection, chronic head lice is not treated).

The caregiver does not change the infant's diaper frequently, often leaving soiled diapers unchanged for several hours, resulting in diaper rash.

Examples:

A child has walked to school several consecutive days wearing only a think jacket without hat or gloves. The temperature has averaged 25 degrees Fahrenheit.

A social worker has visited the home several times when no food has been available. The children report that they do not have lunch or dinner two or three times per week.

The child has been diagnosed with an ear infection, but the parent does not follow through with administration of the prescribed antibiotic.

3= The caregiver does not provide meals on a regular basis, thereby perpetrating a pattern of frequently missed meals: as many as four or more periods of at least two consecutive meals per week are unavailable to the child.

The caregiver fails to make adequate provisions for shelter for the family. For example, the caregiver does not acquire or maintain public assistance, resulting in a loss of residence or loss of financial assistance for seven days or more.

The caregiver does not seek or follow through with medical treatment for moderately severe medical problems (e.g., the caregiver does not follow preventive measures for a chronic heart condition, or moderately elevated blood lead levels are left untreated), or the caregiver administers medical treatment that is inappropriate without consulting a doctor (e.g., caregiver gives child mild sedatives to control child, without a doctor's consultation).

The caregiver does not follow through on treatment or treatment program for a diagnosed psychological or behavioral disorder. This disorder is interfering with the child's ability to engage in developmentally appropriate peer relationships or school functioning.

The caregiver maintains a somewhat unsanitary living situation, where spoiled food or garbage are frequently present and/or where rat or vermin infestation extreme and untreated.

The expectant mother jeopardizes the health of her unborn child by using alcohol or drugs during pregnancy, but no fetal alcohol or drug symptoms are evident.

Examples:

The children are not fed frequently. They have missed two consecutive meals an average of four times a week for the last several months.

The family has been evicted because the parent did not take appropriate actions to maintain public assistance and made no other arrangements for making rent payments. The family had no stable living arrangements for 2 weeks.

The parent has been drunk several times during pregnancy.

The child has come to school with an infected cut. Despite notes from the school nurse recommending medical attention, the cut continues to be untreated.

A social worker has visited the home several times, and each time the house has been a mess. Dirty dishes and spoiled food were all over the kitchen table, counters, and sink. Rats were seen in the open garbage bins by the front door.

The child is emotionally disturbed and is in a treatment program. The caregiver has not sent the child to the program for 6 weeks.

4= The caregiver has made no arrangements for adequate shelter (e.g., the caregiver has not sought heat during the winter; the family is living in a car

because alternative housing was not sought). The condition continues for prolonged periods.

The caregiver maintains the home environment such that living conditions are extremely unhealthy (e.g., feces and urine are present in the living areas).

The caregiver does not seek or comply with medical treatment for potentially life-threatening illness or injury (e.g., the child is not taken to the Emergency Room for severe bleeding, third-degree burn, fractured skull).

The caregiver has provided such poor nourishment that the child fails to gain weight or grow at the rate expected for their development. The failure to grow as expected is not due to any identifiable organic factors.

Examples:

The children live in an unheated home because the parents have failed to ensure that heating was available. During the winter, the children came to school with frostbite.

The child was hit by a car, receiving a fracture and severe cuts and bruises, The child came to school complaining of pain and stated that the parents would not take him to the hospital.

5= The caregiver has provided such poor nourishment or care to the child that physical consequences have ensued such as weight loss in an infant, severe malnutrition, or sever nonorganic failure-to thrive.

The caregiver has abused alcohol or drugs during pregnancy to the extent that the infant is born with Fetal Alcohol Syndrome or a congenital drug addiction.

The caregiver provided such gross inattention to the child's medical needs that the child died or was permanently disabled as a result of lack of medical treatment (e.g., severe starvation or dehydration).

The caregiver does not seek professional help for the child's life threatening emotional problems (e.g., suicidal or homicidal attempts).

Examples:

At birth, the child is addicted to heroin.

The child is diagnosed as being severly malnourished.

The caregiver was informed that the child had expressed suicidal ideation, but the caregiver did nothing to ensure the child's safety.

Appendix II

Data collection guideline for child abuse history based on Barnett, Manly, & Cicchetti, 1993, pp. 54-73.

Child Physical Abuse (CPA) - Caregiver inflicts physical injury to the child by other than accidental means (reports of excessive corporal punishment are not substantiated unless an injury to the child has been sustained)

- Spanking causes bruises or marks
- Received nonaccidental injuries
- Being spanked with an object likely to inflict marks
- Rough handling resulted in bruises or lacerations
- Caregiver inflicted burns
- Caregiver attempted to choke or smother child
- Caregiver threw child against a wall or down stairs
- Caregiver caused child to receive medical attention
- Physical restraints with injury (e.g., rope burn).
- Any injuries that occur in an effort to force a child to engage in sexual relations (e.g., beating, burning)

Child Sexual Abuse (CSA)- any sexual contact or attempt at sexual contact occurs between caregiver (or responsible adult) and child

- Verbally threatens child in effort to have sexual relations
- Expose child to explicit sexual stimuli or activities (pornographic materials, adult sexual activity, graphic sexual discussion
- Caregiver exposes genitals or asks child to watch him masturbate
- Caregiver engages child in mutual sexual touching (touches child or asks child to touch them)
- Attempts to penetrate or actually penetrates child (includes coitus, oral sex, anal sex, or any form of sodomy, as well as intercourse)
- Caregiver attempts to prostitute the child, involves the child in the filming of pornographic movies
- Any injuries that occur in an effort to force a child to engage in sexual relations (e.g., beating, burning)
- Any relevant information in the records related to sexual abuse

Physical Neglect - Failure to Provide (FTP) - Failure to meet child's nutritional, medical, or cleanliness needs

- Supplying the child with adequate food: child fixes own supper and/or misses meals; food is not available; child does not grow at expected rate because of malnutrition
- Ensuring child has clothing that is sanitary, appropriate for weather, and permits freedom of movement

- Providing adequate shelter: caregiver does not clean house, take out garbage; does not seek community assistance in the case of homelessness or unsafe living conditions
- Ensuring adequate medical, dental, and mental health care: caregiver repeatedly misses or does not schedule appointments; caregiver does not attend to behavior problems; mother uses alcohol or drugs during pregnancy; parents do not comply with treatment recommendations or do not seek treatment for children when necessary
- Ensuring the child's adequate hygiene: caregiver does not bathe children or does not attend to dental hygiene
- Children's physical needs are not met because the parents fail to access available community resources for the well-being of their children

Physical Neglect - Lack of Supervision (LOS) - Leaving the child unattended or in the care of an inadequate caregiver (Risk factors: length of time child is left unattended; hazards present in the environment; individual needs of the child, based on history and developmental level)

- Child is allowed to engage in unsafe activities; is not adequately supervised
- Child is left alone, or in the care of an inadequate supervisor (another child, an inebriated adult, etc.)
- Caregiver keeps loaded firearms in unsecured location in home
- Child is kicked out of home with no safe alternatives

Emotional Maltreatment (EM) - Instances of maltreatment that involve extreme thwarting of children's basic emotional needs, (include needs for psychological safety and security in the environment, for acceptance and positive regard, and for age-appropriate autonomy, with sufficient opportunities to explore the environment and extra-familial relationships).

- Family environment contains excessive hostility and violence
- No available, stable adult attachment figure
- Need positive regard and absence of excessively negative or unrealistic evaluation
- Deprived of opportunity to explore the environment and extrafamilial relationships (take developmental level into account)
- Developmentally inappropriate responsibility or constraints placed on child
- Caregiver makes violent threats or gestures of harm at child
- Caregiver abandons child, but ensures that physical needs are met
- Young child left without supervision
- Caregiver belittles or ridicules child
- Child is expected to take care of caregiver
- Child is exposed to extreme marital conflict
- Caregiver threatens suicide or abandonment
- Caregiver rejects child
- Caregiver constantly screams at child or calls names

- Caregiver locks child in a room, or binds hands and/or feet
- Caregiver chases child with car
- Caregiver overdoses or attempts suicide in front of child
- Physical restraint without injury (if there is injury (e.g., rope burn), injury would be scored as physical abuse, and physical restraint scored as emotional neglect).
- Verbal threats in an effort to have sexual relations

Moral/Legal/Educational Maltreatment (MLEM) – undermine child's adequate socialization to society and may foster delinquency. Includes: being exposed to illegal activities through the participation of household members; involvement in illegal activities as a result of a lack of adult intervention, or because of coercion or encouragement by the adult; failure of caregiver to provide for child's adequate education (failing to send child to school).

- Caregiver allows child to skip school (excessively)
- Caregiver exposes child to drunken parties or inappropriate situation
- Caregiver participates in illegal behavior with child's knowledge or in presence
- Caregiver does not punish child for illegal behaviors

Appendix III

Additional archival information for a history of childhood abuse

ID Number: _____ **Date:_____**

Subtypes	Physical Abuse	Sexual Abuse	Physical Neglect	Emotional Maltreatment	Moral/legal/ Educational Maltreatment
Frequency (# of reports ; # of month active CPS involvement)					
Developmental period*					
Separations/ Placements**					
Perpetrator***					

* Developmental periods: (1=birth-6months, 2=7-11 months, 3=12-17 months, 4=18-36 months, 5=37-71 months, 6=72-95 months, 7=96-131 months, 8=132-156 months, 9=157 months and more)
** Separations / placements: foster care / placement with relatives / residential treatment / group home
*** Perpetrator: biological mother / father, step-mother,father,parent substitute / other relative / babysitter or friend / stranger / unknown

Appendix IV

Archival Data

ID Number: _____ **Date:_____**

1. Date of birth:

2. Gender: M F

3. Race: ___ Caucasian ___ African-American

___ Hispanic ___ Native-American

___ Asian ___ Other

4. Marital Status:

5. Date of most recent admission and discharge:

6. Diagnoses:

Axis I:

Axis II:

7. Highest education level completed:

8. Age of onset:.

9. Number of previous hospitalization: