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Predictors of Mental Health Outcomes Among Foster Care Children Receiving Community-Based Services

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PREDICTORS OF MENTAL HEALTH OUTCOMES AMONG FOSTER CARE CHILDREN RECEIVING COMMUNITY-BASED SERVICES

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ABSTRACT

Historically, children served in the foster care system experience less favorable mental health outcomes compared to those in the general population (Anctil, McCubbin, & Pecora, 2006; Burns et al., 2004; Garland et al., 2001; Zima, Bussing, Yang, & Berlin, 2000). As a result, the child welfare system has been described as a "de facto public behavioral health care system" (Lyons & Rogers, 2004), prompting state child welfare agencies to seek to put systems and policies in place to serve the needs of these youth, such as Illinios' statewide community-based program, System of Care (SOC), designed to provide multi-modal services to at-risk youth in substitute care.

Previous research on SOC outcomes has shown modest clinical improvements in youth over time (Sieracki et al., 2008); however, this research did not compare outcomes across youth or explore the possibility of moderators influencing outcomes. The current study aims to use a multivariate classification tree analysis (Optimal Data Analysis; ODA; Yarnold & Soltysik, 2005) to explore the outcomes of youth who enter treatment with significant symptom severity on items of the Child and Adolescent Needs and Strengths (CANS; Lyons, 1999). The current study will take a different approach to the data by studying outcomes at the item level of the CANS, allowing for the comparison of subgroups of youth, exploration of unique interactions between CANS items, and prediction of remission status for specific presenting problems.

CHAPTER I

INTRODUCTION

Historically, children served in the foster care system experience less favorable mental health outcomes compared to those in the general population (Anctil, McCubbin, & Pecora, 2006; Burns et al., 2004; Garland et al., 2001; Zima, Bussing, Yang, & Berlin, 2000), and are up to eight times more likely to have a diagnosis of mental illness (Burns et al., 2004; Landsverk & Garland, 1999). These figures are not surprising considering the traumatic experiences that lead youth to enter the child welfare system, such as severe abuse, neglect, and social instability. Unfortunately, once in the foster care system, many children continue to be exposed to traumatic stressors. Research suggests that multiple foster home placements, disruption of mental health and educational services, and the potential for abuse and neglect in the foster care system contribute to the increased vulnerability of this population to mental illness (Benedict, Zuravin, Somerfield, & Brandt, 1996; Newton, Litrownik, & Landsverk, 2000; Roberts, 1993; Skarbo, Rosenvinge, Holte, 2004).

As a result of significantly increased rates of mental health needs among youth in foster care, the child welfare system has been described as a "de facto public behavioral health care system" (Lyons & Rogers, 2004), prompting state child welfare agencies to seek to put systems and policies in place to appropriately match youth needs with the most effective treatments. However, until the mid 1980s there existed no formal model

for how to conceptualize service delivery and how to match needs and services. However, in 1986, a landmark proposal was developed by the Child and Adolescent Service System Program (CASSP) that set the stage for what would become the System of Care (SOC) model. The most consequential element of the SOC model holds that the community should be the centerpiece of any service system and should always be considered the treatment setting of choice (Stroul & Friedman, 1986, 1994). The SOC model also calls for services to be (a) delivered in the least restrictive environment, (b) individualized, (c) coordinated, (d) delivered as close to youths' home as possible, (e) involve all available adults in youths' lives, (f) recognize youth strengths, and (g) be culturally competent.

In 2002, the state of Illinois responded to the call to serve youth in their communities by developing a statewide community-based program designed to provide multi-modal services to at-risk youth in substitute care. The program was designed by the Illinois Department of Children and Family Services (DCFS) for children and adolescents that were capable of community functioning but were either at-risk of stepping up to specialized foster or residential care or were stepping down from these higher-level placements. All clients that are admitted to the DCFS community-based program reside in the homes of relatives, traditional foster care placements, or DCFS managed foster homes. The Illinois model, called "SOC," uses a Wraparound approach to treatment, which has been shown to be successful in the mental health, child welfare, and juvenile justice systems (Burchard, Bruns, & Burchard, 2002). Using existing community services and natural supports, the Wraparound system is a family-centered and child-focused intervention that capitalizes on youth strengths, creating an

individualized, community-based treatment program that it is interagency coordinated and culturally competent (Burchard, Burchard, Sewell, & VanDenBerg, 1993; Burchard, Bruns, & Burchard, 2002; VanDenBerg & Grealish, 1998). As a result, the Wraparound model is consistent with an SOC approach to service planning and delivery.

Sieracki and colleagues (2008) recently studied the effects of the Illinois SOC program on youth outcomes using Hierarchical Linear Modeling (HLM). These researchers modeled outcomes as a function of time in the SOC program (level 1), youth variables such as demographics and a measure of needs and strengths (level 2), and the SOC agency coordinating and delivering Wraparound services (level 3). Sieracki et al. (2008) found that children's scores on a composite measure of presenting problems taken from the Child and Adolescent Needs and Strengths (CANS; Lyons, 1999) improved over time in the SOC program. However, the changes were small; the average youth only improved 1 point over 10 months on the Presenting Problems scale with a possible score on the scale of 21. This led the authors to conclude that the Illinois SOC program is modest in its overall effects.

Sieracki et al.'s (2008) study was important in that it was able to report on the average child's outcome in the SOC program on a composite scale of presenting problems, an approach that gives policy makers in the state a broad view of how the program is performing generally for children and families. The limitation of this approach is that it does not disaggregate data by youth characteristics to determine if some youth achieve better outcomes than others. For example, the Presenting Problems scale, the measure of outcome in Sieracki and colleagues (2008) study, is a composite of items ranging from oppositional behavior to depression. And while the overall scale

demonstrated adequate reliability to be used as a composite measure, prior work using Confirmatory Factor Analysis (CFA) has also demonstrated that the individual CANS items exhibit enough unique variance to be examined independently (Miller, Leon, & Lyons, 2007). The current study will take a different approach to the data by studying outcomes at the item level for the psychosis, depression, attention problems, and antisocial behavior items of the CANS Presenting Problems scale.

The Sieracki et al. study (2008) was also limited in that it did not explore the possibility that outcomes on the presenting problems scale might be moderated by factors hypothesized to attenuate outcomes (e.g., risk factors such as runaway risk) or lead to relatively better outcomes (e.g., child strengths such as spiritual, educational, or vocational strengths). The risk and resilience literature has evolved to explore the unique risk and protective factors that interplay to affect the outcomes of specific mental health problems. The approach taken in this study aligns with this advance in the literature in that it allows for the exploration of the ways in which individual CANS items- ranging from risk factors, caregiver needs, and youth and family strengths- interact to predict the outcomes of specific presenting problems.

The current study aims to use a multivariate classification tree analysis (Optimal Data Analysis; ODA; Yarnold & Soltysik, 2005) to explore the outcomes of youth who enter treatment with significant severity on the psychosis, depression, attention problems, or antisocial behavior items of the CANS. ODA allows for unique interactions to emerge and this study will use a range of variables in this task, including problem behaviors, risk behaviors, youth functioning, care intensity and organization, family/caregiver needs and strengths, and youth strengths. The use of this exploratory analysis permits the inclusion

of all variables examined by the CANS, thus making effective use of the strengths of the ODA approach in maximizing classification accuracy.

CHAPTER II

COMMUNITY MENTAL HEALTH SERVICES FOR YOUTH

The Mental Hygiene Movement of the nineteenth century is credited as the beginning of the current public mental health system for children in the United States (Lyons, 1999). With this movement came the notion that mental illness resulted from negative experiences during childhood, identifying childhood as the developmental period in which symptoms of mental illness would begin to emerge. This change in perspective led to increased interest in child psychopathology and the promotion of early detection and treatment of symptoms during childhood.

Children and adults were treated together until the 1820s when the differences between adults and children became known and alternative treatment strategies were suggested (Lyons, 1999). During this time institutionalization was the primary treatment option for children experiencing mental illness. An understanding of children's mental health was slow to develop. It was not until the 1930s that child psychiatry was established as a distinct field of study. Advancements in technology led to an increase in drug treatment for psychological issues in the 1950s, resulting in decreased hospitalization (Lyons, 1999). The proliferation of psychotropic medication paired with the deterioration of the state hospital system and the acknowledgment of civil rights for the mentally ill set the stage for the Community Mental Health Movement in the 1960s. The Community Mental Health Center Construction Act was passed in 1963. This act

established community mental health centers and focused on the deinstitutionalization of the mentally ill. Community mental centers were developed to serve those in need in the surrounding area, known as catchment areas, and became a major outpatient service provider for children. With the passing of the United States Public Law 94-142 in 1975, now codified as Individuals with Disabilities Education Act (IDEA) children with disabilities, children with disabilities both physical and mental, were guaranteed education in the least restrictive environment possible, establishing the foundation for the System of Care (SOC) philosophy in the future.

The Children's Defense Fund commissioned the first comprehensive evaluation of the mental health services available for children. Their report, *Unclaimed children: The failure of public responsibility to children and adolescents in need of mental health services*, found that two-thirds of all children with severe emotional disturbances were not receiving appropriate services, leaving them "unclaimed" by the public agencies responsible for serving them (Knitzer, 1982). The report also found that there was little coordination amongst the various child-serving systems such as child welfare and juvenile justice. Subsequent assessments of the provision of mental health services found that in addition to not receiving all necessary services, when services were provided to youth, they were often in overly restrictive environments such as inpatient and residential treatment settings, and were often not integrated, family-centered, or coordinated (Knitzer, 1982; President's Commission on Mental Health, 1978; U.S. Congress, Office of Technology Assessment, 1986). Services were provided in a generic fashion, frequently absent of cultural and linguistic considerations. Further, unsophisticated models of psychopathology placed primary blame for psychiatric suffering on parents,

leading parents to be excluded from service planning (Friesen & Huff, 1996; Isaacs-Shockley, Cross, Bazron, Dennis, & Benjamin, 1996; U.S. Department of Heath and Human Services, 2001).

Partially in response to the Children's Defense Fund report, a new comprehensive mental health system of care was developed by for children, adolescents, and their families. The Child and Adolescent Service System Program (CASSP), initiated by the National Institute for Mental Health in 1984, worked on the state and community level to develop their capacity to serve children with severe emotional disturbances (SEDs) and their families (Lyons, 1999; Stroul, Blau, & Sondheimer, 2008). The CASSP adopted the SOC philosophy, defined in 1986 by Stroul & Friedman as a "comprehensive spectrum of mental health and other necessary services which are organized into a coordinated network to meet the multiple and changing needs of children and their families" (p. 3). Although initially designed for youth with SEDs, with modifications the SOC philosophy has been found to be applicable to many other populations, including child welfare, juvenile justice, and, more recently, foster care.

In 1999, with the case of Olmstead v. LC, the Supreme Court ruled that, according to the American's with Disabilities Act (ADA), individuals with mental and/or physical disabilities must be treated in the least restrictive environment possible and that failure to do so is discriminatory (see Olmstead v. LC 527 U.S. 581). The decision came about as the result of a suit filed against the state of Georgia on behalf of L.C., a mentally retarded woman with schizophrenia. L.C. was denied community-based treatment by the State following the recommendation of mental health professionals for her transfer from an inpatient psychiatric unit. The Supreme Court ruled that that the State's refusal of her

transfer was in opposition to the ADA and that it inappropriately isolated her on the basis of her disability alone and limited her exposure and involvement with the outside community. The Court's ruling established least-restrictive placement and community treatment as rights guaranteed to all clients and set the precedence that the ADA would be upheld.

The System of Care (SOC) philosophy

The SOC philosophy emerged from the CASSP initiative and the foundation set by the Olmstead decision and was created to instigate change in the current mental health system, work with states and communities to establish all-inclusive systems of care in the community, and promote an alliance amongst service providers, policy makers, and parents (Stroul et al., 2008). Prior to the CASSP initiative, care was provided to youth and their families from one of several public service agencies: mental health, child welfare, juvenile justice, education, substance abuse, or health (Lourie, 2008). Under the guidance of the SOC philosophy came the acknowledgment of the multiple needs of the youth and families served. Youth with SEDs often require services from a variety of disciplines; however, these services were often poorly integrated before the CASSP initiative. SOC called for an integrated system of care that allowed for the sophisticated treatment planning and improved communication across the different provider disciplines. A major element in implementing the SOC philosophy consists of increasing the collaboration amongst the various service providers in the community and creating a service structure that provides all needed services under one community-based program. By advocating for local control and management of the service system, the process of

receiving multiple services is streamlined and is more responsive and flexible to the needs of the community.

According to its core values, services implemented using the SOC philosophy should be child-centered, family-focused, community-based, and culturally and linguistically competent (see Table 1). Youth-centered treatment planning empowers youth by having them play an active role in creating their treatment plan and be educated on the services they are to receive (Stroul et al., 2008). Family-focused care allows the entire family system to be involved in treatment planning and gives the family decision-making rights in the allocation of services (Stroul et al., 2008). The guiding principles underlying the SOC philosophy call for services to be inclusive, coordinated, and varied, structured to attend to the personal needs of each client and family, distributed in the least restrictive environment available, involve the youth and families as full participants in the planning process, and focus on early identification and intervention whenever possible (Stroul & Friedman, 1986, 1996). With the recognition of the complex and numerous needs of the youth and families served and the involvement of both the youth and family in the treatment planning process, the SOC philosophy promotes holistic health care and educates and integrates the youth and family into the development of an effective treatment plan.

SOC outcomes

In a study evaluating the effectiveness of the SOC model, Bickman, Noser, and Summerfelt (1999) found no differences in clinical outcomes between those youth served using an SOC model versus those who received care as usual. All children evaluated improved at the same rate, regardless of the services they received. However, the SOC

Table 1

Core values and principals for the System of Care

Core Values

1. The SOC should be child-centered and family-focused.

2. The SOC should be community based.

3. The SOC should be culturally competent.

Guiding Principles

1. Children with emotional disturbances should have access to a comprehensive array of services.

2. Children with emotional disturbances should receive individualized services.

3. Children with emotional disturbances should receive services whining the least restrictive setting that is clinically appropriate.

4. Families and surrogate families should be full participants in the planning and delivery of services.

5. Children with emotional disturbances should receive integrated services.

6. Children with emotional disturbances should be provided with case management or similar services.

7. Early identification, intervention, and prevention should be promoted by the SOC.

Adopted from *A System of Care for Children and Adolescents with Severe Emotional Disturbances* (p. 6), by B. Stroul and R.M. Friedman, 2008

model is a broad philosophy of service delivery and organization and does not advocate for any specific therapeutic approach. Recent research has demonstrated that the implementation of the SOC model in the context of therapeutic services that are at least probably efficacious treatments (e.g., Wraparound) leads to more favorable outcomes for youth (Burchard, Burns, & Burchard, 2002; Farmer, Dorsey, & Mustillo, 2004; Kamradt, 2000).

The Wraparound approach

The Wraparound approach is a comprehensive, family-centered service intervention strategy that identifies existing services and supports in the community that will meet the needs of youth and their family (Burchard, Bruns, & Burchard, 2002; Burns & Goldman, 1999). Treatment planning is directed by the child and caregiver(s), in collaboration with a service coordinator, and is focused on the strengths of the youth, providing an alternative to more medically oriented service models. Developed from the social-ecological theory of Urie Bronfenbrenner (1979), Wraparound acknowledges the critical role that relationships play in the development of adaptive and maladaptive behaviors. By involving the child and family directly in the service planning process, Wraparound attempts to work within the youth's specific social-ecological family environment by creating a unique treatment plan tailored to each youth's needs and strengths (Burchard, Bruns, & Burchard, 2002). Community-based agencies are coordinated and collaborated, following Munger's systems theory (1998), to insure that the involved agencies have an opportunity to influence one another and provide comprehensive care. The Wraparound approach aims to provide community-based, individualized, and flexible services that are culturally relevant and coordinated between

service partners (Burchard, Burchard, Sewell, & VanDenBerg, 1993; Burchard, Burns, & Burchard, 2002; VanDenBerg & Grealish, 1998).

The Surgeon General's report on mental health reported that there was "emerging evidence" for the effectiveness of the Wraparound approach, according to available research (U.S. DHHS, 1999). A meta-analysis performed by Farmer and colleagues (2004) found positive effects of SOC in the context of Wraparound, including improvements in living environment, permanency, school attendance and adjustment, family functioning, behavior adjustment, and delinquency. An evaluation of the child welfare system in Nevada also reported more favorable outcomes for youth receiving services through Wraparound, including improvements in global functioning and school performance, compared to those utilizing traditional services (Burns, Rast, Peterson, Walker, & Bosworth, 2006). Therefore, the Wraparound approach has been established as a promising community-based intervention that represents a direct treatment application of the broad SOC model.

Illinois' DCFS

In Illinois, the Department of Child and Family Services (DCFS) works at the state level using SOC principles and a Wraparound approach to promote the wellbeing of children and families. It is the mission of Illinois' DCFS to not only protect those children who are found to be abused or neglected but also to work with their families to develop their capacity to safely care for them. DCFS works to provide suitable permanent families for those children who cannot safely return home. Additionally, DCFS works in conjunction with communities to encourage early intervention and child abuse prevention programs.

DCFS takes youth into custody after caregiver abuse and/or neglect and becomes legally responsible for the needs of the child (State of Illinois DCFS, 2009). Such responsibility requires DCFS to provide safe and secure home placement for the youth and provide the necessary medical and mental health treatment. Each child undergoes a comprehensive evaluation to identify mental, developmental and behavioral health needs (State of Illinois DCFS, 2009). Caseworkers then work with community agencies to get access to needed services for the children served. Using a Wraparound approach, service plans are created collaboratively with the youth's family, behavioral health services, school, and all other service agencies involved (State of Illinois DCFS, 2009).

Adoption of SOC in Illinois

In response to the Olmstead Act and the instability of foster care placements, Illinois implemented the SOC service option in 2002. Based in the CASSP principles, the SOC serves children with emotional and behavioral issues and their families by uniting educators, families, mental health and other service providers into a comprehensive service network to fulfill each child's unique needs. This partnership works to promote success at home, in school, and in the community. The SOC approach was created for the youth who are at-risk for changing their level of care, be it stepping up to a inpatient or residential facility or stepping down from these more intensive placement options (Sieracki, Leon, Miller, & Lyons, 2008).

All children with mental health issues living in traditional or relative foster care through DCFS are eligible for SOC services; residential, specialized, and adoptive foster care youth are excluded. If accepted into the SOC program, caseworkers head a "Child

and Family Team" that is responsible for developing an Individual Plan of Care (IPC) for the client (State of Illinois DCFS, 2009). The IPC consists of the client's individual strengths and weaknesses, as well as a treatment plan laying out goals for treatment, services to be rendered, and duration of care and is updated at least every six months to reflect the client's current service needs and his/her strengths and weaknesses. The primary focus of the SOC service option is to serve children and adolescents in the community in which they live and to provide positive youth development and therapeutic services using the Wraparound approach. Each area of the state is divided into Local Area Network (LANs; State of Illinois DCFS, 2009). Service providers are contracted by the client's caseworker to provide services to youth in their LAN or catchment area. Youth are served in the LAN where they reside whenever possible.

In an effort to assess the outcomes of the Illinois SOC, Sieracki and colleagues (2008) conducted a study to model the course of improvement for youth served in the system. Hierarchical linear modeling (HLM) was applied to three levels of data, including time (months in care), child-level (clinical factors and demographic data), and provider agency to assess the course of improvement for youth involved in SOC services in Illinois. Months in care, problem behavior score at intake, caregiver needs and strengths, youth strengths, and school problems emerged as predictors of the course of improvement at the level of the individual child (Sieracki et al., 2008). Interestingly, greater caregiver needs predicted better youth outcomes, suggesting that when caregiver issues exacerbate youths' problems, they ameliorate relatively more quickly in a family-centered approach to treatment such SOC via Wraparound. Findings like these also stress the importance of exploring potentially different predictors of outcome in a child welfare

versus non-child welfare population. Finally, Sieracki et al. (2008) found that the SOC service agencies coordinating and delivering services were a significant predictor of youths' clinical outcomes, controlling for differences in youth demographics and clinical severity at intake. This finding has important policy implications in that it suggests that quality improvement efforts directed at agencies with poorer outcomes could benefit youth.

The "main effects" driven approach to outcome monitoring via mixed modeling used by Sieracki et al. (2008) is the most typical approach seen in the treatment literature today. However, researchers in the adult psychotherapy literature have begun disaggregating datasets by unique patient characteristics and using those smaller datasets to predict outcomes, with the goal of accounting for more variance in treatment slope outcomes. For example, Lutz, Leach, Barkham, et al. (2005) recently used a novel approach to psychotherapy outcome forecasting by using a nearest neighbor (NN) approach, a technique that was originally developed to determine the probability of avalanches in Switzerland. The NN approach applied by Lutz et al. (2005) first grouped patients according to intake characteristics. Then, the outcome slopes of all the patients in the groups were averaged to represent the group's rate of change. The authors found that this approach was significantly more successful in accounting for variation in patients' outcome slopes compared to the traditional mixed model (i.e., HLM) approach.

The children's mental health research literate has not reached the level of sophistication evidenced by the NN approach of Lutz and colleagues (2005). However, the ODA approach that will be used in this study is an attempt to accomplish essentially the same goal- to study subsamples of youth based on intake clinical characteristics to

determine if this approach leads to high levels of outcome prediction accuracy. The ODA approach to outcomes modeling for individual CANS items could be appealing to policy makers and SOC providers for three reasons. First, as mentioned above, it has the potential to be an improvement over prior attempts to model outcome variability for this population. In Sieracki et al.'s (2008) study, only 5% of the variability was accounted for by the composite CANS items, a substantially lower figure than the 22% found previously in the psychotherapy literature (Lutz, Martinovich, & Howard, 1999). One goal of an outcomes prediction model such as those developed by Lutz et al. (1999) and Sieracki et al. (2008) is to use the model to develop expectations for change for future patients, what Lutz et al. (1999) called Expected Treatment Responses. Therefore, on the basis of recent NN research in the adult psychotherapy literature, a more patient-specific, "granular" approach to outcome analysis- such as what is possible with ODA- might lead to more accurate outcome predictions and therefore more accurate Expected Treatment Responses.

The second improvement of the current proposal's approach to outcomes prediction is that it allows stakeholders to better understand the unique variables that moderate outcome for specific subsamples of youth in way that could inform treatment planning and monitoring. For example, if the CANS strength item "Talents/Interests" is a significant moderator of outcome for depressed youth but plays less of a role in outcome with other presenting problems, then it suggests that this variable should play an important role in future treatment planning for youth in Illinois' DCFS population who present to SOC treatment with depression.

The third improvement brought by the current approach is that it allows the provider variable to moderate outcomes. In the Sieracki et al. (2008) study, provider emerged as a significant main effect predictor of outcomes. However, it might be the case that some providers are better at serving some youth- such as youth with externalizing diagnoses such as Conduct Disorder- and not as good at serving other youth presenting problems. Further, different providers might have relative strengths and weaknesses with the exact opposite presenting problem type. This type of result was found in a recent study using ODA to understand the variables associated with adoption rates. Snowden, Leon, & Sieracki (2008) found that some states were better at helping younger foster care children with fewer placements achieve adoption but that an entirely different slate of states were better than the other states at adopting out older youth with several prior placements. As a result, when entering providers into an ODA model, a more nuanced picture of provider patient match is possible.

The specific intake characteristics that will be examined in the current study are the psychosis, depression, attention problems, and antisocial behavior items of the CANS. Outcome will be defined as change from a severe score on these CANS items to a sub-clinical score at the termination of treatment in the Illinois SOC program. A variety of predictors will be entered into the model as possible interactions, including problem behaviors (other than the ones studied above), risk behaviors, youth functioning, care intensity and organization, family/caregiver needs and strengths, and youth strengths. In order to derive hypotheses regarding which variables within each of the four presenting problems to be studied will significantly interact to predict outcome, the

review below discusses the literature on childhood psychosis, depression, attention problems, and antisocial behavior.

CHAPTER III

CHILD PSYCHOPATHOLOGY

Psychosis

Symptoms and associated features. Psychosis refers to a range of disorders that result in a severe breach in an individual's reality testing. The Diagnostic and Statistical Manual of Mental Disorders-IV-TR (DSM-IV-TR; American Psychiatric Association, APA, 2000) distinguishes a class of psychotic disorders that are related in their expression of a group of key symptoms including hallucinations, delusions, and disorganized thinking (Asarnow & Asarnow, 2003). Therefore, psychosis is considered a symptom cluster rather than a diagnosis in it of itself. Currently, the DSM-IV-TR identifies nine distinct psychotic disorders: schizophrenia, schizoaffective disorder, schizophreniform disorder, brief psychotic disorder, delusional disorder, shared psychotic disorder, substance-induced psychosis, psychosis due to a general medical condition, and psychotic disorder not otherwise specified.

The assessment of psychosis in children is a difficult process due to the nature of the cluster of symptoms, which cause a breach in reality testing and obscure some of the effects of the symptoms. An assessment for psychosis should be completed over the course of numerous sessions and multiple informants should be used to account for the transient nature of the symptoms. A comprehensive developmental history should be obtained and a mental status examination administered. Information regarding the

youth's premorbid functioning, the onset of the symptoms, and any changes in social and academic functioning should be collected as well (Volkmar, 1996). There are many differential diagnosis considerations to be taken into account before a diagnosis can be made. It must be clear that the psychosis is not the result of some biological process due to a general medical condition or substance abuse (Minns & Valentine, 1994; Werry, 1996). Youth with schizophrenia and other psychotic disorders often present with symptoms of depression, oppositional behavior, conduct problems, and suicidal ideation, resulting in issues concerning comorbidity and differential diagnoses (Russell, 1994; Russell, Bott, & Sammons, 1989; Asarnow et al., 2001).

Prevalence and incidence. Schizophrenia, often considered to be the most severe of the psychotic disorders, characteristically presents between late adolescence and early adulthood (Remschmidt, 1993; Weinberger, 1987). Psychosis does not typically manifest during childhood, however, childhood onset is possible and has major implications for proper development (Volkmar, 1996). Prevalence rates for childhood-onset schizophrenia range from 0.19 per 10,000 children between the ages of 2 and 12 years old (Burd & Kerbeshian, 1987) to 1 in every 10,000 children (Remschmidt, Schultz, Martin, Warnke, & Trott, 1994). As found in adult-onset psychosis, the vast majority of childhood-onset cases are male. The ratio of male-to-female cases ranges from 2:1 to 5:1 in the literature (Asarnow & Asarnow, 2003), with the gender breakdown becoming evening out in adolescence (Hollis, 1995; Remschmidt et al., 1994). Such a discrepancy in childhood-onset cases suggests a biological vulnerability for developing psychosis in younger males, similar to the genetic predisposition found in males for neurological disorders (Fish & Ritvo, 1979; Lewine, 1988; Werry, 1992).

Course and prognosis. Research is scarce on psychosis in infants and preschoolers. Fictional beliefs in the form of imaginary friends and fantasy characters are developmentally appropriate in pre-school aged children and should be distinguished from hallucinations (Volkmar, 1996). However, after the age of seven such experiences have diminished in normally developing children. Abnormal personality, neurodevelopmental issues, language problems, and impaired motor functioning may be early indicators of a psychotic disorder in infants and preschools (Russell, 1994; Werry, 1996). Informant issues complicate research on childhood psychosis, as it is difficult to obtain an accurate assessment from a child. The content of hallucinations in children typically reflects developmental concerns and are often focused on issues of identity formation (Volkmar, 1996). Such hallucinations may be more pronounced in children served by the child welfare system because identity formation is often jeopardized for these youth, as caregiver instability and the multiple roles forced upon foster care children interrupt developmental processes (Volkmar, 1996). Symptom presentation of psychotic disorders in adolescence more closely resembles adult symptomatology, likely due to maturing cognitive abilities (Volkmar, 1996). Distinguishing amongst the psychotic disorders is also more difficult during this developmental period as drug and alcohol use become more probable, introducing the possibility of substance-induced psychosis. Increased cognitive abilities paired with psychological stress may also bring about a brief psychotic episode. The gradual onset of this disorder complicates the identification of the precise onset and also obscures the distinction of premorbid and comorbid symptoms.

The currently accepted etiological model for the development of psychosis suggests a diathesis-stress framework, highlighting the contribution of both a genetic vulnerability and the experience of stressful life events (Asarnow & Asarnow, 2003). Genetic factors, central nervous system damage resulting from birth complications, inadequate learning environments, and the experience of abnormal family communication patterns have been suggested as vulnerability factors for developing psychosis (Asarnow & Asarnow, 2003). The impact of a major life event or the experience of chronic stressors is hypothesized to interact with this genetic predisposition and bring about psychosis, although the type of stressor and the degree of stress necessary to trigger the psychosis dependent on the individual.

Attention problems

Symptoms and features. Issues with attention typically fall under the diagnosis of attention-deficit/hyperactivity disorder (ADHD), according to the DSM-IV-TR (APA, 2000). The primary characteristics of this disorder fall into two discrete behavioral dimensions: chronic expression of inattention and/or hyperactivity and impulsivity that is above and beyond that displayed by peers of the same developmental level (Barkley, 2003). To qualify for a diagnosis of ADHD, the youth must have displayed some core symptoms that have interfered with social, academic, and/or occupational functioning and development before the age of seven. Additionally, the symptoms must present and impair the child in at least two distinct settings. The symptoms must be best explained by a diagnosis of ADHD, rather than another mental disorder, and must present outside of the course of a pervasive developmental disorder, schizophrenia, or a psychotic disorder.

For a diagnosis of ADHD, symptoms of inattention and disinhibition must not only present across environments (i.e. academic, social, and occupational settings), but also have a chronic course, persisting for at least six months to the extent that they are interfering with the development of the child (APA, 2000). Symptoms of inattention include a lack of attention to detail and excessive careless mistakes in assignments, a difficulty in sustaining attention in tasks or at play, and issues with listening when spoken to. Inattention can also be manifest as difficulty complying with instruction and completing tasks that is not accounted for by oppositional behavior, a misunderstanding of instructions, general messiness, forgetfulness, or distractibility (Barkley, 2003). Children with ADHD may also be hesitant to perform tasks that require sustained mental effort and may often misplace things.

The second symptom cluster associated with ADHD is hyperactive and impulsive behavior. This behavior is thought to be the result of dysfunctional voluntary or executive inhibitory processes (Barkley, 2003; Nigg, 2001). Disinhibition presents as increased psychomotor activity, fidgetiness, impulsive behavior, and excessive talking (APA, 2000). Parents and teachers often describe these children as constantly on the go and always in motion, as though they are anxiously anticipating the next activity (Barkley, 2003). Children with ADHD tend to have a low threshold for tolerating frustration and are partial to having frequent outbursts and an inconsistent mood. These symptoms are typically accounted for by impairments in executive functioning that interfere with emotional regulation and impulse control (Barkley, 2003; Nigg, 2001). Also, the expression of the symptoms of ADHD often takes a toll on the parent-child relationship, resulting in negative parent-child interactions (APA, 2000).

A diagnosis of ADHD is commonly accompanied by diagnoses of other psychological issues. A meta-analysis of a community sample by Szatmari and colleagues (1989) found 44% of youth with ADHD to have at least one other diagnosis and 43% of youth to have at least two other disorders. The rates in the clinic population are much higher, with 87% of youth reporting at least one additional disorder and 67% having at least two other diagnoses (Kadesjo & Gillberg, 2001). ADHD is often comorbid with oppositional defiant disorder (ODD) and conduct disorder (CD), with approximately half of all children diagnosed with ADHD having both disorders (APA, 2000). Comorbidity rates are highest amongst other disruptive behavior disorders compared to other mental disorders, although anxiety and mood disorders are also commonly found in this population, with anxiety disorders reported in approximately 25% of clinic cases of ADHD (Biederman, Newcorn, & Sprich, 1991) and mood disorders found in 20% to 30% of youth with ADHD (Cuffe et al., 2001). Youth with the hyperactive-impulsive subtype of ADHD are more likely to present with comorbid disorders than those with the predominately inattentive type. There is also evidence of a history of child abuse or neglect, multiple foster home placements, exposure to neurotoxins, infections, fetal exposure to drugs, and/or mental retardation in children with ADHD (APA, 2000).

Prevalence and incidence. ADHD occurs in 3-7% of school-aged children, with most studies reporting a prevalence rate between 4.2% to 6.3% (APA, 2000; Szatmari, 1992). The disorder is more prominent in males, with the estimate of the male-to-female ratio ranging from 2:1 to 9:1, depending upon the subtype and referral setting, with a 3:1 ratio across studies (APA, 2000; Barkley, 2003). However, it has been suggested that the

DSM diagnostic criteria is more applicable to males than females, possibly inflating the gender discrepancy (Barkley, 2003). There is evidence of a genetic component in the manifestation of ADHD, with an increased expression of the disorder reported in first-degree biological relatives of children with ADHD. Children with family members with mood and anxiety disorders, learning disorders, substance-related disorders, and antisocial personality disorder (APD) are also more likely to have ADHD, suggesting a non-specific etiological link. However, the severity of the symptoms and the presence of comorbid diagnoses is impacted by familial, social, and peer factors in addition to the influence of a possible genetic predisposition.

Course and prognosis. Symptoms of hyperactivity and impulsivity begin to manifest around the age of three or four, prior to symptoms of inattention, which present between the ages of five and seven; the cognitive impairments associated with the inattentive subtype are not often exhibited until the child is between eight and ten years of age (Hart, Lahey, Loeber, Applegate, & Frick, 1995; Loeber, Green, Lahey, Christ, & Frick, 1992; Milich, Balentine, & Lynam, 2001). Diagnosing ADHD in children under the age of five is difficult due to increased variability of symptom presentation; however, excessive motor activity as a toddler is often the first indicator of the disorder (APA, 2000).

The diagnosis of ADHD is typically made when children enter school and their symptoms impair their adjustment to the academic environment. Between 19% and 26% of children with ADHD qualify for a learning disability (Barkley, 1990). Amongst school-aged children, the symptoms of ADHD typically interfere with academic performance and general cognitive abilities and may also lead to rule breaking at home

and in the classroom. These youth are also less adept at successfully meeting developmental milestones focused on organization and self-regulation than their same-aged peers (Barkley, 2003). The inattentive and hyperactive/impulsive symptoms of ADHD are most pronounced during elementary school and persist through late childhood (APA, 2000; Hart et al., 1995). Symptoms become more internalized in late childhood and early adolescence and are most often experienced as inner restlessness or fidgetiness rather than issues with motor hyperactivity (Fischer, Barkley, Fletcher, & Smallish, 1993). Research suggests that ADHD is best characterized as a developmental disorder related to impairments in executive functioning and is dimensional in nature, with ADHD symptoms reflecting the extremes of a continuum of developmental traits relating to sustained attention and impulse control (Levy & Hay, 2001). Therefore, the manifestation of ADHD is the result of a retarded rate of the development of normal, developmentally appropriate traits, rather than an indication of pathology or of a loss of functioning.

The symptoms of inattentiveness, hyperactivity, and impulsivity typically impair academic performance in these youth. The low academic achievement of youth with ADHD is often misinterpreted as purposeful laziness, rather than a function of a disorder, leading to conflicts at home and in the classroom (APA, 2000). Children with ADHD tend to receive less schooling overall, compared to their same-aged peers, and have poorer professional success in the future. Academic and school related problems are typically more marked in the inattentive subtype, whereas issues regarding peer rejection are seen more often in the hyperactive-impulsive subtype (APA 2000). Studies suggest that the inattentiveness of these youth, as well as the associated developmental

impairments of ADHD, such as motor coordination and self-monitoring, may be the result of prefrontal cortex dysfunction that impairs executive functioning (Oosterlan, Scheres, & Sergeant, 2005; Seguin, Boulerice, Harden, Tremblay, & Pihl, 1999; Wiers, Gunning, & Sergeant, 1998).

The severity of the symptoms of ADHD is highly variable and depends upon the youth's environment and the nature of the task at hand. Studies have shown that youth with ADHD exhibit more inconsistency in task performance measuring attention and impulse control (Douglas, 1972). Behavioral issues are greater in situations requiring sustained attention on a work-related task or when behavioral restraint is required, such as when in a public place, rather than an unrestrictive play environment (Altepeter & Breen, 1992; Barkley & Edelbrock, 1987; DuPaul & Barkley, 1992). When the criteria for symptoms of inattention have been met but those for hyperactivity/impulsivity have not, the child may be diagnosed with ADHD, predominately inattentive type. In the case of hyperactive-impulsive symptoms being fulfilled and not inattention criteria, ADHD, predominately hyperactive-impulsive type can be diagnosed.

Depression

Symptoms and associated features. Symptoms of a depressed mood, social withdrawal, anxiety, fluctuations in weight or eating behavior, loss of motivation, and sleep disturbances can be indicative of a number of mood disorders, including major depressive disorder (MDD), dysthymia, or bipolar disorder (Lyons, 1999). Although the same diagnostic criteria are used for both children and adults, identification of the symptoms of a mood disorder is less clear in children (Carlson & Cantwell, 1980; Mitchell, McCauley, Burke, & Moss, 1988). Diagnosis is made more complicated by the

fact that externalizing symptoms are more noticeable in children and may detract from the identification of internalizing issues. Additionally, some of the symptoms of mood disorders in youth, an irritable rather than depressed mood for example, are more developmentally appropriate in childhood, obscuring the recognition of depression symptomatology in youth (Hammen & Rudolph, 2003).

MDD is diagnosed by a persistent depressed mood and/or loss of pleasure in a majority of activities all day, nearly everyday for at least two weeks (APA, 2000). The depressed mood characteristic of those experiencing a major depressive episode can be either subjectively reported by the individual or can be observed by others. A loss of interest or pleasure in taking part in activities the individual typically enjoys may be manifest as social withdrawal or purposeful avoidance of those activities. Depressive episodes for youth typically last between seven and nine months, consistent with the duration of episodes of adult depression (Kovacs, 1996). Additional symptoms found in those suffering from MDD include changes in eating behavior, weight, sleep, and/or physical activity; a loss of energy; feelings of worthlessness and guilt; disruptions in thinking, concentration, and decision-making; and suicidal ideation or preoccupation with death (APA, 2000). Changes in weight and appetite in youth are best monitored by consulting with developmental growth charts. Suicidal thoughts are common in youth with depression, reported in approximately 60% of cases of depression in youth (Kashani & Carlson, 1987). The symptoms of depression must be a significant change from the individual's normal daily functioning to qualify as contributing to a diagnosis. To be clinically significant, symptoms must interfere across social, academic, and/or occupational domains and be distressing to the youth. Depression can also lead to

intimacy issues and insecurity in relationships, manifesting as separation anxiety in children (APA, 2000). Persistent depression interferes with the achievement of important developmental milestones; therefore, early detection and intervention is paramount to ensuring a normal developmental trajectory (Birmaher, Arbelaez, & Brent, 2002; Hammen & Rudolph, 2003).

When the symptoms of depression are more chronic, lasing over a year in childhood cases, and less comprehensive, a diagnosis of dysthymic disorder should be made. Dysthimia is characterized by the experience of a depressed mood more days than not for at least a year. The symptoms of depression must be persistent over the course of this year; if the symptoms relent for more than two months a diagnosis cannot be made. Dysthymic disorder typically lasts for an average of four years (Birmaher et al., 1996). The associated features of dysthymic disorder are the same as those for major depressive disorder; however, a study of children with dysthymia revealed that children experiencing dysthymic disorder tend to present primarily with dark and depressing thoughts and a negative affect rather than with the externalizing symptoms of a loss of pleasure in activities or a changes in eating or sleeping that adults experiencing dysthymia present with (Kovacs, Akiskal, Gatsonis, & Parrone, 1994).

Researchers question the distinction between MDD and dysthymic disorder in childhood. In an analysis taken from the Methods of the Epidemiology of Child and Adolescent Mental Disorders (MECA) study by Goodman and colleagues (2000), researchers found that other than an earlier onset for children with dysthymia, the two disorders failed to significantly differ in terms of course, impairment, and sociodemographic factors. However, children receiving a dual diagnosis of both MDD

and dysthymia, known as double-depression, historically experience less favorable outcomes and are more impaired than their peers with single diagnoses (Goodman, Schwab-Stone, Lahey, Shaffer, & Jensen, 2000).

The expression of mood disorders with depressive features varies between youth and adult populations with children and adolescents presenting with irritability rather than a depressed mood (APA, 2000; Hammen & Rudolph, 2003). Children typically present with symptoms of physical pain and discomfort, irritability, and social withdrawal, while symptoms of delusions, decreased energy, and increases in sleep are more common in adolescents (Kovacs, 1996). Younger children suffering from depression tend to display a depressed appearance and exaggerated somatic complaints (Kashani & Carlson, 1987). Psychotic symptoms are also found in some cases of childhood depression (APA, 2000). Although psychosis is an associated feature in adult depression, the rates of psychotic symptoms in childhood-onset cases are greater than those in adult cases, with between one-third to one-half of preadolescent depression cases reporting hallucinations, primarily auditory in nature (Mitchell et al., 1988).

Depression is more often comorbid with disruptive behavior disorders, ADHD, and anxiety disorders in children than as a standalone diagnoses (APA, 2000). In adolescence depression is frequently comorbid with substance-related disorders and eating disorders (Fleming & Offord, 1990). Angold, Costello, and Erkanli (1999) performed a meta-analysis of comorbidity rates in studies using samples taken from youth in the community. Using the median odds ratio, the researchers found a degree of association between depression and anxiety disorders of 8.2, a ratio of 6.6 for depression and disruptive behavior disorders, and a ratio of 5.5 for depression and ADHD (Angold,

Costello, & Erkanli, 1999). Comorbidity rates differ across gender, with girls experiencing greater rates of comorbid anxiety and boys presenting with greater rates of comorbid ADHD and disruptive behavior disorders (Hammen & Rudolph, 2003).

Prevalence and incidence. The lifetime prevalence rates of depression ranges from 10% to 25% in women and 5% to 12% in men (APA, 2000). Prevalence rates for preadolescent children are difficult to obtain as the majority of studies using a sample of children and adolescents fail to differentially report results. Depression is not typical in this population, with the lifetime prevalence rate of depression for preadolescent school-aged children reported to be less than 3% (Cohen et al., 1993; Fleming & Offord, 1990) and the lifetime rate for preschoolers reported to be less than 1% (Kashani & Carlson, 1987). The lifetime prevalence of MDD in adolescents is significantly greater, with a rate estimated between 14%-20% (Birmaher et al., 2002; Kessler & Walter, 1998). There is a clear genetic variable in the expression of depression with a diagnosis being 1.5 to 3 times more likely in individuals with a first-degree relative with depression, compared to the general population (APA, 2000). Environment has also been found to contribute to the prevalence of depression in youth. In a study of the impact of low socioeconomic status (SES) on the mental health of youth, Costello and colleagues (1996) found low SES to be associated with a greater number of diagnoses of psychological disorders, including mood disorders.

Course and prognosis. Before diagnosing an individual with depression it should be made clear that the symptoms are not the result of a general medical condition or induced by substance use and that the symptoms related to inattentiveness and irritability are not better accounted for by a diagnosis of ADHD. Women are more likely to develop

depression over the course of their lifespan than males; however, this discrepancy emerges in adolescence, suggesting that puberty may play a role in the elevated number of female cases (APA, 2000; Birmaher et al., 2002; Cohen et al., 1993). Depression typically presents in the early 20s, therefore any diagnosis made before the age of 21 is considered early-onset. Studies have found that childhood- and adolescent-onset cases to be more likely to have multiple major depressive episodes than adult-onset cases (APA, 2000).

There appears to be a consistent temporal relationship between depression and its commonly comorbid disorders, with comorbid disorders presenting prior to the onset of depression (Rohde, Lewinsohn, & Seeley, 1991). It has been suggested that comorbidity between depression and anxiety could be the result of diagnostic issues that fail to differentiate between diagnoses, however, it is more likely that the comorbidity found is related to shared etiological factors. These disorders may present together due to a common cause, shared risk factors, or a functional and causal relationship (Angold et al., 1999). Comorbidity between depression and externalizing disorders has been proposed to be the result of common risk factors, a predisposition for emotional and behavioral dysregulation, or the result of a stressful home, school, or social situations created by the behavioral disorders (Hammen & Rudolph, 2003).

Antisocial behavior

Symptoms and associated features. Issues related to compliance with the rules of society fall under the umbrella of antisocial behavior and, in childhood and adolescence, suggest the possibility of a diagnosis of CD. CD is characterized by a chronic pattern of disregard for, and violation of, the rights of others and age-appropriate societal norms,

beginning in childhood or early adolescence (APA, 2000). Antisocial behavior typically falls within one of four groups: aggressive behavior to other people or animals, deliberate destruction of property, deceitfulness or theft, or serious violation of rules. Such behavior can be overt or covert and nature, with the majority of youth presenting with behavior primarily in one domain or the other, though mixed cases do exist (Achenbach, 1993; Coie & Dodge, 1998). The varied symptom presentation of youth with CD renders a heterogeneous group with the diagnosis, prompting questions as to appropriateness of the current diagnostic criteria (Achenbach, 1993). In order to qualify for a diagnosis of CD, a youth must exhibit at least three antisocial behaviors over the course of the past 12 months with at least one behavior during the previous six months. The symptoms of the disorder must significantly interfere with the academic, occupational, and/or social functioning of the youth to merit a diagnosis. Although most youth suffering from CD exhibit antisocial behavior in a variety of settings, it is imperative that multiple informants be used during assessment, as youth with CD may fail to accurately report symptoms and attempt to manipulate the assessment process (APA, 2000).

Typical associated features of CD include a lack of empathy for others, an overly hostile worldview, compromised feelings of guilt or remorse, failure to take responsibility for one's actions, decreased tolerance of frustration or irritation, and impaired self-esteem. These associated features suggest an impaired personality and dysfunctional interpersonal functioning. CD is also associated with early sexual activity, drug use, and increased reckless behavior (APA, 2000). Academically, these youth typically fall behind their same-aged peers in IQ and other measures of academic

achievement (APA, 2000). However, comorbid ADHD has been proposed to be the cause of the academic underachievement found in children with CD, while interpersonal dysfunction, antisocial behavior, and delinquency is said to account for academic issues in adolescents (Frick et al., 1991; Hinshaw, 1992; Hinshaw & Lee, 2003).

Learning disorders, ADHD, mood disorders, anxiety disorders, and substance-related disorders are all disorders commonly comorbid with CD. ADHD is the most often comorbid disorder with CD; 50% of youth with CD are also diagnosed with ADHD (Hinshaw & Lee, 2003). However, the diagnostic criteria of the DSM may be partially to blame for the high concordance rates of these two disorders. Hyperactive and impulsive symptoms of ADHD are more closely correlated with the aggressive and antisocial behavior of CD than with the inattentive dimension of ADHD (Hinshaw, 1987; Quay, 1986). Early aggression and impairments in relationship formation are also suggested to account for this high rate of comorbidity (Hinshaw & Lee, 2003). Youth with an early-onset of CD and those who display aggressive behavior and symptoms of ADHD are most at risk of developing comorbid disorders (Hinshaw & Lee, 2003). It is important to consider the environment that the antisocial behavior occurs in when making a diagnosis of CD. The impact of poverty, traumatic stress, and violent community life should be taken into consideration when assessing for the disorder as these factors may contribute to the adoption of an excessively violent or aggressive lifestyle (Hinshaw & Lee, 2003). A diagnosis should only be made when it is clear that the behavior is related to an underlying personality dysfunction and not an isolated reaction to some social context.

Prevalence and incidence. CD primarily affects males, particularly in the childhood-onset type, but does occur in both genders. Symptom presentation varies by

gender, males exhibiting more confrontational behavior than females. The prevalence of CD varies depending upon the environment, estimates ranging from 1% to 10% of the general population, with urban settings reporting greater prevalence rates than rural settings (Zoccolillo, 1993). In a study of the prevalence of CD, Offord and colleagues (1986) found an overall prevalence of CD in youth between the ages of four and 16 in the general population to be 5.5%, with a rate of 8.1% for boys and 2.8% for girls.

Course and prognosis. CD can develop as early as preschool; however, diagnostically significant criteria tend to emerge between middle-childhood and middle-adolescence (Hinshaw & Lee, 2003). A diagnosis of CD is rarely made after the age of 16. The disorder typically abates prior to adulthood, but persistent cases may develop into APD. There are two subtypes of CD: childhood- and adolescent-onset, based on concurrent studies done by a number of researchers identifying two distinct onset patterns (Loeber, 1988; Moffitt, 1993; Patterson, 1993; Patterson, DeBaryshe, & Ramsey, 1989). The types differ not only in terms of age of onset, but also in course, prognosis, and prevalence. A distinction of childhood-onset type is made if at least one antisocial behavior is present prior to the age of 10. These children are predominately male, tend to exhibit aggressive behavior and have impaired peer relationships. Also, childhood-onset type is often comorbid with ODD. The developmental course for this subtype of CD is less favorable than adolescent-onset, with these children typically developing APD in late adolescence or adulthood or other more chronic psychopathology. Additionally, impairments in the childhood-onset type are more pervasive. Children with CD often experience neurological and cognitive deficits, symptoms of ADHD, and inconsistent and insecure family relationships (Moffitt, 1993). The prognosis for adolescent-onset type

CD is more optimistic. Adolescent-onset type refers to those youth who fail to show any characteristic of CD prior to the age of 10. The gender breakdown of this subtype is more evenly distributed than that of childhood-onset type (Zoccolillo, 1993). These youth tend to have more developmentally appropriate peer relationships and present with less violent behavior and symptoms of underlying psychopathology (Moffitt & Caspi, 2001). Adolescent-onset CD is less chronic, typically remitting prior to adulthood and failing to develop into APD. It is suggested that this subtype of CD may be the result of social mimicry rather than underlying psychopathology (Moffitt, 1993).

Risk and protective factors

Individual factors. Individual youth factors have a powerful effect on the course and prognosis of youth psychopathology. In depression, gender moderates the impact of the condition on the youth. Increased overall symptom expression has been found in females (Meng et al., 2006). However, this finding may be due to comorbidity issues pertaining to the increased report of internalizing symptoms by females, and therefore should be interpreted with caution. Females and those with comorbid conditions are also vulnerable to experiencing more severe depressive symptomatology (McCauley et al., 1993).

Low cognitive functioning acts as a risk factor for the development of and recovery from certain psychological disorders. Developmental delays, lower intelligence, and broad cognitive impairments elevate the risk of developing early-onset psychosis (Hollis, 2003; Malla & Payne, 2005). Cognitively, youth with childhood-onset CD have been found to have IQ deficits greater than one standard deviation below their same-aged peers (Lynam, Moffitt, & Stouthamer-Loeber, 1993; Moffitt & Silva, 1988), with the

deficits most commonly found in verbal reasoning abilities and executive functioning (Moffitt, 1993; Moffitt & Lynam, 1994). These cognitive deficits produce cumulative effects and may increase the vulnerability of CD youth to environmental stressors (Moffitt & Lynam, 1994). In depressed youth, acute benefits have been found for found for those with higher cognitive functioning (Curry et al., 2006).

Psychosocial functioning has been found to be a consistent predictor of youth psychopathology, particularly in the case of youth psychosis. In a study assessing the diagnostic predictability of premorbid impairment on child- and adolescent-onset schizophrenia, Hollis (2003) found that higher rates of premorbid social development impairment and urinary continence distinguished early-onset schizophrenia from other early-onset psychoses. Impaired sociability is suggested to be the clearest distinguishing symptom between the two disorders. Using a longitudinal data set, Meng and colleagues (2006) also explored the relationship between pretreatment social functioning and treatment outcomes for youth with psychosis. Pretreatment social functioning was found to be the best predictor of total symptom and negative symptom expression as well as social functioning one year after treatment (Meng et al., 2006). Impairments in social functioning, including social withdrawal and dysfunctional peer relationships, are associated with greater negative symptomatology and continued social functioning deficits and are, consequently, predictive of a less favorable course of illness (Hollis, 2003; McClellan & McCurry, 1999; Meng et al., 2006). However, Rutter and colleagues (1967) propose that vulnerability associated with impaired social functioning can by attenuated by increased schooling, which promotes social adjustment.

Impaired psychosocial functioning has been found to have an impact on other forms of youth psychopathology. Evidence has also shown poor psychosocial functioning in childhood to predict poorer outcomes for youth with ADHD (Rasmussen & Gillberg, 2000). In a study of the course of depression in adolescents, Rao et al. (1995) found psychosocial dysfunction to predict the recurrence of depressive episodes. Psychosocial impairments were also related to a history of disrupted interpersonal relationships, life dissatisfaction, and lower global functioning and were predictive of a less favorable outcome for depressed youth (Rao et al., 1995). Youth with CD also experience dysfunctional social-cognitive processing, leading to impaired interpersonal functioning. These impairments are proposed to contribute to the expression of aggressive and antisocial behavior in these youth. The global interpersonal deficits of these youth include failing to identify social cues, seeing the world with a negative bias, and experiencing difficulty in generating solutions to social problems (Coie & Dodge, 1998).

Research has consistently shown that, for those experiencing depression, outlook is an important contributor to the course of the disorder and clinical outcomes. Feelings of hopelessness and overall life dissatisfaction are associated with poorer outcomes and more chronic depression (Brent et al., 1998; Curry et al., 2006; Rao et al., 1995). Age also impacts the experience of depression in youth. Curry and colleagues (2006) found acute benefits in depressed adolescents who were younger and less chronically depressed.

Biological factors. Individual parent characteristics have been found to influence the course of psychopathology in children. In ADHD, parental depression and low parental IQ predict less favorable child outcomes (Molina & Pelham, 2003). Youth with

parents who have a history of psychopathology are at an increased risk of developing CD, especially in the case of paternal APD (Frick et al., 1991), paternal substance abuse, and maternal histrionic personality disorder with antisocial features (Lahey et al., 1988).

There is evidence of a genetic component in some psychological disorders. Although evidence for the heritability of CD exists, the effects differ across the subtypes of the disorder with the strongest heritability reported in the childhood-onset type (Taylor, Iacono, & McGue, 2000). Evidence for the heritability of violence, however, is not strong; rather, it is suggested that biological vulnerabilities interact with environmental factors to bring about violent behavior in these youth (Coie & Dodge, 1998; Rutter et al., 1998). Lahey and colleagues (1993) propose that a socioenvironmental event triggers the expression of antisocial behavior but that it is neurological functioning that mediates the impact of this event on the youth.

Environmental factors. A youth's environment contributes greatly to clinical outcomes as well as the course of psychological disorders. For youth with depression, high socioeconomic status (SES) has been found to be associated with greater overall treatment benefits (Curry et al., 2006), while low SES predicts the recurrence of depressive episodes (Rao et al., 1995). Family structure also predicts the development of CD. Evidence has been found for an increased prevalence of youth with CD in single-parent families, divorced families, large families, and families with young mothers (Hinshaw & Lee, 2003). Additionally, greater familial stress is associated with poorer overall outcomes in depressed youth (McCauley et al., 1993).

Parental involvement in treatment is a strong predictor of outcomes for youth with ADHD. There is evidence that treatment adherence and medical management by

parents/caregivers promotes more favorable outcomes in functional domains such as social skills, academics, emotional regulation, and oppositional behavior (Jensen et al., 2001). Parental communication with the youth's school has also been associated with more positive functional outcomes, promoting continuity of care and consistency in treatment of the youth's condition (Jensen et al., 2001).

Child abuse and neglect has been found to be associated with youth psychopathology. Evidence has been found for an increased risk of psychosis amongst maltreated children (McClellan & McCurry, 1999). Poorer clinical outcomes have also been found for youth with CD who experienced abuse or neglect (Moffitt, 1993). The experience of physical abuse in youth also predicts later violence and aggressive behavior in youth with CD (Coie & Dodge, 1998).

Important to note is that all these factors (family structure, parental psychopathology, and child abuse/neglect) are associated with the experience of poverty. However, researchers suggest that the effects of poverty, as well as the family structure variables, may be strongly mediated by parenting style and the quality of parent-child interactions (Coie & Dodge, 1998; Rutter et al., 1998). Evidence for this mediation has been found in the association between decreased parental involvement, inadequate supervision, and harsh and inconsistent discipline strategies with an increased prevalence of CD (Patterson, 1982; Patterson, Reid, & Dishion, 1992).

Condition factors. Factors associated with the expression of the disorder itself contribute to the experience of psychopathology in youth. Symptom severity has been found to have implications on psychological disorders in youth. Studies have consistently shown that an increased severity of positive and negative symptoms, as well

as low overall premorbid functioning, predict a more chronic course for adolescents with psychosis (Maziade et al., 1996; McClellan, McCurry, Snell, & Dubose, 1999). Additionally, Eggers and Bunk (1997) found a more gradual onset of psychosis to predict less favorable outcomes in this population. In youth with ADHD, more severe symptomatology in childhood predicts poorer outcomes (Molina & Pelham, 2003). The same is true for youth with CD, with more severe antisocial symptoms associated with less favorable outcomes (Crowley, Mikulich, MacDonald, Young, & Zerbe, 1998; Zoccolillo, 1992). For youth with depression, temporal consistency of symptoms predicts clinical outcomes; acute benefits have been found for adolescents who were less chronically depressed (Curry et al., 2006).

The experience of comorbid psychological disorders in youth also impacts clinical outcomes, course, and prognosis. Comorbid developmental coordination disorder is associated with poorer functional outcomes for youth with ADHD, including continued ADHD symptoms, alcohol abuse, low educational level, and APD (Rasmussen & Gillberg, 2000). For youth with depression, research suggests comorbid anxiety and/or CD predicts less favorable outcomes (Brent et al., 1998; Fombonne, Wostear, Cooper, Harrington, & Rutter, 2001; Harrington, Fudge, Rutter, Pickles, & Hill, 1991; McCauley et al., 1993) and more severe symptomotology (McCauley et al., 1993), while depressed youth with fewer comorbid conditions were found to experience acute benefits (Curry et al., 2006).

Summary and Current Study

Previous research assessing long-term mental health outcomes for youth served in the foster care system has consistently shown that these youth are an increased risk of

developing mental illness compared to youth in the general population (Anctil et al., 2006; Brandford & English, 2004; Grant, Compas, Thurm, McMahon, & Gipson, 2004; McMahon, Grant, Compas, Thurm, & Ey, 2003; Skarbo et al., 2004). However, the SOC model, particularly when it is coupled with an empirically supported treatment such as Wraparound, has been shown to be successful in improving mental health outcomes for this significantly at-risk population.

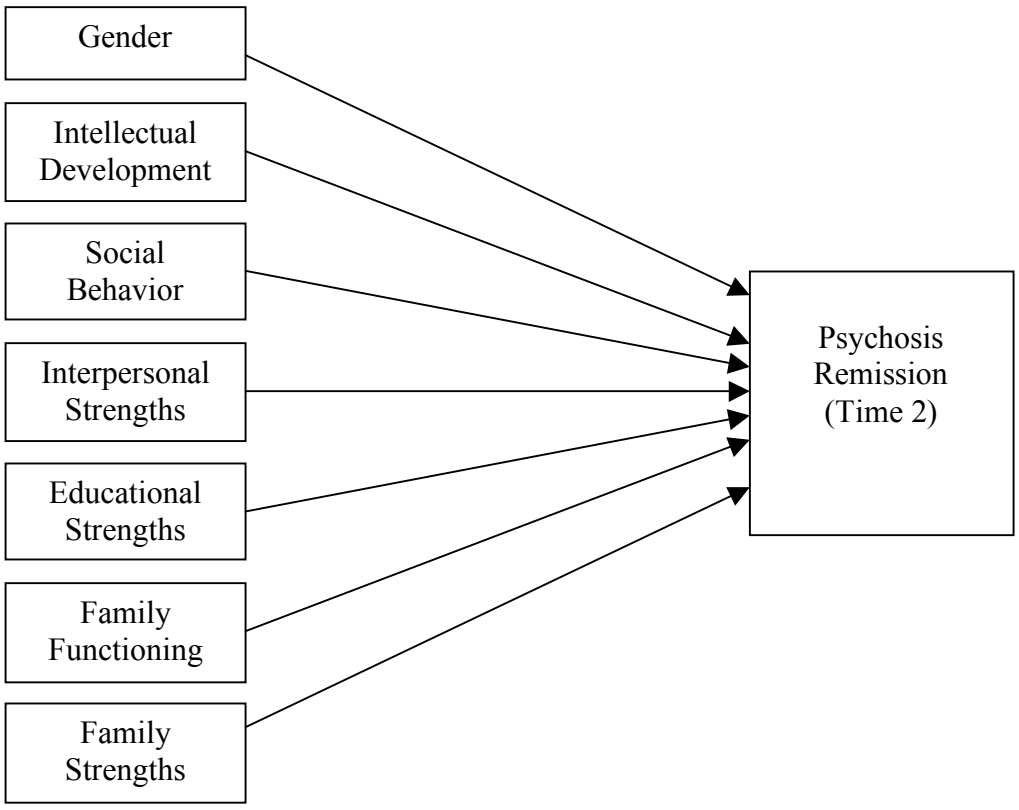
Prior attempts to predict global mental health status with a main effects driven approach (e.g., Sieracki et al., 2008) have been successful; however, with indications from the adult psychotherapy literature (e.g., Lutz et al., 2005), the current approach represents a potential improvement over prior attempts to predict outcome. Exploratory analysis will be conducted by this study using optimal data analysis (ODA; Soltysik & Yarnold, 1993; Yarnold & Soltysik, 2005) to determine those variables collected by the CANS that interact to predict remission of mental illness in a population of youth in foster care. Examples of efforts to explore symptom-distinct pathways using ODA can be found in the literature (Lyons, Leon, Zaddach, Luboyeski, & Richards, 2009; Snowden, Leon, Sieracki, 2008). The selection of the four specific symptoms of psychopathology to analyze- psychosis, depression, attention, and conduct disturbance- were guided by prior research demonstrating that these variables demonstrate unique variance using Structural Equation Modeling (SEM; Miller, Leon, & Lyons, 2007) and by the fact that they represent diagnoses commonly seen in treatment settings, particularly among youth in child welfare (Anctil et al., 2006).

Based on the previous literature with these clinical populations, a range of variables across the individual and his or her ecologies are hypothesized to predict

outcome. However, it is important to note that the overwhelming majority of variables studied in the child and adolescent psychosis, depression, attention, and conduct disturbance literature have been main effects variables. The literature offers very little guidance on what will emerge from an exploratory statistical analysis designed specifically to unearth highly distinct moderations- many ODA studies unearth up to four or five total interactions. Therefore, the hypotheses below apply to the univariate ODA analyses that will be run and not to the final multivariate ODA results. With this caveat in mind, the following hypotheses are proposed:

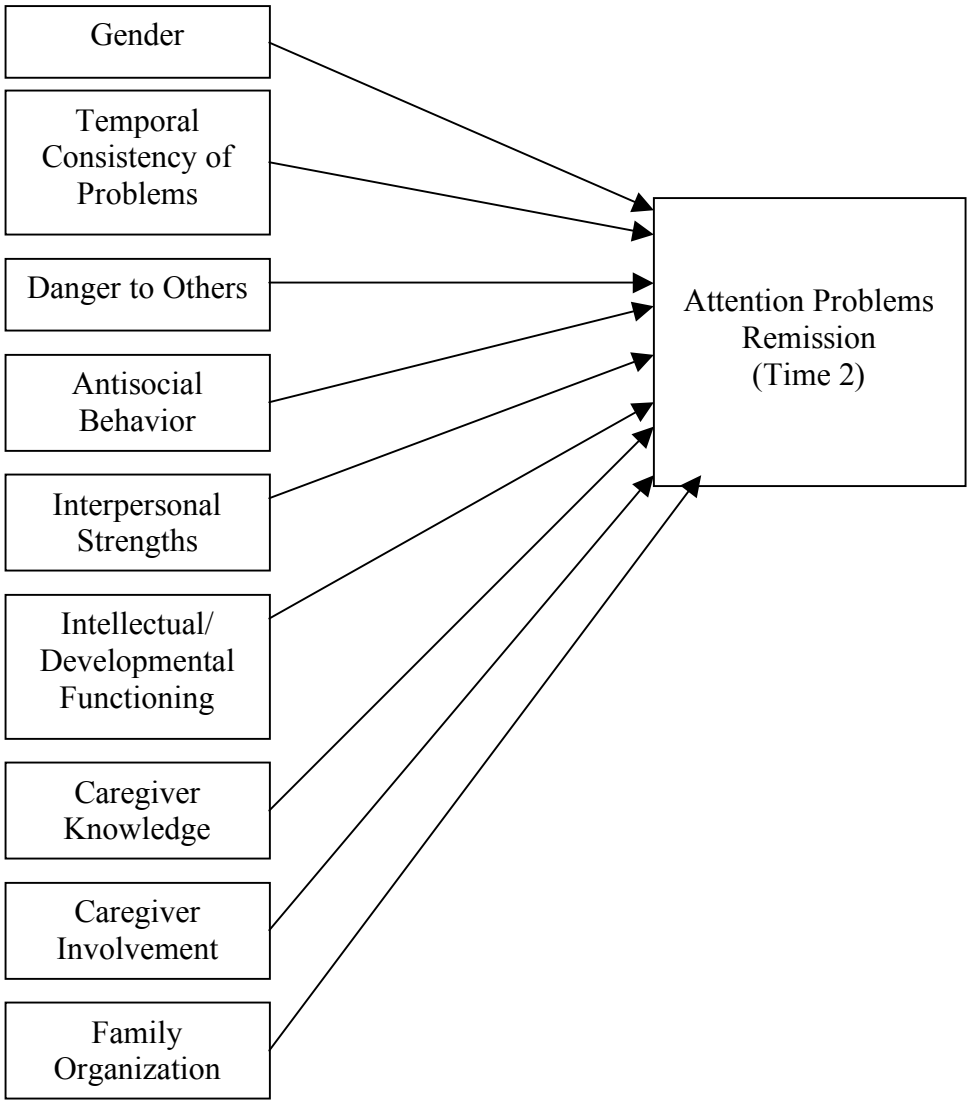
Hypotheses. Based on a review of the available literature and how the findings are best mapped onto CANS variables, the following factors are proposed to predict remission from specific problem presentations for youth in foster care:

1. Psychosis:
    a. Individual: Individual factors will predict remission from psychosis.
        i. Of those variables, female gender, high intellectual/developmental functioning, positive social behavior, high interpersonal strengths, high educational strengths, will significantly predict remission for youth with psychosis.
    b. Family: Family factors will predict remission from psychosis.
        i. Of those variables, positive family functioning and positive family strengths will significantly predict remission for youth with psychosis.



2. Attention problems:
    a. Individual: Individual factors will predict remission from attention problems.
        i. Of those variables, female gender, less temporal consistency of problems, low danger to others, low antisocial behavior, high interpersonal strengths, and high intellectual/developmental functioning will significantly predict remission for youth with attention problems.
    b. Family: Family factors will predict remission from attention problems.

i. Of those variables, high caregiver knowledge, high caregiver involvement, and high family organization will significantly predict remission for youth with attention problems.



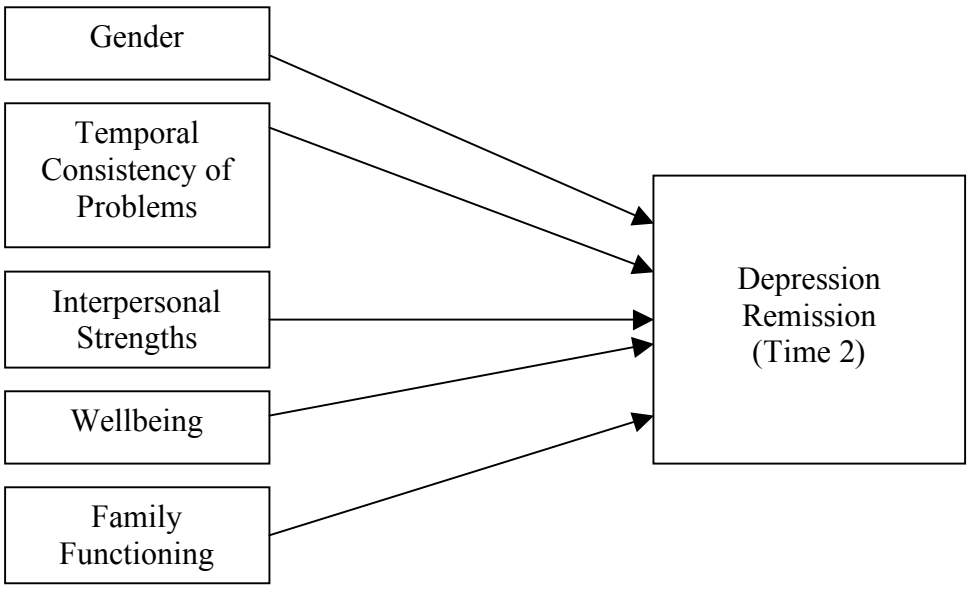
3. Depression:

   a. Individual: Individual factors will predict remission from depression.

i. Of those variables, male gender, low temporal consistency of problems, high interpersonal strengths and high wellbeing will significantly predict remission for youth with depression.

b. Family: Family factors will predict remission from depression.

i. Of those variables, positive family functioning will significantly predict remission for youth with depression.



4. Antisocial behavior:

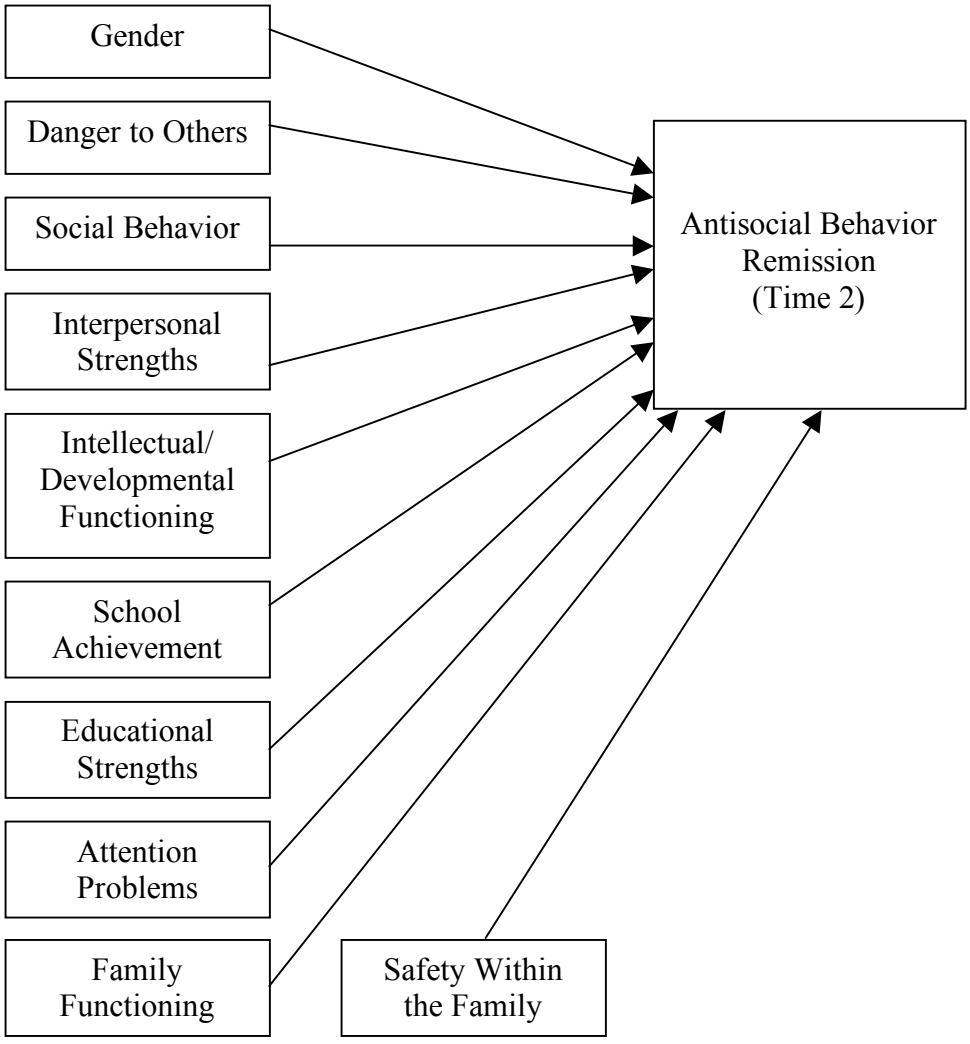
a. Individual: Individual factors will predict remission from antisocial behavior.

i. Of those variables, female gender, low danger to others, positive social behavior, high interpersonal strengths, high intellectual/developmental functioning, high school achievement, high educational strengths, and low attention problems will

significantly predict remission for youth exhibiting antisocial behavior.

b. Family: Family factors will predict remission from antisocial behavior.

i. Of those variables, positive family functioning and high safety within the family will significantly predict remission for youth with antisocial behavior.



5. Overall, service provider and severity of problem behavior will significantly predict clinical outcomes for youth in all four groups.

CHAPTER IV

METHOD

Participants

The subsample used for this study consists of 563 children and adolescents referred to community-based SOC treatment through DCFS between September 1999 and December 2004. The participants included in this study were taken from a larger overall sample of 3950 youth involved in the DCFS SOC program during the time the data was collected. Those youth included in this study completed the assessment measure at three or more time-points from the same agency over the course of their time in SOC treatment. The participants received treatment from 26 different service agencies.

Demographically the subgroup used for this study did not significantly differ from the overall sample. The gender breakdown of the overall sample is 45% female and 55% male. At initial consent, the average age of the participants was 11.6 years old. Unfortunately, race/ethnicity information was only collected for 10% of the participants. Of these youth, the racial breakdown obtained from caseworker report is as follows: 71% African American, 21% European American, 4% Latio/a, 3% Asian American. DCFS SOC workers assessed for DSM diagnosis at each evaluation. Diagnosis decisions typically resulted from the SOC worker's evaluation as well as additional information obtained from consulting the Child and Family Team, consisting of important active figures from the youth's life. Adjustment disorder, ODD, and ADHD were most

commonly reported in the overall sample (see Table 2 for the complete breakdown of initial diagnoses).

Materials

Youth outcomes were evaluated using the Child and Adolescent Needs and Strengths (CANS; Lyons, 1999). This assessment tool was developed to guide service delivery for children with emotional and behavioral healthcare needs. The CANS instrument assesses the needs and strengths of a child or adolescent across multiple domains and is used as an assessment, decision-support and outcome measure instrument (State of Illinois DCFS, 2009). In order to become a certified CANS rater, staff must achieve a reliability of 85% rating accuracy on a practice clinical vignette. This has translated into acceptable reliability statistics (see below) that remain stable over time in subsequent chart audits.

The CANS divides its 44 dimension across 6 factors: symptoms, risk factors, functioning, care intensity and organization, placement/system factors/caregiver needs and strengths, and child strengths (see Table 3). Severity ratings are reported along a four-point Likert scale, from 0 to 3. Across all dimensions, a score of 0 indicates no evidence or reason to believe that the rated item requires any action, a 1 indicates a need for watchful waiting, monitoring or possibly preventative action, a 2 indicates a need for action and the implementation of some strategy to address the problem or need, and a 3 indicates a need for immediate or intensive action and specifies an immediate safety concern or a priority for investigation. The CANS manual provides a detailed description of what each numerical rating constitutes for the specific dimension items (see Appendix 1).

Table 2

Initial Diagnosis of clients in overall sample

Diagnosis	Cases	% of Total
Mental Retardation	15	.4
Learning Disorders	22	.6
Childhood Attachment Disorder	24	.6
Pervasive Developmental Disorders (PDD)		
Autism	7	.2
Rett's Disorder	10	.3
PDD Not Otherwise Specified	1	.0
Attention-Deficit and Disruptive Disorders		
AD/HD	374	9.5
Disruptive Behavior Disorder	44	1.1
Conduct Disorder	99	2.5
Oppositional Defiant Disorder	287	7.3
Pica	2	.1
Tourette's Disorder	1	.0
Encopresis/Enuresis	7	.2
Substance Related Disorders	12	.3
Psychotic Disorders		
Schizoaffective Disorder	3	.1
Psychotic Disorder NOS	7	.2

Table 2 (cont.)

Initial diagnosis of clients in overall sample

Diagnosis	Cases	% of Total
Mood Disorders		
Major Depression	76	1.9
Dysthymic Disorder	127	3.2
Depressive Disorder NOS	99	2.5
Bipolar Disorder	75	1.9
Mood Disorder NOS	10	.3
Anxiety Disorders		
Social Phobia	1	.0
OCD	2	.1
PTSD	157	4.0
Generalized Anxiety Disorder	11	.3
Anxiety Disorder NOS	12	.3
Dissociative Disorder	1	.0
Sexual Masochism	1	.0
Fetishism	1	.0
Bulimia	1	.0

Table 2 (cont.)

Initial diagnosis of clients in overall sample

Diagnosis	Cases	% of Total
Impulse Control Disorders		
Intermittent Explosive Disorder	12	.3
Pathological Gambling	1	.0
Impulse Control Disorder NOS	6	.2
Adjustment Disorders	525	13.3
Relational Problems	45	1.1
*Neglect or Abuse of Child	91	2.3
Borderline Intellectual Functioning	28	.7
Bereavement	4	.1
Academic Problems	17	.4
Identity Problems	2	.1
Not reported, diagnosis deferred, or no diagnosis assigned	1,735	43.9
N = Total	3,955	

* - includes physical and sexual abuse

Table 3

Alpha levels for CANS factor scores

	Alpha	*Number of Items*
Problem Behavior	.79	10
Risk Factors	.61	6
Functioning	.35	7
Care Intensity & Organization	.49	4
Placement Factors	.81	8
Strengths	.84	9

The CANS has consistently been shown to be a reliable and valid assessment tool (Anderson, Lyons, Giles, Price, & Estle, 2003; Lyons, 1999). The CANS ratings reliably correlate with clinical vignettes as the source of ratings (kappa=0.74), with case records and current cases as the course of ratings (kappa=0.85) and with individual items (kappa=0.73) (Lyons, 2004). The CANS is significantly correlated with an independently assessed Child and Adolescent Functional Assessment Scale (CAFAS), with the CANS factor significantly correlated with an independent measure of burden from the CAFAS, providing evidence for its use as an assessment tool (Hodges, Kline, Stern, Cytryn, & McKnew, 1982; Rautkis & Hdalio, 2001). As a decision-support tool, the CANS has been found to show excellent clinical judgment. In a comparison study evaluating the clinical judgment ability of the CANS against professionals in Multnomah County, OR, the CANS informed level-of-care criteria agreed with the expert panel decision 91% of the time (Lyons, 2004). It has also been found to distinguish the needs of children in rural and urban settings (Anderson et al., 2003). Shown to be sensitive to change, the CANS is a useful outcome measurement instrument.

Procedure

During the course of data collection (September 1999 to December 2004), 3950 children and adolescents were served by the DCFS SOC system. Clients included in this study were required to have completed the outcome assessment tool at least three times over the course of this time period. According to the DCFS protocol the CANS is completed by the DCFS SOC worker and the youth's Child and Family Team when the client is accepted into the program and when the client is discharged from the program (State of Illinois DCFS, 2009). The CANS is also given at regular intervals throughout

each client's placement, every six months of receiving SOC services, and after the Individual Plan of Care (IPC) for the client is updated or renewed. It is expected that all Illinois DCFS SOC staff be competent in administering the CANS. A CANS training course is offered by Northwester University. Each SOC service provider is expected to send at least one staff member to receive training to become a CANS Certified Trainer. The remaining SOC staff is then trained by the CANS Certified Trainer in how to administer the CANS.

Of the overall sample of 3950, 989 youth met the first inclusion criteria; however, not all of these clients met the remaining criteria to be included in this study. In 157 client cases (15.9%), services were received at multiple agencies and the outcome measure was not administered at least three times at one agency. These clients were excluded from the current study as to maintain the agency provider as an independent variable. Multiple treatment episodes were reported in 100 clients (10.1%). Although these youth received services from only one agency and completed the outcome measure at least three times, they did not have at least three data points within a single treatment episode. These clients were excluded from the current study so that each treatment episode could be analyzed independently. In 96 client cases (9.7), treatment was either received from multiple provider agencies or the youth experienced more than one treatment episodes. In these cases the outcome measure was completed at least three times at one of the agencies from which they received treatment or during one of their treatment episodes, therefore, the data collected during these single episodes at a single agency could be used for this study. Nine clients (.9%) received treatment from multiple agencies or had multiple treatment episodes and had data collected three or more times

from each agency or episode. In these cases, a coin flip determined which set of data was analyzed for the present study.

Statistical procedure

In order to create a prediction model for recovery from mental illness for youth in foster care, ODA will be used (Soltysik & Yarnold, 1993; Yarnold & Soltysik, 2005). ODA is an exploratory, non-parametric data analysis method that maximizes the accuracy of the model created from the data sample. For the present study, the selection of the best predictors of foster care youth's recovery from mental illness will be conducted with the aid of ODA software for Windows. All individual CANS variables will be entered into the analyses. Additionally, difference scores will also be computed by subtracting Time 1 CANS scores from the CANS scores from the final time point available and entered into the analyses to account for change in each individual variable over time in treatment. Youth exhibiting clinically significant symptoms (i.e. a score of a 2 or 3 on the specific CANS problem behavior item) at admission to SOC treatment will be the sample used for each ODA analysis. The ODA analyses will reveal those factors that significantly predict "remission" of the problem behavior (i.e. a score of a 0 or 1 on the particular CANS problem behavior item at discharge) and those that predict "no improvement" of symptoms (i.e. a score of a 2 or 3 on the particular CANS problem behavior item at discharge). Four analyses will be run in total, one for each of the problem behaviors reviewed, in an effort to identify specific prediction pathways for subgroups of youth within the foster care system.

ODA's method of statistical analysis is best suited for the current study. The approach to the testing of multivariate interactions used by ODA allows for an unlimited

number of variables to be tested to fit into the optimal predictive model. Traditional analyses, such ANOVA and regression, require the selection of specific predictors to be tested in a pre-described model. ODA permits the inclusion of an unlimited number of possible predictors without the specification of hypothetical interactions. Although some researchers argue that only those variables with supporting evidence in the literature should be included in the model of analysis, the techniques used by ODA are able to accommodate an unlimited number of variables without increasing the chance of error (Yarnold & Soltysik, 2005). By not placing restrictions on those variables included in the model, ODA allows variables not previously explored to be examined for involvement in mental health outcomes for youth in foster care. Additionally, ODA allows for the creation of subgroups within the context of the model, rather than each variable needing to have a predictive effect for the entire group, as is the case in traditional models. For example, gender may moderate the effect of IQ on the remission of antisocial behavior in youth in foster care. The methodology of ODA allows for the creation of a model that identifies the strongest predictors for each subgroup of the sample (Yarnold & Soltysik, 2005).

ODA techniques allow for the identification of both main effects and interactions. Main effects will be tested using univariate ODA (UniODA; Yarnold & Soltysik, 2005). First, UniODA will be performed for each variable of the CANS, revealing which variables significantly predict remission of mental illness in foster care children. After identifying those variables with a significant main effect, a Classification Tree Analysis (CTA) will be created to provide information about other variables that interact with the variables with significant main effects in predicting remission of psychopathology.

The optimal predictors, those variables with the greatest effect strength, will be selected for the CTA. ODA analyses will provide a decision rule that divides the sample into subgroups. Once the sample has been partitioned, ODA will again be performed with all of the original variables, but this time only for those members of the particular subgroup. For example, if gender is determined to be the optimal predictor for remission of antisocial behavior in youth in foster care, the second ODA selects one group, males or females, and determines the greatest main effect for that subgroup, further dividing the original sample. This process continues, forming "branches" of the CTA, until the sample can no longer be subdivided (Yarnold & Soltysik, 2005). ODA will then be conducted on each branch of the ODA tree until it cannot be partitioned further. Significance will be determined using the Dunn and Sidak adjusted per-comparison *p* values (Yarnold & Sotysik, 2004) for an experiment-wise alpha of 0.05. This procedure determines the adjusted Type I error rate according to the number of contrasts conducted in the multivariate classification trees.

CHAPTER V

RESULTS

Descriptive statistics

Descriptive statistics were computed for the overall sample used in the analyses, collapsed across problem behaviors sub-groups (see Table 4). Overall, 390 individual youth were included in the analyses. Youth ranged from 2 to 20 years old, with a mean age of 11.4 years (*SD*=3.97), and males comprised slightly more of the sample than females (55.4%). Services were received from 21 distinct agencies, with treatment periods averaging 299 days (*SD*=119.06).

The descriptive statistics for the CANS composite scales (problem presentation, risk behavior, care intensity and organization, caregiver needs and strengths, and youth strengths) suggest that this sample's needs and strengths are consistent with other samples of child welfare youth being served in community settings (Lyons, 2004). However, the individual CANS items comprising the various composite scales varied in their rated severity. For example, examining items from the problem presentation scale (Table 4), adjustment to trauma (*M*=1.55, *SD*=0.81), oppositional behavior (*M*=1.48, *SD*=0.78), and temporal consistency of problems (*M*=1.62, *SD*=0.94) were the highest rated items, with average scores nearing the moderate range of impairment across youth (i.e., a "2" rating on the CANS item). This result is intuitive given that this sample was a higher-risk group

Table 4

Descriptive statistics across variables used in Optimal Data Analysis

Variable	*N*	Mean (*SD*)	Min/Max
Demographics			
Age	388	11.44 (*3.97*)	2/20
Gender (male)	216		
Gender (female)	174		
Non-clinical			
Agency	21		
Treatment days	362	299.22 (*119.06*)	6/799
Problem Presentation			
Psychosis (T1)	389	0.25 (*0.57*)	0/3
Psychosis (Difference)	387	0.04 (*0.49*)	-3/2
Attention problems (T1)	390	1.42 (*0.86*)	0/3
Attention problems (Difference)	389	0.16 (*0.67*)	-2/3
Depression (T1)	390	1.56 (*0.74*)	0/3
Depression (Difference)	389	0.23 (*0.72*)	-2/3
Oppositional behavior (T1)	387	1.48 (*0.78*)	0/3
Oppositional behavior (Difference)	386	0.24 (*0.82*)	-3/3
Antisocial behavior (T1)	389	0.81 (*0.79*)	0/3
Antisocial behavior (Difference)	388	0.16(*0.71*)	-3/2
Substance abuse (T1)	387	0.27 (*0.62*)	0/3
Substance abuse (Difference)	384	-0.02 (*0.49*)	-3/3
Adjustment to trauma (T1)	389	1.55 (*0.81*)	0/3
Adjustment to trauma (Difference)	388	0.29 (*0.73*)	-2/3
Attachment (T1)	324	1.09 (*0.76*)	0/3
Attachment (Difference)	311	0.18 (*0.73*)	-3/3
Situational consistency of problems (TI)	381	1.41 (*0.81*)	0/3
Situational consistency of problems (Difference)	377	0.21 (*0.80*)	-3/3
Temporal consistency of problems (T1)	377	1.62 (*0.94*)	0/3
Temporal consistency of problems (Difference)	371	0.15 (*0.81*)	-3/3
Risk Behaviors			
Danger to self (T1)	388	0.39 (*0.63*)	0/3
Danger to self (Difference)	386	0.00 (*0.62*)	-3/3
Danger to others (T1)	390	1.02 (*0.86*)	0/3

Table 4 (cont.)

Descriptive statistics across variables used in Optimal Data Analysis

Variable	*N*	Mean (*SD*)	Min/Max
Risk Behaviors (cont.)			
Elopement (T1)	389	0.43 (*0.75*)	0/3
Elopement (Difference)	388	0.02 (*0.80*)	-3/3
Sexually abusive behavior (T1)	386	0.32 (*0.65*)	0/3
Sexually abusive behavior (Difference)	383	0.07 (*0.58*)	-3/3
Social behavior (T1)	388	0.96 (*0.83*)	0/3
Social behavior (Difference)	386	0.14 (*0.77*)	-3/3
Crime/delinquency (T1)	385	0.43 (*0.71*)	0/3
Crime/delinquency (Difference)	384	0.01 (*0.62*)	-3/2
Functioning			
Intellectual (T1)	384	0.48 (*0.66*)	0/3
Intellectual (Difference)	382	-0.01 (*0.49*)	-2/2
Physical (T1)	386	0.32 (*0.65*)	0/3
Physical (Difference)	383	0.03 (*0.55*)	-3/3
Family (T1)	386	1.66 (*0.95*)	0/3
Family (Difference)	384	0.17 (*0.88*)	-3/3
School (T1)	381	1.46 (*0.93*)	0/3
School (Difference)	375	0.22 (*0.94*)	-2/3
Sexual development (T1)	388	0.48 (*0.73*)	0/3
Sexual development (Difference)	385	0.06 (*0.66*)	-3/2
Care intensity and organization			
Monitoring (T1)	390	0.87 (*0.84*)	0/3
Monitoring (Difference)	389	0.09 (*0.73*)	-3/3
Treatment (T1)	390	1.23 (*0.87*)	0/3
Treatment (Difference)	388	0.08 (*0.86*)	-3/3
Transportation (T1)	388	0.59 (*0.64*)	0/3
Transportation (Difference)	386	0.05 (*0.61*)	-3/2
Service permanence (T1)	390	1.23 (*1.04*)	0/3
Service permanence (Difference)	388	0.13 (*1.00*)	-3/3
Caregiver needs and strengths			
Behavioral health (T1)	385	0.28 (*0.55*)	0/3
Behavioral health (Difference)	370	-0.02 (*0.54*)	-3/2
Supervision (T1)	384	0.33 (*0.62*)	0/3
Supervision (Difference)	369	-0.07 (*0.65*)	-2/2

Table 4 (cont.)

Descriptive statistics across variables used in Optimal Data Analysis

Variable	*N*	Mean (*SD*)	Min/Max
Caregiver needs and strengths (cont.)			
Involvement with care (T1)	384	0.53 (*0.65*)	0/3
Involvement with care (Difference)	369	-0.02 (*0.72*)	-3/2
Knowledge (T1)	383	0.77 (*0.73*)	0/3
Knowledge (Difference)	368	0.11 (*0.75*)	-3/2
Organization (T1)	383	0.30 (*0.56*)	0/3
Organization (Difference)	367	-0.07 (*0.63*)	-2/2
Resources (T1)	383	0.68 (*0.76*)	0/3
Resources (Difference)	369	0.12 (*0.74*)	-2/3
Residential stability (T1)	383	0.13 (*0.37*)	0/3
Residential stability (Difference)	369	-0.03 (*0.43*)	-3/2
Safety (T1)	384	0.26 (*0.52*)	0/3
Safety (Difference)	369	0.01 (*0.56*)	-2/2
Strengths			
Family (T1)	387	1.36 (*0.88*)	0/3
Family (Difference)	384	0.09 (*0.76*)	-2/3
Interpersonal (T1)	388	1.27 (*0.78*)	0/3
Interpersonal (Difference)	388	0.14 (*0.77*)	-3/2
Relationship permanence (T1)	389	1.56 (*0.82*)	0/3
Relationship permanence (Difference)	389	0.22 (*0.77*)	-2/3
Educational (T1)	379	1.22 (*0.85*)	0/3
Educational (Difference)	375	0.16 (*0.82*)	-3/3
Vocational (T1)	218	1.57 (*0.98*)	0/3
Vocational (Difference)	191	0.23 (*0.81*)	-3/3
Wellbeing (T1)	388	1.67 (*0.65*)	0/3
Wellbeing (Difference)	384	0.24 (*0.77*)	-2/3
Spiritual/Religious (T1)	353	1.09 (*0.94*)	0/3
Spiritual/Religious (Difference)	340	0.11 (*0.75*)	-2/3
Talents/Interests (T1)	378	1.31 (*0.85*)	0/3
Talents/Interests (Difference)	374	0.19 (*0.74*)	-2/3
Inclusion (T1)	380	1.31 (*0.85*)	0/3
Inclusion (Difference)	375	0.23 (*0.77*)	-2/3

Table 4 (cont.)

Descriptive statistics across variables used in Optimal Data Analysis

Variable	*N*	Mean (*SD*)	Min/Max
Composite variables			
Problem presentation (excludes consistency variables)	388	8.12 (*2.80*)	1/18
Risk behaviors	389	3.51 (*2.26*)	0/13

Note. Time 1 assessments were conducted within 30 days of admission into the System of Care. Difference scores were computed by taking the difference between Time 1 scores and the last data point available, either at termination or the last available point prior to the end of data collection.

of youth in the child welfare system, where PTSD and externalizing behavior are likely to be prevalent and symptoms have been present for a relatively longer period of time.

Regarding risk behaviors, danger to others (*M*=1.02, *SD*=0.86) and social behavior deficits (*M*=0.96, *SD*=0.83) were, on average, the items rated highest across the sample of youth, although both items reached the low end of mild impairment. These findings are consistent with a population of foster care youth with complex needs and predominately externalizing symptoms (Lyons, 2004). In terms of functioning challenges, family (*M*=1.66, *SD*=0.95) and school (*M*=1.46, *SD*=0.93) deficits had the highest mean ratings across the sample. Again, this is consistent with a sample of youth who were referred because they were at-risk of stepping up to higher levels of care. Family and school are environmental contexts and deficits in these domains are among the most common reasons youth are referred to residential placements (Stroul & Friedman, 1994).

Regarding youth strengths, means were highest across the sample for impairment in relationship permanence (*M*=1.56, *SD*=0.82), vocation (*M*=1.57, *SD*=0.98), and wellbeing (*M*=1.67, *SD*=0.65). Relationship permanence deficits are an intuitive result of being a part of the foster care system, as children are often subject to not only removal from their biological parents, but also multiple foster home placements. In terms of the higher levels of vocational strengths deficits, this sample had a mean age of approximately 11 years, so it is unlikely that these youth would have vocational strengths.

ODA results

The next sections describe the univariate ODA (uniODA) and multivariate classification tree results. As described in the method section, uniODA analyses were used to determine the optimal predictors of remission from the four indicated problem behaviors. Table 5 reports the results of hypothesis testing according to the findings of the uniODA analyses. The identified optimal predictors established subgroups of youth predicted to remit and those not predicted to remit. Multivariate classification trees were created, first for the remittance group and then for the no remittance group, by using uniODA analyses for subsequent predictor variables, controlling for the optimal predictor, until variables no longer significantly predicted remission. Many variables emerged as having a high classification strategy, both in the initial uniODA and subsequent analyses, however, a strategy was developed where all possible classification trees were created and that with the best overall classification accuracy was retained.

Figures 1-4 depict the final ODA classification tree model for the four outcome groups. Each rectangle signifies a decision point and arrows represent pathways of prediction. P values for each decision point are listed within the rectangles to show significance. The fractions and percentages included within the rectangles represent the number of correctly predicted individuals of the total number included in that category at that particular endpoint. The numbers listed next to the prediction pathway arrows specify the cutoff values for designation into classification categories.

Dunn and Sidak adjusted per-comparison *p* adjustments (Yarnold & Soltysik, 2004) were used to decrease Type I error. Those decision points that met the Dunn and

Table 5

Support for hypotheses

Hypothesis	Supported
Psychosis	
Gender	No
Intellectual/developmental functioning	No
Social behavior*	
Interpersonal strengths	No
Educational strengths	No
Family functioning	No
Family strengths	No
Attention problems	
Gender	No
Temporal consistency of problems*	
Danger to others*	
Antisocial behavior	No
Interpersonal strengths	Partial
Intellectual/developmental functioning*	
Caregiver knowledge	Partial
Caregiver involvement	No
Family organization	Partial
Depression	
Gender*	
Temporal consistency of problems	Partial
Interpersonal strengths	No
Well-being	No
Family functioning	No
Antisocial behavior	
Gender	No
Danger to others*	
Social behavior*	
Interpersonal strengths	No
Intellectual/developmental functioning	No
School functioning	Partial
Educational strengths	No

Table 5 (cont.)

Support for hypotheses

Hypothesis	Supported
Antisocial behavior (cont.)	
Attention problems*	
Family functioning	Partial
Safety within the family	No

Note. A p-value of 0.01 or below was chosen to determine the significance of hypotheses. A p-value of less than 0.05 was chosen to indicate partial support of hypotheses. Variables denoted with an asterisk are not LOO stable and, therefore, were not eligible to be entered into the overall classification tree model and support for the hypothesis cannot be determined.

Sidak criteria, as well as those that trended toward significance were included. Those factors that neared significance but did not meet the criteria are shaded in gray.

Psychosis. As the uniOda analyses demonstrate (Table 6) non-clinical variables such as age, gender, and treating agency were not significant predictors of remission from psychosis. Examining the clinical variables and strengths entered in the model, only difference scores emerged as significant predictors in the uniODA analyses. Specifically, changes in variables within the problem presentation (e.g., depression and adjustment to trauma) and strengths (e.g., interpersonal strengths and inclusion) domains were the strongest predictors. However, change in adjustment to trauma score from Time 1 to termination (or the last data point collected) was found to be the single best variable in predicting remission from clinically significant psychosis in the uniODA analyses. Youth with no change or negative change in their adjustment to trauma score (difference less than 1) were more likely *not* to experience remission while youth who experienced a positive change in adjustment to trauma (difference of 1, 2, or 3) were significantly more likely to demonstrate remission from psychosis on the CANS.

As a result of being the best predictor in the overall uniOda analysis, adjustment to trauma entered the multivariate analysis first and is at the top of the tree (see Figure 1). According to the procedure for creating a multivariate ODA tree, the newly created subsamples of youth who had an adjustment to trauma difference score of "1", "2", or "3" (predicted remission group) versus youth with scores less than "1" can be submitted to new UniOda analyses to determine the additional variables that further classify the sample. However, for the sample of youth who were predicted to remit (adjustment to trauma difference score of "1" or higher), it was not necessary to conduct further analyses

Table 6

UniODA results for psychosis group

Variable	Remit	No remit	Overall classification accuracy	Effect Strength	Sensitivity (Remit)	Sensitivity (No remit)	Specificity (Remit)	Specificity (No remit)	*p*-value
Sex	Male	Female	66.67%	33.03%	66.67%	66.67%	72.73%	60.00%	0.142
Age (T1)*	≤12.5	>12.5	66.67%	36.11%	58.33%	77.78%	77.78%	58.33%	0.799
Agency*	4201, 4203, 3900	400, 2700, 3000, 3501, 4200	66.67%	40.87%	50.00%	88.89%	85.71%	57.14%	0.929
Psychosis (T1)*	>2.5	≤2.5	47.62%	8.33%	16.67%	88.89%	66.67%	44.44%	0.258
Attention problems (T1)*	>1.5	≤1.5	61.90%	22.22%	66.67%	55.56%	66.67%	55.56%	0.425
Depression (T1)*	≤1.5	>1.5	57.14%	16.67%	50.00%	66.67%	66.67%	50.00%	0.017
Oppositional behavior (T1)	>1.5	≤1.5	66.67%	36.11%	58.33%	77.78%	77.78%	58.33%	0.113
Antisocial behavior (T1)*	≤1.5	>1.5	57.14%	7.19%	83.33%	22.22%	58.82%	50.00%	1.000
Substance abuse (T1)	≤0.5	>0.5	66.67%	42.69%	100.00%	22.22%	63.16%	100.00%	0.171
Adjustment to trauma (T1)*	>1.5	≤1.5	60.00%	19.19%	63.64%	55.56%	63.64%	55.56%	0.898
Attachment (Ti1)*	≤0.5	>0.5	56.25%	16.51%	25.00%	87.50%	66.67%	53.85%	0.941
Situational consistency of problems (T1)*	≤0.5	>0.5	52.38%	32.02%	16.67%	100.00%	100.00%	47.37%	0.991

Table 6 (cont.)

UniODA results for psychosis group

Temporal consistency of problems (T1)*	≤1.5	>1.5	47.37%	12.86%	25.00%	85.71%	75.00%	40.00%	1.000
Danger to self (T1)*	≤0.5	>0.5	57.14%	16.67%	50.00%	66.67%	66.67%	50.00%	0.575
Danger to others (T1)*	≤1.5	>1.5	57.14%	11.32%	66.67%	44.44%	61.54%	50.00%	1.000
Elopement (T1)*	>0.5	≤0.5	52.38%	8.49%	41.67%	66.67%	62.50%	46.15%	1.000
Sexually abusive behavior (T1)	≤0.5	>0.5	61.90%	22.22%	66.67%	55.56%	66.67%	55.56%	0.284
Social behavior (T1)*	>1.5	≤1.5	50.00%	4.17%	41.67%	62.50%	62.50%	41.67%	1.000
Monitoring (T1)*	≤0.5	>0.5	52.38%	8.49%	41.67%	66.67%	62.50%	46.15%	0.984
Treatment (T1)	≤0.5	>0.5	57.14%	37.50%	25.00%	100.00%	100.00%	50.00%	0.165
Transportation (T1)	>0.5	≤0.5	61.90%	20.44%	75.00%	44.44%	64.29%	57.14%	0.319
Service Permanence (T1)	>0.5	≤0.5	66.67%	30.56%	83.33%	44.44%	66.67%	66.67%	0.183
Behavioral health (T1)*	≤0.5	>0.5	57.14%	7.19%	83.33%	22.22%	58.82%	50.00%	1.000
Supervision (T1)	>0.5	≤0.5	61.90%	33.61%	41.67%	88.89%	83.33%	53.33%	0.148
Involvement with care (T1)*	≤0.5	>0.5	61.90%	20.44%	75.00%	44.44%	64.29%	57.14%	0.523
Knowledge (T1)*	>0.5	≤0.5	61.90%	22.22%	66.67%	55.56%	66.67%	55.56%	0.425
Organization (T1)*	≤0.5	>0.5	57.14%	7.19%	83.33%	22.22%	58.82%	50.00%	1.000
Resources (T1)*	≤1.5	>1.5	61.90%	20.83%	91.67%	22.22%	61.11%	66.67%	1.000
Residential stability (T1)*	>0.5	≤0.5	50.00%	10.40%	18.18%	88.89%	66.67%	47.06%	1.000
Safety (T1)*	>0.5	≤0.5	47.62%	8.33%	16.67%	88.89%	66.67%	44.44%	1.000

Table 6 (cont.)

UniODA results for psychosis group

Family strengths (T1)*	>2.5	≤2.5	52.38%	32.02%	16.67%	100.00%	100.00%	47.37%	0.963
Interpersonal strengths (T1)	>1.5	≤1.5	65.00%	25.69%	75.00%	50.00%	69.23%	57.14%	0.251
Relationship permanence (T1)*	>2.5	≤2.5	47.62%	26.67%	8.33%	100.00%	100.00%	45.00%	1.000
Educational strengths (T1)	≤1.5	>1.5	57.14%	11.32%	66.67%	44.44%	61.54%	50.00%	0.472
Vocational strengths (T1)*	>2.5	≤2.5	60.00%	26.38%	37.50%	85.71%	75.00%	54.55%	1.000
Wellbeing (T1)*	≤2.5	>2.5	57.14%	9.17%	75.00%	33.33%	60.00%	50.00%	1.000
Spiritual strengths (T1)	≤0.5	>0.5	55.00%	34.09%	18.18%	100.00%	100.00%	50.00%	0.289
Talents (T1)	≤1.5	>1.5	52.38%	12.22%	33.33%	77.78%	66.67%	46.67%	0.477
Inclusion (T1)*	≤2.5	>2.5	61.90%	20.83%	91.67%	22.22%	61.11%	66.67%	1.000
Composite problem score*	≤8.5	>8.5	61.90%	33.61%	41.67%	88.89%	83.33%	53.33%	0.528
Composite risk score	≤2.0	>2.0	52.38%	32.02%	16.67%	100.00%	100.00%	47.37%	0.314
Composite functioning score*	≤1.5	>1.5	47.62%	26.67%	8.33%	100.00%	100.00%	45.00%	1.000
Composite care intensity and organization score*	>6.5	≤6.5	57.14%	26.11%	33.33%	88.89%	80.00%	50.00%	1.000
Composite caregiver needs and strengths score*	≤2.5	>2.5	61.90%	22.22%	66.67%	55.56%	66.67%	55.56%	0.0159

Table 6 (cont.)

UniODA results for psychosis group

Composite strengths deficits score	≤16.5	>16.5	70.00%	39.39%	72.73%	66.67%	72.73%	66.67%	0.095
Psychosis (Diff)	>0.5	≤0.5	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	<0.001
Attention problems (Diff)*	>0.5	≤0.5	57.14%	20.44%	41.67%	77.78%	71.43%	50.00%	1.000
Depression (Diff)	>0.5	≤0.5	71.43%	55.00%	50.00%	100.00%	100.00%	60.00%	0.017
Oppositional behavior (Diff)*	>0.5	≤0.5	61.90%	33.61%	41.67%	88.89%	83.33%	53.33%	0.414
Antisocial behavior (Diff)	>0.5	≤0.5	66.67%	40.87%	50.00%	88.89%	85.71%	57.14%	0.078
Adjustment to trauma (Diff)	>0.5	≤0.5	75.00%	53.35%	63.64%	88.89%	87.50%	66.67%	0.025
Attachment (Diff)*	>1.5	≤1.5	62.50%	41.07%	25.00%	100.00%	100.00%	57.14%	1.000
Situational consistency of problems (Diff)*	>0.5	≤0.5	55.00%	17.12%	41.67%	75.00%	71.43%	46.15%	0.847
Temporal consistency of problems (Diff)*	>0.5	≤0.5	66.67%	50.00%	50.00%	100.00%	100.00%	50.00%	0.162
Danger to self (Diff)	>0.5	≤0.5	61.90%	33.61%	41.67%	88.89%	83.33%	53.33%	0.148
Elopement (Diff)*	>0.5	≤0.5	52.38%	17.97%	25.00%	88.89%	75.00%	47.06%	0.429
Sexually abusive behavior (Diff)*	>0.5	≤0.5	52.38%	32.02%	16.67%	100.00%	100.00%	47.37%	1.000
Social behavior (Diff)	>0.5	≤0.5	70.00%	45.83%	58.33%	87.50%	87.50%	58.33%	0.054
Crime/Delinquency (Diff)	>0.5	≤0.5	57.14%	37.50%	25.00%	100.00%	100.00%	50.00%	0.165

Table 6 (cont.)

UniODA results for psychosis group

Intellectual functioning (Diff)	≤-0.5	>0.5	57.14%	37.50%	25.00%	100.00%	100.00%	50.00%	0.165
Physical functioning (Diff)*	>0.5	≤0.5	52.38%	32.02%	16.67%	100.00%	100.00%	47.37%	1.000
Family functioning (Diff)	>1.5	≤1.5	57.14%	37.50%	25.00%	100.00%	100.00%	50.00%	0.165
School functioning (Diff)*	>0.5	≤0.5	60.00%	25.00%	50.00%	75.00%	75.00%	50.00%	1.000
Sexual development (Diff)*	>0.5	≤0.5	52.38%	17.97%	25.00%	88.89%	75.00%	47.06%	1.000
Monitoring (Diff)*	>0.5	≤0.5	61.90%	33.61%	41.67%	88.89%	83.33%	53.33%	0.258
Treatment (Diff)*	>1.5	≤1.5	52.38%	17.97%	25.00%	88.89%	75.00%	47.06%	1.000
Transportation (Diff)	>0.5	≤0.5	61.90%	33.61%	41.67%	88.89%	83.33%	53.33%	0.148
Service Permanence (Diff)	>0.5	≤0.5	66.67%	48.96%	41.67%	100.00%	100.00%	56.25%	0.039
Behavioral health (Diff)*	≤-0.5	>-0.5	47.37%	26.77%	9.09%	100.00%	100.00%	44.44%	1.000
Supervision (Diff)*	>0.5	≤0.5	60.00%	41.67%	33.33%	100.00%	100.00%	50.00%	0.347
Involvement with care (Diff)*	>0.5	≤0.5	55.00%	36.03%	25.00%	100.00%	100.00%	47.06%	1.000
Knowledge (Diff)*	>0.5	≤0.5	55.00%	23.75%	33.33%	87.50%	80.00%	46.67%	1.000
Organization (Diff)*	>-1.5	≤-1.5	65.00%	37.83%	100.00%	12.50%	63.16%	100.00%	0.898
Resources (Diff)*	≤2.0	>2.0	65.00%	37.83%	100.00%	12.50%	63.16%	100.00%	1.000
Residential stability (Diff)	≤-0.5	>-0.5	47.37%	26.77%	9.09%	100.00%	100.00%	44.44%	0.579

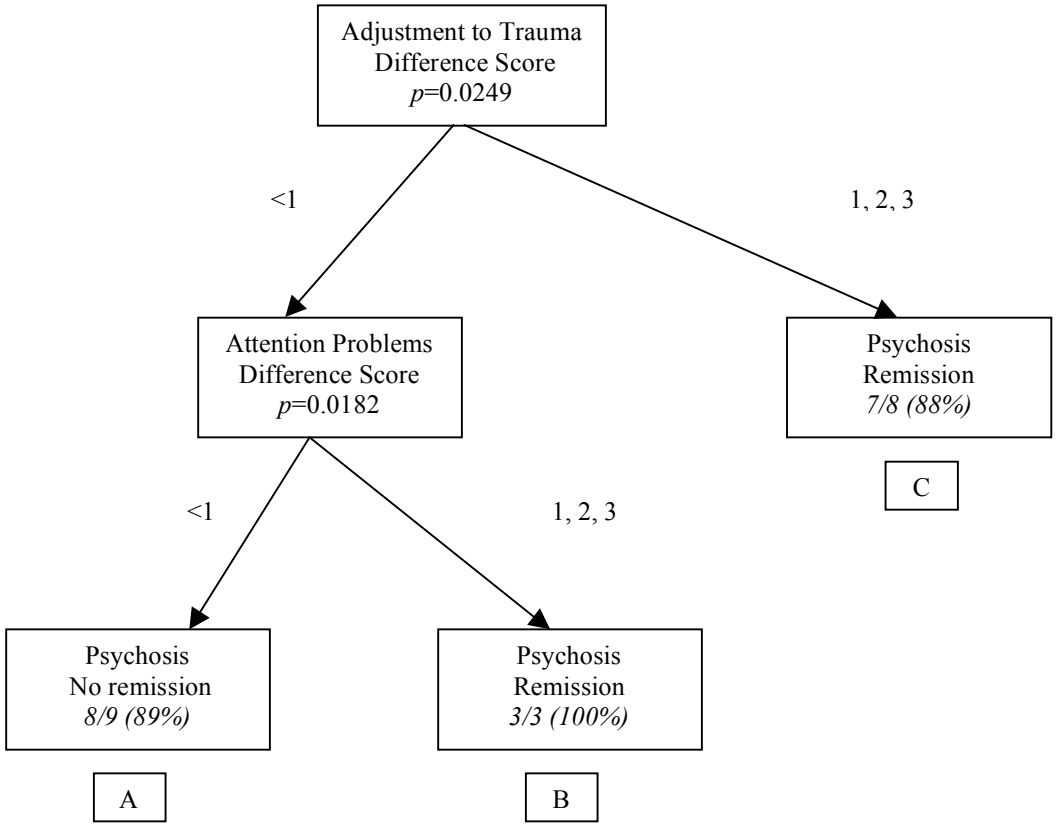
Table 6 (cont.)

UniODA results for psychosis group

Safety (Diff)*	>0.5	≤0.5	50.00%	30.56%	16.67%	100.00%	100.00%	44.44%	1.000
Family strengths (Diff)	>0.5	≤0.5	61.90%	43.14%	33.33%	100.00%	100.00%	52.94%	0.083
Interpersonal strengths (Diff)	>0.5	≤0.5	75.00%	53.35%	66.67%	87.50%	88.89%	63.64	0.025
Relationship permanence (Diff)	>0.5	≤0.5	61.90%	28.31%	50.00%	77.78%	75.00%	53.85%	0.201
Educational strengths (Diff)*	≤-0.5	>-0.5	57.14%	37.50%	25.00%	100.00%	100.00%	50.00%	0.647
Vocational strengths (Diff)*	>0.5	≤0.5	64.29%	31.79%	42.86%	85.71%	75.00%	60.00%	0.500
Wellbeing (Diff)*	>0.5	≤0.5	65.00%	37.41%	45.45%	88.89%	83.33%	57.14%	0.221
Spiritual strengths (Diff)*	≤-0.5	>-0.5	57.89%	36.47%	20.00%	100.00%	100.00%	52.94%	1.000
Talents (Diff)	>0.5	≤0.5	61.90%	28.31%	50.00%	77.78%	75.00%	53.85%	0.201
Inclusion (Diff)	>0.5	≤0.5	76.19%	52.30%	75.00%	77.78%	81.82%	70.00%	0.024
Treatment days*	>361	≤361	80.00%	66.43%	63.64%	100.00%	100.00%	69.23%	0.012

Note. Variables denoted with an asterisk are not LOO stable and, therefore, were not eligible to be entered into the overall classification tree model.

Figure 1. Predictors of outcome in a sample of youth with psychosis: Optimal Data Analysis (ODA) results



because this prediction was 100% accurate (i.e., all youth who had a score higher that "1" were in the remission group). The group C endpoint on the right side of the tree represents this finding.

Change in attention problems emerged as the best predictor of remission from psychosis for the subsample of youth who had adjustment to trauma difference scores of less than "1" (see the left side of the tree in Figure 1). Youth with a difference in attention problems of one or more points were predicted to be in the remission group and youth with difference scores of less than one were predicted to be in the non-remit group. For the sample of youth predicted to remit (i.e. those with an attention problems difference score of "1" or greater), further analyses were unnecessary because the prediction was 100% accurate (see node B on the left side of the tree). A final uniODA analysis was conducted with the subsample of you with difference scores on the attention problems item of less than one. The results revealed that none of the UniODA analyses were significant in further classifying this subsample. However, the classification accuracy (non-remit sensitivity) for this subsample was high; the results indicated that 89% of youth in this group were non-remitters (see node A).

Classification performance statistics were computed for the full CTA model of psychosis, as well as for the remission and no remission sub-groups (see Table 7). The overall model led to 90.0% accuracy, representing an almost 40% improvement over the base rate, which is 80% above chance. Yarnold and Soltysik (2005) consider an effect strength of this size "strong". The mean sensitivity was 89.9% for the full CTA model of psychosis, with a sensitivity of 90.0% for the remission group and 88.9% for those who

Table 7

Classification performance summary for the classification tree model of remission versus no remission from psychosis (N=20)

Performance Index	Performance Parameter	Effect Strength
Overall Classification Accuracy	18/20 (90.0%)	80.0%
Sensitivity (Remission)	10/11 (90.9%)	81.8%
Sensitivity (No Remission)	8/9 (88.9%)	77.8%
Mean Sensitivity Across Classes	89.9 %	79.8%
Specificity (Remission)	10/11 (90.9%)	81.8%
Specificity (No Remission)	8/9 (88.9%)	77.8%
Mean Specificity Across Classes	89.9%	79.8%
Mean Performance Across Classes	89.9%	79.8%

Overall cross-classification table

		Predicted Status	
		No Remission	Remission
Actual Status	No Remission	8	1
	Remission	1	10

Note. Overall classification accuracy is the percentage of the total sample that is correctly classified by the overall tree model. Sensitivity is a predictive indicator of the percentage of the predicted classifications into a given category that were correct. Specificity is a descriptive index of the percentage of the actual members of a given category (i.e., those whose problem behavior remitted) that the classification tree correctly categorized. Effect strength is a standardized index of the performance of the model, defined as the percentage above chance that the model correctly predicts, on a 0-100 scale, where 0 is the performance expected by chance and 100 is perfect classification accuracy. The statistic is computed using the following formula: [(1-{(100-model performance statistic)/(100/C)}) x 100%], where C is the number of response categories for the class variable (Yarnold, Soltysik, & Bennett, 1997, p. 1454). Effect strengths of 25% or less are considered weak, values between 25% and 50% are considered moderate, and those above 50% are considered strong (Yarnold & Soltysik, 2005).

did not remit. Correspondingly, specificity was 88.9% for the overall CTA model, with a specificity of 90.9% for the remission group and 89.9% for those who did not remit.

Attention problems. UniODA results found change in the CANS clinical and strengths variables to be the best predictors of remission status from attention problems (see Table 8). Results indicated that among the difference scores, change in problem presentation (e.g., depression and adjustment to trauma), environmental functioning at school and within the family, and youth strengths deficits (e.g., wellbeing) were the strongest predictors. According to the UniODA analyses, change in depression score from Time 1 to termination (or the last data point collected) emerged as the strongest predictor of remission from clinically significant attention problems at Time 1. Those youth who showed no change or negative change in their depression score (difference less than "1") were more likely to *not* experience remission from attention problems, while youth who exhibited positive change in their depression scores (difference of "1", "2", or "3") were significantly more likely to remit from attention problems on the CANS.

As the optimal predictor in the overall uniODA analysis, change in depression score was the first variable to be entered in the multivariate analysis and, therefore, is at the top of the classification tree (see Figure 2). And consistent with the procedures for developing a multivariate classification tree analysis, new UniODA analyses were run for the subsamples of youth who either did or did not experience positive change in their depression scores over time. For the subsample of youth who experienced positive change in their depression scores (difference score of "1" or greater), both family

Table 8

UniODA results for attention problems group

Variable	Remit	No remit	Overall classification accuracy	Effect Strength	Sensitivity (Remit)	Sensitivity (No remit)	Specificity (Remit)	Specificity (No remit)	*p*-value
Sex	Female	Male	58.80%	7.29%	40.91%	66.67%	35.06%	71.94%	0.179
Age (T1)*	≤13.5	>13.5	43.26%	8.82%	81.54%	26.67%	32.52%	76.92%	0.997
Agency*	200, 600, 703, 800, 1500, 2000, 2300, 2600, 3000, 3400, 3501, 3900, 4203	400, 702, 2700, 3100, 3300, 4105, 4200, 4201	56.48%	24.09%	78.79%	46.67%	39.39%	83.33%	0.743
Psychosis (T1)*	>2.5	≤2.5	70.37%	36.56%	3.03%	100.00%	100.00%	70.09%	<0.001
Attention problems (T1)	>2.5	≤2.5	67.13%	5.90%	12.12%	91.33%	38.10%	70.26%	0.289
Depression (T1)	>1.5	≤1.5	59.72%	14.86%	53.03%	62.67%	38.46%	75.20%	0.023
Oppositional behavior (T1)*	≤1.5	>1.5	53.95%	4.04%	47.69%	56.67%	32.29%	71.43%	<0.001

Table 8 (cont.)

UniODA results for attention problems group

Antisocial behavior (T1)	≤1.5	>1.5	40.00%	6.25%	84.62%	20.67%	31.61%	75.61%	0.239
Substance abuse (T1)*	>1.5	≤1.5	68.84%	8.53%	6.06%	96.64%	44.44%	69.90%	1.000
Adjustment to trauma (T1)	>1.5	≤1.5	52.78%	6.84%	56.06%	51.33%	33.64%	72.64%	0.197
Attachment (T1)*	≤1.5	>1.5	43.68%	6.52%	77.36%	28.93%	32.28%	74.47%	1.000
Situational consistency of problems (T1)	≤1.5	>1.5	55.19%	13.40%	62.50%	52.03%	36.04%	76.24%	0.036
Temporal consistency of problems (T1)*	≤1.5	>1.5	54.72%	7.50%	52.31%	55.78%	34.34%	72.57%	0.174
Danger to self (T1)	>1.5	≤1.5	69.16%	11.46%	10.77%	94.63%	46.67%	70.85%	0.130
Danger to others (T1)*	≤1.5	>1.5	48.15%	3.06%	60.16%	42.67%	31.75%	71.11%	1.000
Elopement (T1)	≤0.5	>0.5	46.05%	17.00%	87.88%	27.52%	34.94%	83.67%	0.009
Sexually abusive behavior (T1)*	≤1.5	>1.5	36.32%	8.80%	93.75%	11.49%	31.41%	80.95%	0.983
Social behavior (T1)*	>0.5	≤0.5	46.51%	8.38%	73.85%	34.67%	32.88%	75.36%	0.997
Crime/Delinquency (T1)	≤0.5	>0.5	45.33%	7.63%	75.00%	32.67%	32.21%	75.38%	0.170
Intellectual functioning (T1)*	>1.5	≤1.5	66.20%	2.73%	12.50%	89.26%	33.33%	70.37%	0.998
Physical functioning (T1)	>0.5	≤0.5	63.72%	6.29%	24.24%	81.21%	36.36%	70.76%	0.230
Family functioning (T1)	≤2.5	>2.5	40.19%	6.41%	84.62%	20.81%	31.79%	75.61%	0.232

Table 8 (cont.)

UniODA results for attention problems group

School functioning (T1)	≤0.5	>0.5	67.14%	6.27%	14.29%	89.80%	37.50%	70.97%	0.264
Sexual development (T1)	≤1.5	>1.5	38.89%	11.17%	92.42%	15.33%	32.45%	82.12%	0.086
Monitoring (T1)	≤0.5	>0.5	62.96%	8.14%	30.30%	77.33%	37.04%	71.60%	0.153
Treatment (T1)	≤0.5	>0.5	65.28%	8.19%	22.73%	84.00%	38.46%	71.19%	0.160
Transportation (T1)	>1.5	≤1.5	67.91%	9.53%	13.64%	91.95%	42.86%	70.62%	0.153
Service Permanence (T1)*	≤0.5	>0.5	61.57%	10.60%	39.39%	71.33%	37.68%	72.79%	1.000
Behavioral health (T1)	≤1.5	>1.5	34.11%	12.24%	98.48%	5.41%	31.71%	88.89%	0.176
Supervision (T1)	≤0.5	>0.5	43.46%	11.05%	84.85%	25.00%	33.53%	78.72%	0.074
Involvement with care (T1)	≤0.5	>0.5	48.60%	4.41%	62.12%	42.57%	32.54%	71.59%	0.312
Knowledge (T1)	≤1.5	>1.5	41.78%	16.73%	93.94%	18.37%	34.07%	87.10%	0.012
Organization (T1)	≤0.5	>0.5	43.19%	14.43%	89.23%	22.97%	33.72%	82.93%	0.026
Resources (T1)	≤0.5	>0.5	55.61%	12.18%	59.09%	54.05%	36.45%	74.77%	0.052
Residential stability (T1)	≤0.5	>0.5	37.09%	9.88%	93.85%	12.16%	31.94%	81.82%	0.138
Safety (T1)	≤0.5	>0.5	39.25%	4.63%	84.85%	18.92%	31.82%	73.68%	0.323
Family strengths (T1)	≤1.5	>1.5	56.81%	19.11%	69.23%	51.35%	38.46%	79.17%	0.004
Interpersonal strengths (T1)	≤0.5	>0.5	68.37%	13.82%	21.54%	88.67%	45.16%	72.28%	0.043
Relationship permanence (T1)*	≤1.5	>1.5	58.80%	6.51%	39.39%	67.33%	34.67%	71.63%	0.996

Table 8 (cont.)

UniODA results for attention problems group

Educational strengths (T1)*	≤0.5	>0.5	66.51%	8.05%	19.05%	86.99%	38.71%	71.35%	1.000
Vocational strengths (T1)*	≤2.5	>2.5	40.63%	5.86%	82.76%	22.39%	31.58%	75.00%	1.000
Wellbeing (T1)*	>1.5	≤1.5	44.39%	0.92	65.62%	35.33%	30.22%	70.67%	1.000
Spiritual strengths (T1)	≤0.5	>0.5	62.83%	12.53%	38.98%	73.48%	39.66%	72.93%	0.060
Talents (T1)	≤1.5	>1.5	52.43%	10.28%	63.49%	47.55%	34.78%	74.73%	0.093
Inclusion (T1)	≤0.5	>0.5	66.51%	13.44%	28.13%	83.45%	42.86%	72.46%	0.043
Composite problem score*	≤12.5	>12.5	37.96%	8.03%	90.91%	14.67%	31.91%	78.57%	0.220
Composite risk score	≤4.5	>4.5	51.39%	15.81%	75.76%	40.67%	35.97%	79.22%	0.014
Composite functioning score	≤2.5	>2.5	66.67%	16.08%	33.33%	81.33%	44.00%	73.49%	0.016
Composite care intensity and organization score*	≤4.5	>4.5	55.56%	15.28%	65.15%	51.33%	37.07%	77.00%	0.720
Composite caregiver needs and strengths score*	≤0.5	>0.5	68.22%	15.68%	24.24%	87.84%	47.06%	72.22%	1.000
Composite strengths deficits score	≤13.5	>13.5	57.22%	17.96%	66.07%	53.44%	37.76%	78.65%	0.011
Psychosis (Diff)	>-0.5	≤-0.5	35.35%	9.19%	95.38%	9.33%	31.31%	82.35%	0.185
Attention problems (Diff)	>0.5	≤0.5	94.91%	88.89%	98.48%	93.33%	86.67%	99.29%	<0.001
Depression (Diff)	>0.5	≤0.5	75.00%	40.12%	56.06%	83.33%	59.68%	81.17%	<0.001

Table 8 (cont.)

UniODA results for attention problems group

Oppositional behavior (Diff)	>0.5	≤0.5	68.84%	30.40%	58.46%	73.33%	48.72%	80.29%	<0.001
Antisocial behavior (Diff)	>0.5	≤0.5	65.58%	13.33%	32.31%	80.00%	41.18%	73.17%	0.040
Substance abuse (Diff)	>-0.5	≤-0.5	34.58%	9.37%	96.97%	6.76%	31.68%	83.33%	0.226
Adjustment to trauma (Diff)	>0.5	≤0.5	73.15%	37.27%	57.58%	80.00%	55.88%	81.08%	<0.001
Attachment (Difference)	>1.5	≤1.5	72.29%	32.71%	15.38%	98.25%	80.00%	71.79%	0.002
Situational consistency of problems (Diff)	>0.5	≤0.5	65.88%	17.11%	39.06%	77.55%	43.10%	74.51%	0.011
Temporal consistency of problems (Diff)	>0.5	≤0.5	66.51%	14.63%	31.75%	81.51%	42.55%	73.46%	0.029
Danger to self (Diff)	>-0.5	≤-0.5	41.12%	18.00%	95.38%	17.45%	33.51%	89.66%	0.007
Elopement (Diff)	>-0.5	≤-0.5	40.00%	20.86%	98.48%	14.09%	33.68%	95.45%	0.002
Sexually abusive behavior (Diff)	>-0.5	≤-0.5	36.97%	17.35%	98.44%	10.20%	32.31%	93.75%	0.021
Social behavior (Diff)	>0.5	≤0.5	70.09%	25.14%	40.00%	83.22%	50.98%	76.07%	<0.001
Crime/Delinquency (Diff)	>-0.5	≤-0.5	35.98%	10.74%	95.31%	10.67%	31.28%	84.21%	0.124
Intellectual functioning (Diff)	>0.5	≤0.5	69.81%	14.86%	17.46%	91.95%	47.83%	72.49%	0.042
Physical functioning (Diff)	≤0.5	>0.5	69.01%	12.80%	13.85%	93.24%	47.37%	71.13%	0.082

Table 8 (cont.)

UniODA results for attention problems group

Family functioning (Diff)	>0.5	≤0.5	68.69%	24.38%	44.62%	79.19%	48.33%	76.62%	<0.001
School functioning (Diff)	>0.5	≤0.5	68.27%	29.17%	58.06%	72.60%	47.37%	80.30%	<0.001
Sexual development (Diff)	>-0.5	≤-0.5	38.14%	8.17%	90.91%	14.77%	32.09%	78.57%	0.180
Monitoring (Diff)	>0.5	≤0.5	70.70%	26.98%	40.91%	83.89%	52.94%	76.22%	<0.001
Treatment (Diff)	>0.5	≤0.5	73.02%	32.29%	42.42%	86.58%	58.33%	77.25%	<0.001
Transportation (Diff)	>0.5	≤0.5	65.89%	9.79%	22.73%	85.14%	40.54%	71.19%	0.114
Service Permanence (Diff)*	>-1.5	≤-1.5	35.51%	15.33%	98.46%	8.05%	31.84%	92.31%	1.000
Behavioral health (Diff)*	>-0.5	≤-0.5	35.92%	8.91%	95.31%	9.15%	32.11%	81.25%	0.838
Supervision (Diff)	>-0.5	≤-0.5	40.78%	15.04%	93.75%	16.90%	33.71%	85.71%	0.028
Involvement with care (Diff)	>0.5	≤0.5	64.56%	6.07%	20.31%	84.51%	37.14%	70.18%	0.254
Knowledge (Diff)*	≤1.5	>1.5	35.12%	19.08%	100.00%	5.67%	32.49%	100.00%	<0.001
Organization (Diff)	≤0.5	>0.5	37.25%	17.24%	98.41%	9.93%	32.80%	93.33%	0.026
Resources (Diff)	>-0.5	≤-0.5	39.13%	10.51%	92.31%	14.79%	33.15%	80.77%	0.112
Residential stability (Diff)	≤0.5	>0.5	34.95%	13.46%	98.44%	6.34%	32.14%	90.00%	0.127
Safety (Diff)	>-0.5	≤-0.5	36.89%	10.24%	95.38%	9.93%	32.80%	82.35%	0.155
Family strengths (Diff)	>0.5	≤0.5	64.45%	11.73%	32.81%	78.23%	39.62%	72.78%	0.065
Interpersonal strengths (Diff)	>0.5	≤0.5	66.98%	22.06%	46.15%	76.00%	45.45%	76.51%	0.001

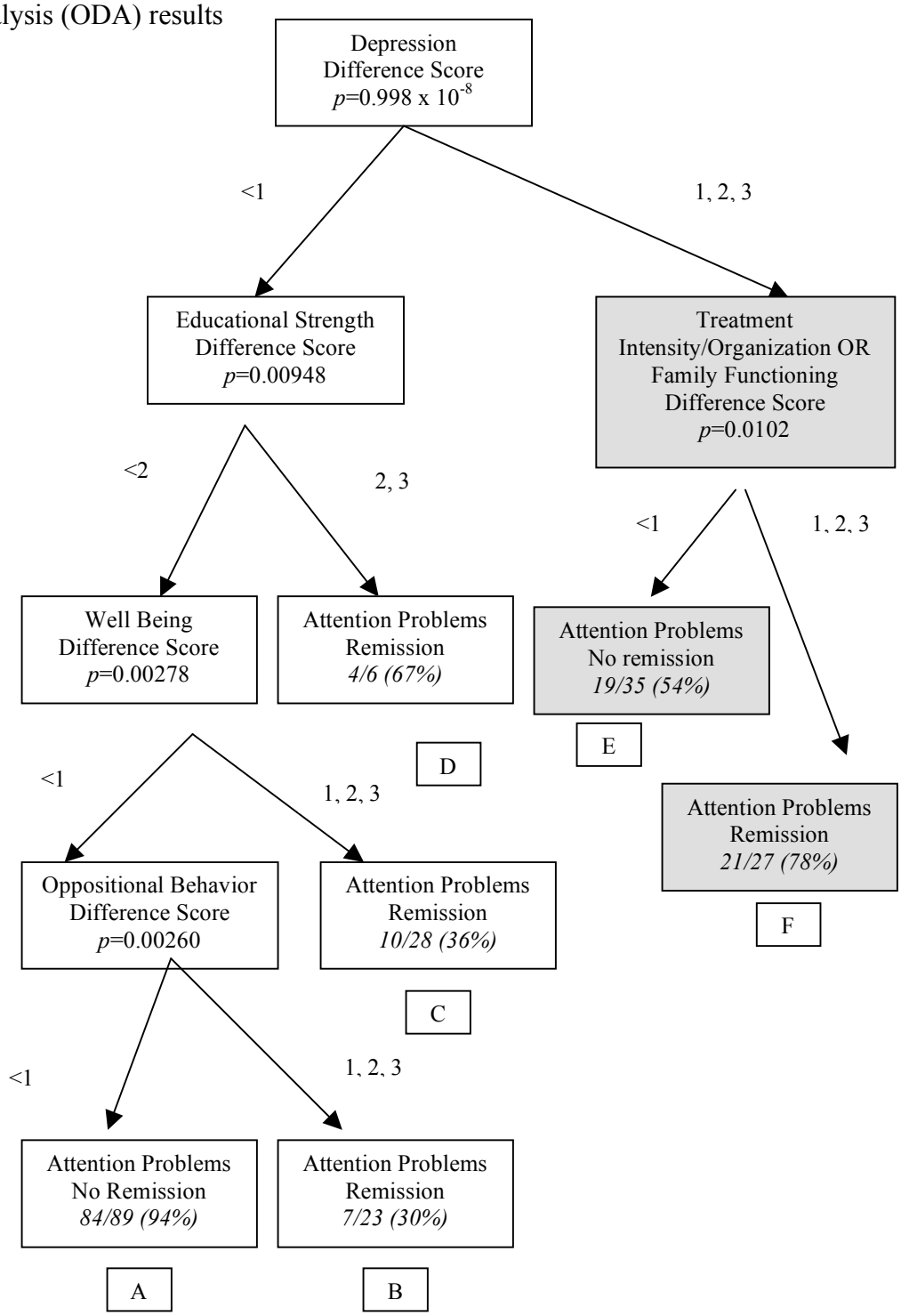
Table 8 (cont.)

UniODA results for attention problems group

Relationship permanence (Diff)	>0.5	≤0.5	66.20%	18.67%	40.91%	77.33%	44.26%	74.84%	0.006
Educational strengths (Diff)	>0.5	≤0.5	65.22%	14.79%	37.10%	77.24%	41.07%	74.17%	0.027
Vocational strengths (Diff)*	>-1.5	≤-1.5	28.40%	14.96%	100.00%	3.33%	26.58%	100.00%	0.837
Wellbeing (Diff)	>0.5	≤0.5	73.36%	36.19%	54.69%	81.33%	55.56%	80.79%	<0.001
Spiritual strengths (Diff)	>-0.5	≤-0.5	37.10%	10.92%	94.74%	11.63%	32.14%	83.33%	0.138
Talents (Diff)	>0.5	≤0.5	66.67%	19.86%	41.27%	78.01%	45.61%	74.83%	0.004
Inclusion (Diff)	>0.5	≤0.5	65.05%	16.95%	41.27%	75.52%	42.62%	74.48%	0.013
Treatment days*	>231.5	≤232	48.48%	11.74%	75.81%	36.03%	35.07%	76.56%	0.168

Note. Variables denoted with an asterisk are not LOO stable and, therefore, were not eligible to be entered into the overall classification tree model.

Figure 2. Predictors of outcome in a sample of youth with attention problems: Optimal Data Analysis (ODA) results



functioning and change in intensity and organization of treatment difference scores were significant at the $p<.05$ level. However, after applying the Dunn and Sidak adjusted per-comparison p correction procedure (see method section) to the multivariate classification tree, these variables were no longer significant and were therefore pruned from the tree. Because neither variable was statistically significant in predicting remission, further UniODA analyses were not conducted. Therefore, the previous UniODA results served as the endpoint for this branch of the tree: positive change in depression score predicted remission with 60% accuracy in this group (see node E).

Change in educational strengths entered the multivariate analyses next, as it emerged as the next best predictor of remission from attention problems for youth who experienced no change or negative change in their CANS depression score. Subgroups were created for youth with a difference of "2" or "3" (predicted remission group) and those with a difference score of less than "2" (predicted no-remit group). Additional UniODA analyses were run to identify variables to further classify the sample. However, for the predicted remission group (group D), an additional predictor did not emerge as statistically significant. Remission was predicted with 67% accuracy in group D. For those youth with an educational strengths score of less than "2", the UniODA analyses revealed wellbeing difference score to be a significant predictor of remission. Youth with a positive change in wellbeing (difference score of "1", "2", or "3") formed the predicted remission subgroup and those with a difference score less than "1" comprised the group predicted to not remit. No additional variables emerged from an additional UniODA analyses as significantly predicting remission for the predicted remission group (labeled group C). Remission was predicted with 36% accuracy in this group. An additional

UniODA was run for the group who reported a difference of less than "1" on wellbeing. Change in oppositional behavior came out as significantly predicting remission from attention problems. Subgroups were formed; youth with positive change in oppositional behavior (a difference score of "1", "2", or "3") formed the predicted remission group and those youth with a difference score of less than "1" forming the other group. Additional uniODA analyses did not reveal any further variables that significantly predicted remission from attention problems on the CANS. Remission was accurately predicted in 30% of the cases in the predicted remission group (labeled group B). The final uniODA analysis did not identify an additional variable that significantly predicted those youth who did not demonstrate remission. The prediction that these youth would not experience remission from attention problems was 94% accurate for this group (labeled group A).

Classification performance statistics were computed for the full CTA model for attention problems, as well as for the separate remission and no remission groups (see Table 9). The overall model was predicted with 68.3% accuracy. The mean sensitivity across classes was 77.7%, with a sensitivity of 96.0% for the remission group and 59.3% for the group those attention problems did not remit. The mean specificity was found to be 75.0% for the overall CTA model. Specificity for the group whose attention problems remitted was 92.1% and 57.9% for the no remission group. The overall classification tree predicted remission 36.6% above chance, which is considered a "moderate" effect strength according to parameters set forth by Yarnold and Soltysik (2005).

Depression. According to results of the initial UniODA analysis, clinical and strengths variables measured at Time 1 were not significant predictors of remission status

Table 9

Classification performance summary for the classification tree model of remission versus no remission from attention problems (N=208)

Performance Index	Performance Parameter	Effect Strength
Overall Classification Accuracy	142/208 (68.3%)	36.6%
Sensitivity (Remission)	119/124 (96.0%)	92.0%
Sensitivity (No Remission)	89/150 (59.3%)	18.6%
Mean Sensitivity Across Classes	77.7%	55.4%
Specificity (Remission)	58/63 (92.1%)	84.2%
Specificity (No Remission)	84/145 (57.9%)	15.8%
Mean Specificity Across Classes	75.0%	50.0%
Mean Performance Across Classes	76.4%	52.8%

Overall cross-classification table

		Predicted Status	
		No Remission	Remission
Actual Status	No Remission	84	61
	Remission	5	58

Note. Overall classification accuracy is the percentage of the total sample that is correctly classified by the overall tree model. Sensitivity is a predictive indicator of the percentage of the predicted classifications into a given category that were correct. Specificity is a descriptive index of the percentage of the actual members of a given category (i.e., those whose problem behavior remitted) that the classification tree correctly categorized. Effect strength is a standardized index of the performance of the model, defined as the percentage above chance that the model correctly predicts, on a 0-100 scale, where 0 is the performance expected by chance and 100 is perfect classification accuracy. The statistic is computed using the following formula: [(1-{(100-model performance statistic)/(100/C)}) x 100%], where C is the number of response categories for the class variable (Yarnold, Soltysik, & Bennett, 1997, p. 1454). Effect strengths of 25% or less are considered weak, values between 25% and 50% are considered moderate, and those above 50% are considered strong (Yarnold & Soltysik, 2005).

from depression (see Table 10). Age at Time 1 emerged as a significant predictor, as well as several difference score variables from the problem presentation domain (e.g., oppositional behavior and adjustment to trauma), functioning domain (i.e., family functioning and school functioning), and youth strengths domain (e.g., interpersonal strengths and wellbeing). UniODA results found that youth's adjustment to trauma from Time 1 to termination (or the last data point available) to be the strongest predictor of remission from clinically significant depression on the CANS. Youth who showed no change or negative change in their adjustment to trauma (difference less than "1") score were more likely to *not* demonstrate remission from depression, while youth who reported positive change in their adjustment to trauma score (difference of "1", "2", or "3") were significantly more likely to experience remission from depression.

Adjustment to trauma difference score was entered as the first variable in the multivariate analysis because it came out as the optimal predictor in the overall UniODA analysis (see Figure 3). Subsamples of youth were formed; those with a positive change in adjustment to trauma (difference of "1", "2", or "3") forming the predicted remission group (labeled group F on the right side of the tree) and those with an adjustment to trauma difference less than "1" comprising the subgroup predicted to not experience remission from depression. Additional UniODA analyses were conducted for both subgroups to identify variables that further divided the groups. For the predicted remission group, an additional variable that significantly predicted remission did not emerge; therefore, further analyses were not conducted. Positive change in the youth's adjustment to trauma score predicted remission with 72% accuracy.

Table 10

UniODA results for depression group

Variable	Remit	No remit	Overall classification accuracy	Effect Strength	Sensitivity (Remit)	Sensitivity (No remit)	Specificity (Remit)	Specificity (No remit)	*p*-value
Sex*	Female	Male	49.36%	0.24%	56.73%	43.51%	44.36%	55.88%	1.000
Age (T1)	≤13.5	>13.5	60.52%	23.88%	72.82%	50.77%	53.96%	70.21%	<0.001
Agency*	100, 200, 400, 600, 702, 703, 800, 3300, 3501, 4203	2000, 2300, 2600, 2700, 2900, 3000, 3100, 3400, 3900, 4200, 4201	62.98%	23.88%	49.04%	74.05%	60.00%	64.67%	0.117
Psychosis (T1)	≤0.5	>0.5	50.85%	9.88%	81.55%	26.72%	46.67%	64.81%	0.090
Attention problems (T1)	>1.5	≤1.5	57.02%	11.83%	45.19%	66.41%	51.65%	60.42%	0.047
Depression (T1)	≤2.5	>2.5	46.81%	6.65%	93.27%	9.92%	45.12%	65.00%	0.264
Oppositional behavior (T1)	>2.5	≤2.5	57.94%	13.45%	11.65%	94.62%	63.16%	57.48%	0.068
Antisocial behavior (T1)	≤0.5	>0.5	53.85%	6.74%	49.51%	57.25%	47.66%	59.06%	0.184

Table 10 (cont.)

UniODA results for depression group

Substance abuse (T1)	≤0.5	>0.5	53.65%	16.84%	85.44%	28.46%	48.62%	71.15%	0.008
Adjustment to trauma (T1)	>1.5	≤1.5	51.71%	6.64%	66.02%	40.46%	46.58%	60.23%	0.190
Attachment (T1)	>0.5	≤0.5	51.44%	11.79%	86.17%	22.81%	47.93%	66.67%	0.070
Situational consistency of problems (T1)	≤1.5	>1.5	53.04%	7.68%	60.78%	46.88%	47.69%	60.00%	0.151
Temporal consistency of problems (T1)	≤1.5	>1.5	58.33%	15.48%	52.48%	62.99%	53.00%	62.50%	0.014
Danger to self (T1)	≤0.5	>0.5	56.41%	14.45%	64.42%	50.00%	50.76%	63.73%	0.019
Danger to others (T1)	≤0.5	>0.5	58.30%	14.00%	43.27%	70.23%	53.57%	60.93%	0.022
Elopement (T1)	≤1.5	>1.5	52.34%	21.00%	94.23%	19.08%	48.04%	80.65%	0.002
Sexually abusive behavior (T1)	>1.5	≤1.5	56.41%	6.11%	9.71%	93.13%	52.64%	56.74%	0.290
Social behavior (T1)	≤1.5	>1.5	51.07%	7.21%	74.04%	32.56%	46.95%	60.87%	0.171
Crime/Delinquency (T1)	≤0.5	>0.5	53.68%	12.60%	75.73%	35.94%	48.75%	64.79%	0.038
Intellectual functioning (T1)	>1.5	≤1.5	56.90%	8.32%	8.82%	94.62%	56.25%	56.94%	0.221
Physical functioning (T1)*	>2.5	≤2.5	57.33%	30.23%	3.88%	100.00%	100.00%	56.58%	<0.001
Family functioning (T1)	≤1.5	>1.5	55.36%	8.26%	41.35%	66.67%	50.00%	58.50%	0.131
School functioning (T1)	≤2.5	>2.5	51.50%	16.00%	91.35%	19.38%	47.74%	73.53%	0.016

Table 10 (cont.)

UniODA results for depression group

Sexual development (T1)	>0.5	≤0.5	53.22%	3.70%	38.46%	65.12%	47.06%	56.76%	0.334
Monitoring (T1)	>1.5	≤1.5	59.57%	15.73%	32.69%	80.92%	57.63%	60.23%	0.013
Treatment (T1)	>0.5	≤0.5	50.21%	6.73%	76.92%	29.01%	46.24%	61.29%	0.191
Transportation (T1)	>1.5	≤1.5	58.12%	15.05%	9.71%	96.18%	66.67%	57.53%	0.060
Service Permanence (T1)	>0.5	≤0.5	49.79%	4.04%	70.19%	33.59%	45.63%	58.67%	0.317
Behavioral health (T1)	>0.5	≤0.5	49.79%	5.54%	76.92%	27.91%	46.24%	60.00%	0.246
Supervision (T1)	≤0.5	>0.5	51.72%	9.12%	75.73%	32.56%	47.27%	62.69%	0.108
Involvement with care (T1)	≤0.5	>0.5	55.17%	11.53%	61.17%	50.39%	49.61%	61.90%	0.052
Knowledge (T1)	≤2.5	>2.5	46.12%	24.14%	100.00%	3.10%	45.18%	100.00%	0.094
Organization (T1)	≤0.5	>0.5	55.17%	18.95%	84.47%	31.78%	49.71%	71.93%	0.003
Resources (T1)	≤0.5	>0.5	55.84%	11.52%	55.34%	56.25%	50.44%	61.02%	0.053
Residential stability (T1)	≤0.5	>0.5	48.05%	10.39%	93.14%	12.40%	45.67%	69.57%	0.119
Safety (T1)	≤0.5	>0.5	50.86%	8.43%	78.64%	28.68%	46.82%	62.71%	0.131
Family strengths (T1)	≤0.5	>0.5	57.45%	10.28%	24.04%	83.97%	54.35%	58.20%	0.085
Interpersonal strengths (T1)	>1.5	≤1.5	54.27%	6.79%	45.19%	61.54%	48.45%	58.39%	0.182
Relationship permanence (T1)	≤1.5	>1.5	55.98%	10.12%	46.15%	63.85%	50.53%	59.71%	0.079
Educational strengths (T1)	≤2.5	>2.5	49.14%	21.30%	98.04%	10.77%	46.30%	87.50%	0.007

Table 10 (cont.)

UniODA results for depression group

Vocational strengths (T1)	≤1.5	>1.5	56.85%	12.65%	54.24%	58.62%	47.06%	65.38%	0.087
Wellbeing (T1)	≤1.5	>1.5	54.27%	3.94%	31.07%	72.52%	47.06%	57.23%	0.324
Spiritual strengths (T1)	≤0.5	>0.5	58.90%	15.79%	39.00%	75.63%	57.35%	59.60%	0.015
Talents (T1)	≤1.5	>1.5	55.65%	13.48%	65.35%	48.06%	49.62%	63.92%	0.028
Inclusion (T1)	≤0.5	>0.5	57.14%	9.26%	22.55%	84.50%	53.49%	57.98%	0.116
Composite problem score*	>13.5	≤13.5	56.84%	10.33%	8.65%	95.38%	60.00%	56.62%	1.000
Composite risk score*	≤3.5	>3.5	57.87%	16.62%	62.50%	54.20%	52.00%	64.55%	0.472
Composite functioning score	≤3.5	>3.5	58.37%	15.39%	50.96%	64.34%	53.54%	61.94%	0.013
Composite care intensity and organization score	>6.5	≤6.5	60.00%	18.64%	19.23%	92.37%	66.67%	59.02%	0.007
Composite caregiver needs and strengths score*	≤6.5	>6.5	50.64%	14.73%	91.26%	18.46%	47.00%	72.73%	0.091
Composite strengths deficits score	≤14.5	>14.5	55.61%	15.17%	71.13%	43.65%	49.29%	66.27%	0.016
Psychosis (Diff)*	>1.5	≤1.5	57.26%	19.94%	3.88%	99.24%	80.00%	56.77%	0.933
Attention problems (Diff)*	>0.5	≤0.5	67.66%	34.79%	41.35%	88.55%	74.14%	65.65%	<0.001
Depression (Diff)	>0.5	≤0.5	95.74%	91.66%	99.04%	93.13%	91.96%	99.19%	<0.001

Table 10 (cont.)

UniODA results for depression group

Oppositional behavior (Diff)	>0.5	≤0.5	66.09%	30.30%	47.57%	80.77%	66.22%	66.04%	<0.001
Antisocial behavior (Diff)	>0.5	≤0.5	59.40%	14.97%	30.10%	82.44%	57.41%	60.00%	0.018
Substance abuse (Diff)	>-0.5	≤-0.5	49.14%	16.59%	96.12%	11.63%	46.48%	78.95%	0.026
Adjustment to trauma (Diff)	>0.5	≤0.5	72.22%	43.14%	61.17%	80.92%	71.59%	72.60%	<0.001
Attachment (Diff)	>0.5	≤0.5	62.38%	23.86%	39.78%	81.65%	64.91%	61.38%	0.001
Situational consistency of problems (Diff)	>0.5	≤0.5	59.83%	16.72%	36.27%	78.74%	57.81%	60.61%	0.009
Temporal consistency of problems (Diff)	>0.5	≤0.5	60.00%	15.98%	33.67%	80.31%	56.90%	61.08%	0.013
Danger to self (Diff)	>-0.5	≤-0.5	52.79%	23.86%	96.15%	17.83%	48.54%	85.19%	0.001
Elopement (Diff)	>-0.5	≤-0.5	53.19%	26.44%	97.12%	18.32%	48.56%	88.89%	<0.001
Sexually abusive behavior (Diff)	>0.5	≤0.5	57.51%	10.82%	13.59%	92.31%	58.33%	57.42%	0.105
Social behavior (Diff)	>0.5	≤0.5	65.24%	29.11%	41.35%	84.50%	68.25%	64.12%	<0.001
Crime/Delinquency (Diff)	>-0.5	≤-0.5	49.35%	15.25%	95.15%	12.50%	46.67%	76.19%	0.035
Intellectual functioning (Diff)	>-0.5	≤-0.5	48.48%	12.59%	94.12%	12.40%	45.93%	72.73%	0.072
Physical functioning (Diff)	>0.5	≤0.5	56.52%	7.53%	13.73%	90.63%	53.85%	56.86%	0.204
Family functioning (Diff)	>0.5	≤0.5	65.67%	29.92%	43.27%	83.72%	68.18%	64.67%	<0.001

Table 10 (cont.)

UniODA results for depression group

School functioning (Diff)	>0.5	≤0.5	65.37%	28.85%	51.96%	75.97%	63.10%	66.67%	<0.001
Sexual development (Diff)	>0.5	≤0.5	57.76%	12.14%	21.15%	87.50%	57.89%	57.73%	0.056
Monitoring (Diff)	>0.5	≤0.5	64.26%	27.05%	35.58%	87.02%	68.52%	62.98%	<0.001
Treatment (Diff)	>0.5	≤0.5	67.09%	33.53%	41.35%	87.69%	72.88%	65.14%	<0.001
Transportation (Diff)	>0.5	≤0.5	61.80%	21.82%	24.51%	90.84%	67.57%	60.71%	0.001
Service Permanence (Diff)	>0.5	≤0.5	57.87%	12.10%	34.62%	76.34%	53.73%	59.52%	0.045
Behavioral health (Diff)*	>-0.5	≤-0.5	48.88%	8.55%	91.09%	13.93%	46.70%	65.38%	0.651
Supervision (Diff)	>-0.5	≤-0.5	54.50%	21.94%	92.00%	23.77%	49.73%	78.38%	0.001
Involvement with care (Diff)	>-0.5	≤-0.5	53.36%	17.96%	90.10%	22.95%	49.19%	73.68%	0.007
Knowledge (Diff)	>-0.5	≤-0.5	53.36%	18.71%	91.09%	22.13%	49.20%	75.00%	0.006
Organization (Diff)	>-1.5	≤-1.5	48.20%	19.51%	99.01%	5.79%	46.73%	87.50%	0.057
Resources (Diff)	>-0.5	≤-0.5	49.10%	8.08%	90.10%	14.88%	46.91%	64.29%	0.182
Residential stability (Diff)	≤0.5	>0.5	48.20%	16.82%	98.00%	7.38%	46.45%	81.82%	0.060
Safety (Diff)*	>-0.5	≤-0.5	48.20%	6.89%	92.08%	11.57%	46.50%	63.64%	1.000
Family strengths (Diff)	>0.5	≤0.5	61.70%	21.19%	29.81%	87.02%	64.58%	60.96%	0.001
Interpersonal strengths (Diff)	>0.5	≤0.5	63.68%	25.24%	45.19%	78.46%	62.67%	64.15%	<0.001
Relationship permanence (Diff)	>0.5	≤0.5	62.39%	22.41%	39.42%	80.77%	62.12%	62.50%	0.001

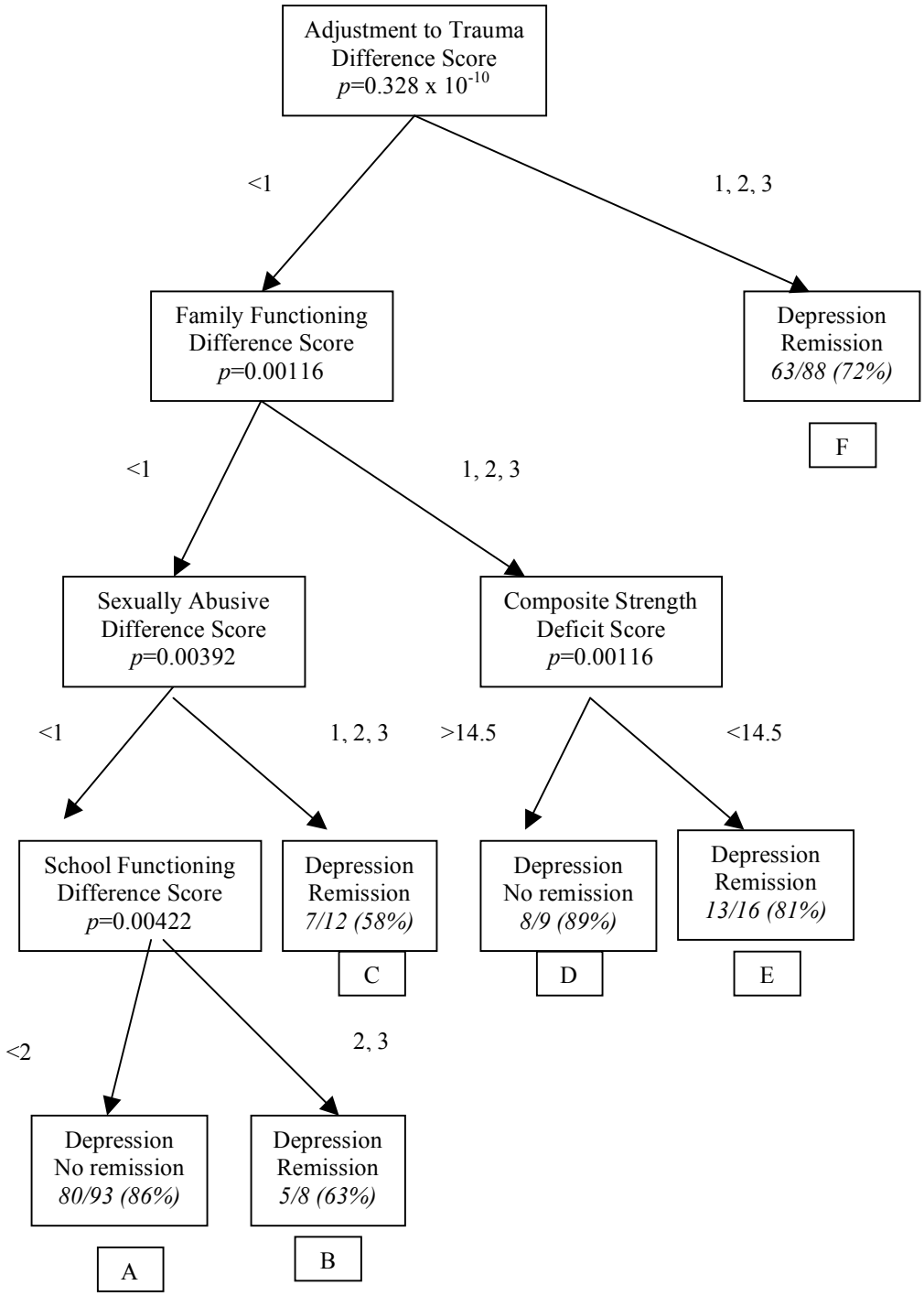
Table 10 (cont.)

UniODA results for depression group

Educational strengths (Diff)	>0.5	≤0.5	61.90%	21.03%	38.24%	80.62%	60.94%	62.28%	0.001
Vocational strengths (Diff)	>0.5	≤0.5	59.84%	11.20%	34.69%	75.64%	47.22%	64.84%	0.146
Wellbeing (Diff)	>0.5	≤0.5	66.96%	31.32%	47.47%	81.68%	66.20%	67.30%	<0.001
Spiritual strengths (Diff)*	>-0.5	≤-0.5	56.28%	11.49%	14.14%	92.24%	60.87%	55.73%	0.925
Talents (Diff)	>0.5	≤0.5	60.96%	18.56%	35.00%	81.25%	59.32%	61.54%	0.004
Inclusion (Diff)	>0.5	≤0.5	63.91%	25.67%	43.14%	80.47%	63.77%	63.98%	<0.001
Treatment days*	>261.5	≤261.5	54.21%	10.58%	67.68%	42.61%	50.38%	60.49%	0.131

Note. Variables denoted with an asterisk are not LOO stable and, therefore, were not eligible to be entered into the overall classification tree model.

Figure 3. Predictors of outcome in a sample of youth with depression: Optimal Data Analysis (ODA) results



For the subgroup not predicted to remit from depression (the left side of the tree), change in family functioning came out as the next best predictor of remission from depression and, therefore, was entered next into the multivariate analysis. Subgroups were established, youth with a positive change in family functioning (difference of "1", "2", or "3") comprising the predicted remission group and those with a difference of less than "1" in the group predicted *not* to remit. Subsequent uniODA analyses revealed additional significant predictors for both groups. For the predicted remission subgroup, composite strengths score came out at the next best predictor of remission from depression and was entered into the multivariate analysis. Two subgroups were formed; youth whose composite strength score was greater than 14.5 (predicted to not remit) and those whose composite strength score was less than 14.5 (predicted remission subgroup). No additional variables emerged for either group in subsequent uniODA analyses. Depression was accurately predicted to remit in 81% of the cases for those youth with a composite strengths score less than 14.5 (labeled group E) and failure to remit was accurately predicted for 89% of those in the subgroup comprised of youth with composite strength scores above 14.5 (labeled group D).

For those youth with a family functioning difference score of less than "1", an additional uniODA analyses revealed change in sexually abusive behavior to be the next best predictor of remission from depression in this group. Youth with positive change in sexually abusive behavior (difference of "1", "2", or "3") formed the subgroup predicted to remit and those youth with a difference score less than "1" were predicted to not experience remission. uniODA analysis on the predicted remission group did not reveal any additional variables that significantly predicted remission from depression.

Remission was accurately predicted for 58% of the youth in this group (labeled group C). Change in school functioning came out of an additional UniODA analysis as significantly predicting remission from depression for the group with no change or negative change in sexually abusive behavior. Again, subgroups were created with the addition of this variable to the multivariate analysis. Youth with a school functioning difference score of "2" or "3" comprised the predicted remission subgroup and those with a difference score of less than "2" formed the group predicted to not remit. Additional UniODA analyses performed for both subgroups did not reveal additional variables that significantly predicted remission or failure to remit. Remission from depression on the CANS was predicted with 63% accuracy for those with a school functioning difference score of "2" or "3" and failure to remit was predicted accurately for 86% of those with a family functioning difference score of less than "2".

Classification performance statistics were calculated for the overall CTA model for depression, as well as for the separate remission and no remission groups (see Table 11). The full classification tree was predicted with 77.2% accuracy. The mean sensitivity for the overall model of depression was 81.5%, with a sensitivity of 88.6% for the remission group and 74.3% for the non-remission group. The mean overall specificity was 77.8% for the full CTA model, with a specificity of 84.6% in the remission group and 71.0% in the group that did not remit. The overall classification tree predicted remission 54.4% above chance, which is considered a "strong" effect strength according to parameters set forth by Yarnold and Soltysik (2005).

Antisocial behavior. Initial UniODA results indicated that only difference score variables are significant predictors of remission from antisocial behavior (see Table 12).

Table 11

Classification performance summary for the classification tree model of remission versus no remission from depression (N=228)

Performance Index	Performance Parameter	Effect Strength
Overall Classification Accuracy	176/228 (77.2%)	54.4%
Sensitivity (Remission)	124/140 (88.6%)	77.2%
Sensitivity (No Remission)	104/140 (74.3%)	48.6%
Mean Sensitivity Across Classes	81.5%	63.0%
Specificity (Remission)	88/104 (84.6%)	69.2%
Specificity (No Remission)	88/124 (71.0%)	42.0%
Mean Specificity Across Classes	77.8%	55.6%
Mean Performance Across Classes	79.7%	59.4%

Overall cross-classification table

		Predicted Status	
		No Remission	Remission
Actual Status	No Remission	88	36
	Remission	16	88

Note. Overall classification accuracy is the percentage of the total sample that is correctly classified by the overall tree model. Sensitivity is a predictive indicator of the percentage of the predicted classifications into a given category that were correct. Specificity is a descriptive index of the percentage of the actual members of a given category (i.e., those whose problem behavior remitted) that the classification tree correctly categorized. Effect strength is a standardized index of the performance of the model, defined as the percentage above chance that the model correctly predicts, on a 0-100 scale, where 0 is the performance expected by chance and 100 is perfect classification accuracy. The statistic is computed using the following formula: [(1-{(100-model performance statistic)/(100/C)}) x 100%], where C is the number of response categories for the class variable (Yarnold, Soltysik, & Bennett, 1997, p. 1454). Effect strengths of 25% or less are considered weak, values between 25% and 50% are considered moderate, and those above 50% are considered strong (Yarnold & Soltysik, 2005).

Table 12

UniODA results for antisocial group

Variable	Remit	No remit	Overall classification accuracy	Effect Strength	Sensitivity (Remit)	Sensitivity (No remit)	Specificity (Remit)	Specificity (No remit)	*p*-value
Sex	Female	Male	54.55%	14.45%	42.22%	71.87%	67.86%	46.94%	0.152
Age (T1)*	≤13.5	>13.5	67.11%	31.57%	73.33%	58.06%	71.74%	60.00%	0.229
Agency*	703, 800, 2300, 2600, 2700, 3501, 3900, 4203	400, 600, 702, 3000, 3300, 4105, 4200, 4201	68.83%	38.91%	64.44%	75.00%	78.38%	60.00%	0.286
Psychosis (T1)*	≤0.5	>0.5	57.89%	7.82%	84.09%	21.88%	59.68%	50.00%	0.489
Attention problems (T1)*	>2.5	≤2.5	49.35%	15.12%	20.00%	90.63%	75.00%	44.62%	1.000
Depression (T1)*	>1.5	≤1.5	54.55%	9.45%	53.55%	56.25%	63.16%	46.15%	0.999
Oppositional behavior (T1)	>1.5	≤1.5	62.67%	21.54%	88.37%	28.13%	62.30%	64.29%	0.066
Antisocial behavior (T1)	≤2.5	>2.5	59.74%	11.49%	93.33%	12.50%	60.00%	57.14%	0.313
Substance abuse (T1)	≤0.5	>0.5	68.42%	33.10%	80.00%	51.61%	70.59%	64.00%	0.004
Adjustment to trauma (T1)	>2.5	≤2.5	53.95%	29.10%	22.73%	96.88%	90.91%	47.69%	0.015
Attachment (T1)	>1.5	≤1.5	56.52%	15.45%	50.00%	65.52%	66.67%	48.72%	0.150

Table 12 (cont.)

UniODA results for antisocial group

Situational consistency of problems (T1)*	≤2.5	>2.5	60.53%	12.94%	84.44%	25.81%	62.30%	53.33%	1.000
Temporal consistency of problems (T1)*	≤2.5	>2.5	55.26%	5.52%	66.67%	38.71%	61.22%	44.44%	1.000
Danger to self (T1)	>1.5	≤1.5	50.65%	24.56%	17.78%	96.88%	88.89%	45.59%	0.048
Danger to others (T1)*	>2.5	≤2.5	45.45%	14.41%	8.89%	96.88%	80.00%	43.06%	1.000
Elopement (Time 1)	≤1.5	>1.5	64.94%	25.66%	88.89%	31.25%	64.52%	66.67%	0.029
Sexually abusive behavior (T1)	>1.5	≤1.5	49.35%	22.43%	15.56%	96.88%	87.50%	44.93%	0.079
Social behavior (T1)*	>2.5	≤2.5	48.05%	27.78%	11.11%	100.00%	100.00%	44.44%	1.000
Crime/Delinquency (T1)	≤0.5	>0.5	56.58%	17.73%	46.67%	70.97%	70.00%	47.83%	0.095
Intellectual functioning (T1)	>1.5	≤1.5	49.35%	18.15%	17.78%	93.75%	80.00%	44.78%	0.126
Physical functioning (T1)*	≤0.5	>0.5	56.58%	4.19%	77.78%	25.81%	60.34%	44.44%	0.592
Family functioning (T1)	>1.5	≤1.5	63.16%	23.73%	68.89%	54.84%	68.89%	54.84%	0.034
School functioning (T1)	≤2.5	>2.5	63.16%	22.37%	77.27%	43.75%	65.38%	58.33%	0.045
Sexual development (T1)*	>2.5	≤2.5	48.05%	27.78%	11.11%	100.00%	100.00%	44.44%	1.000
Monitoring (T1)	>1.5	≤1.5	54.55%	18.40%	35.56%	81.25%	72.73%	47.27%	0.087
Treatment (T1)	>2.5	≤2.5	48.05%	27.78%	11.11%	100.00%	100.00%	44.44%	0.062
Transportation (T1)	≤0.5	>0.5	58.44%	18.76%	53.33%	65.62%	68.57%	50.00%	0.078

Table 12 (cont.)

UniODA results for antisocial group

Service Permanence (T1)*	>1.5	≤1.5	54.55%	13.33%	44.44%	68.75%	66.67%	46.81%	1.000
Behavioral health (T1)*	≤0.5	>0.5	57.33%	6.19%	75.56%	30.00%	61.82%	45.00%	0.280
Supervision (T1)	≤0.5	>0.5	66.67%	30.18%	73.33%	56.67%	71.74%	58.62%	0.009
Involvement (T1)	≤0.5	>0.5	57.33%	15.25%	55.56%	60.00%	67.57%	47.37%	0.139
Knowledge (T1)	≤0.5	>0.5	53.33%	15.19%	37.78%	76.67%	70.83%	45.10%	0.144
Organization (T1)	≤0.5	>0.5	61.33%	20.84%	64.44%	56.67%	69.05%	51.52%	0.059
Resources (T1)	≤0.5	>0.5	60.00%	23.03%	53.33%	70.00%	72.73%	50.00%	0.039
Residential stability (T1)	≤0.5	>0.5	61.33%	13.37%	86.67%	23.33%	62.90%	53.85%	0.208
Safety (T1)	≤0.5	>0.5	61.33%	17.33%	73.33%	43.33%	66.00%	52.00%	0.106
Family strengths (T1)	>1.5	≤1.5	57.14%	12.17%	62.22%	50.00%	63.64%	48.48%	0.202
Interpersonal strengths (T1)	≤0.5	>0.5	46.75%	12.78%	13.33%	93.75%	75.00%	43.48%	0.271
Relationship permanence (T1)*	>2.5	≤2.5	48.05%	12.53%	17.78%	90.63%	72.73%	43.94%	1.000
Educational strengths (T1)	≤2.5	>2.5	63.16%	23.59%	93.18%	21.88%	62.12%	70.00%	0.059
Vocational strengths (T1)*	≤0.5	>0.5	54.76%	22.27%	18.18%	95.00%	80.00%	51.35%	0.999
Wellbeing (T1)	>2.5	≤2.5	53.25%	24.84%	24.44%	93.75%	84.62%	46.88%	0.033
Spiritual strengths (T1)*	≤0.5	>0.5	49.28%	9.43%	25.00%	82.76%	66.67%	44.44%	0.921
Talents (T1)	≤0.5	>0.5	46.58%	15.21%	9.52%	96.77%	80.00%	44.12%	0.288
Inclusion (T1)	≤1.5	>1.5	56.58%	13.75%	54.55%	59.38%	64.86%	48.72%	0.167

Table 12 (cont.)

UniODA results for antisocial group

Composite problem score*	≤8.5	>8.5	54.55%	15.64%	40.00%	75.00%	69.23%	47.06%	0.294
Composite risk score*	≤2.5	>2.5	54.55%	26.87%	26.67%	93.75%	85.71%	47.62%	0.542
Composite functioning score	≤2.5	>2.5	54.55%	30.34%	24.44%	96.88%	91.67%	47.69%	0.010
Composite intensity and organization score*	>6.5	≤6.5	50.65%	17.54%	22.22%	90.63%	76.92%	45.31%	1.000
Composite caregiver needs and strengths score	≤1.5	>1.5	60.53%	33.47%	40.00%	90.32%	85.71%	50.91%	0.003
Composite strengths deficit score*	≤11.5	>11.5	54.41%	16.18%	29.73%	83.87%	68.75%	50.00%	0.837
Psychosis (Diff)	>-0.5	≤-0.5	59.21%	11.99%	95.45%	9.38%	59.15%	60.00%	0.351
Attention problems (Diff)	>0.5	≤0.5	64.94%	44.24%	42.22%	96.88%	95.00%	54.39%	<0.001
Depression (Diff)	>0.5	≤0.5	61.04%	36.36%	37.78%	93.75%	89.47%	51.72%	0.0012
Oppositional behavior (Diff)	>0.5	≤0.5	76.00%	61.07%	58.14%	100.00%	100.00%	64.00%	<0.001
Antisocial behavior (Diff)	>0.5	≤0.5	98.70%	97.35%	100.00%	96.88%	97.83%	100.00%	<0.001
Substance abuse (Diff)	>-0.5	≤-0.5	62.67%	17.59%	93.33%	16.67%	62.69%	62.50%	0.160
Adjustment to trauma (Diff)	>0.5	≤0.5	71.05%	50.30%	54.55%	93.75%	92.31%	60.00%	<0.001
Attachment (Diff)	>0.5	≤0.5	66.18%	43.08%	47.50%	92.86%	90.48%	55.32%	<0.001

Table 12 (cont.)

UniODA results for antisocial group

Situational consistency of problems (Diff)	>0.5	≤0.5	65.79%	41.06%	48.89%	90.32%	88.00%	54.90%	<0.001
Temporal consistency of problems (Diff)	>0.5	≤0.5	65.79%	43.12%	46.67%	93.55%	91.30%	54.72%	<0.001
Danger to self (Diff)*	>-0.5	≤-0.5	64.94%	26.26%	91.11%	28.13%	64.06%	69.23%	1.000
Elopement (Diff)	>0.5	≤0.5	54.55%	20.04%	33.33%	84.38%	75.00%	47.37%	0.067
Sexually abusive behavior (Diff)	>0.5	≤0.5	51.95%	22.73%	22.22%	93.75%	83.33%	46.15%	0.053
Social behavior (Diff)	>0.5	≤0.5	75.32%	60.26%	57.78%	100.00%	100.00%	62.75%	<0.001
Crime/Delinquency (Diff)	>0.5	≤0.5	61.84%	37.67%	40.00%	93.55%	90.00%	51.79%	0.001
Intellectual functioning (Diff)	>-0.5	≤-0.5	64.94%	29.22%	95.56%	21.88%	63.24%	77.78%	0.024
Physical functioning (Diff)*	≤-0.5	>-0.5	46.05%	25.97%	8.89%	100.00%	100.00%	43.06%	0.702
Family functioning (Diff)	>0.5	≤0.5	66.67%	49.49%	44.44%	100.00%	100.00%	54.55%	<0.001
School functioning (Diff)	>0.5	≤0.5	68.00%	40.90%	56.82%	83.87%	83.33%	57.78%	<0.001
Sexual development (Diff)	>0.5	≤0.5	55.84%	24.03%	33.33%	87.50%	78.95%	48.28%	0.032
Monitoring (Diff)	>0.5	≤0.5	55.84	22.17%	35.56%	84.38%	76.19%	48.21%	0.045
Treatment (Diff)	>0.5	≤0.5	51.95%	17.53%	26.67%	87.50%	75.00%	45.90%	0.109
Transportation (Diff)	>0.5	≤0.5	53.25%	21.84%	24.44%	93.75%	84.62%	46.88%	0.033

Table 12 (cont.)

UniODA results for antisocial group

Service Permanence (Diff)	>0.5	≤0.5	54.55%	21.92%	31.11%	87.50%	77.78%	47.46%	0.049
Behavioral health (Diff)	>-0.5	≤-0.5	61.97%	13.51%	90.70%	17.86%	62.90%	55.56%	0.242
Supervision (Diff)	>-1.5	≤-1.5	67.61%	41.50%	100.00%	17.86%	65.15%	100.00%	0.008
Involvement with care (Diff)	>-1.5	≤-1.5	63.89%	23.34%	97.73%	10.71%	63.24%	75.00%	0.160
Knowledge (Diff)	>0.5	≤0.5	52.78%	22.36%	29.55%	89.29%	81.25%	44.64%	0.054
Organization (Diff)*	>-1.5	≤-1.5	63.89%	35.00%	100.00%	7.14%	62.86%	100.00%	0.933
Resources (Diff)	>-0.5	≤-0.5	68.06%	30.85%	93.18%	28.57%	67.21%	72.73%	0.016
Residential stability (Diff)	>-0.5	≤-0.5	63.89%	18.43%	90.91%	21.43%	64.52%	60.00%	0.131
Safety (Diff)*	>0.5	≤0.5	44.44%	7.76%	15.91%	89.29%	70.00%	40.32%	<0.001
Family strengths (Diff)	>0.5	≤0.5	59.21%	36.93%	33.33%	96.77%	93.75%	50.00%	0.001
Interpersonal strengths (Diff)	>0.5	≤0.5	61.04%	36.36%	37.78%	93.75%	89.47%	51.72%	0.001
Relationship permanence (Diff)	>0.5	≤0.5	59.74%	32.14%	37.78%	90.63%	85.00%	50.88%	0.004
Educational strengths (Diff)	>0.5	≤0.5	60.00%	28.60%	43.18%	83.87%	79.17%	50.98%	0.012
Vocational strengths (Diff)	>0.5	≤0.5	61.11%	22.72%	35.29%	84.21%	66.67%	59.26%	0.168
Wellbeing (Diff)	>0.5	≤0.5	73.03%	58.55%	55.56%	100.00%	100.00%	61.54%	<0.001
Spiritual strengths (Diff)	>0.5	≤0.5	57.14%	29.72%	32.43%	92.31%	85.71%	48.98%	0.019

Table 12 (cont.)

UniODA results for antisocial group

Talents (Diff)	>0.5	≤0.5	67.61%	44.76%	47.50%	93.55%	90.48%	58.00%	<0.001
Inclusion (Diff)	>0.5	≤0.5	57.33%	22.35%	39.53%	81.25%	73.91%	50.00%	0.045
Treatment days*	>245.5	≤245.5	64.79%	27.75%	67.44%	60.71%	72.50%	54.84%	0.132

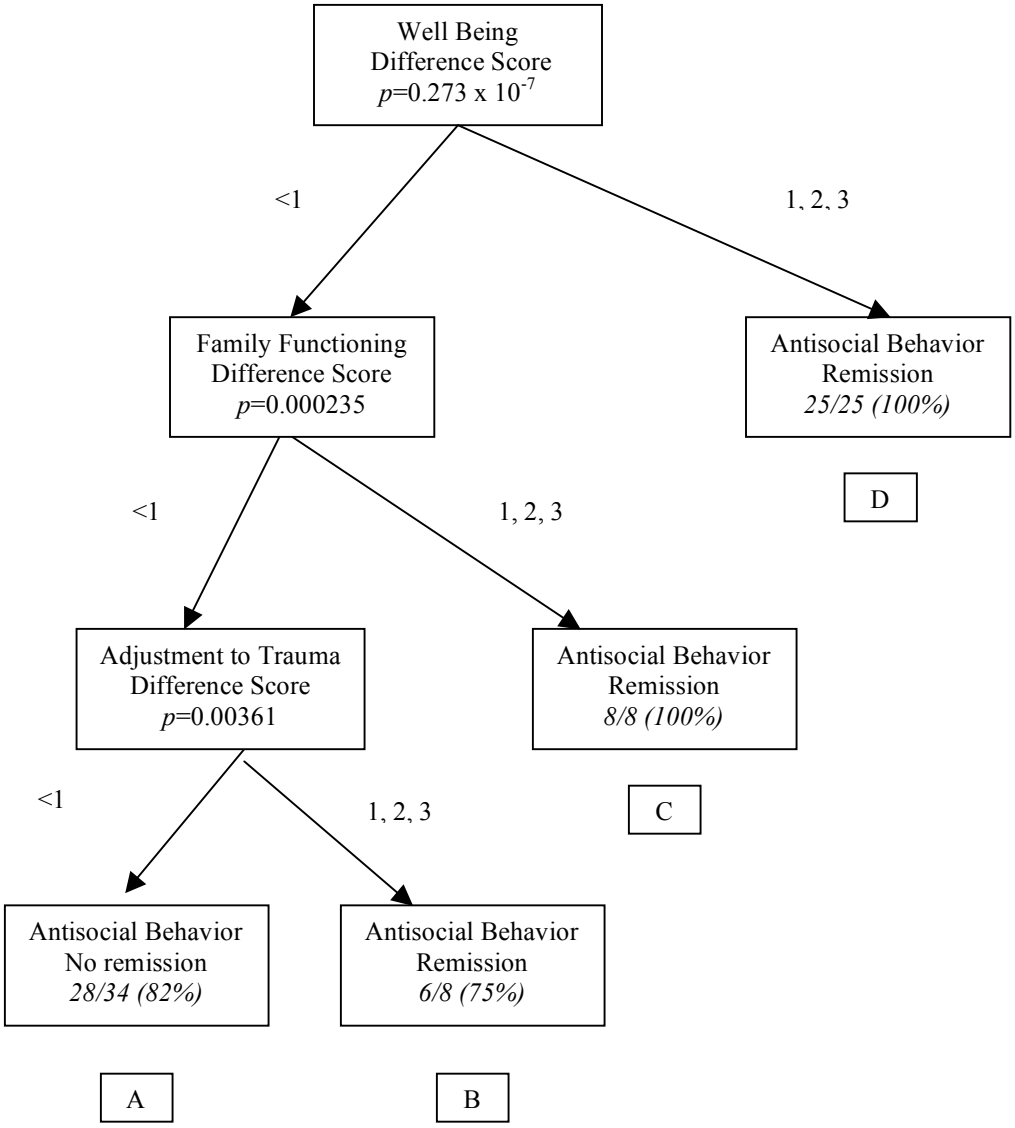
Note. Variables denoted with an asterisk are not LOO stable and, therefore, were not eligible to be entered into the overall classification tree model.

Non-clinical (e.g., demographic) variables and Time 1 clinical and strengths variables did not significantly predict remission status. Among the difference score variables used to successfully predict remission status, variables associated with the CANS problem presentation (e.g., depression and adjustment to trauma) domain, CANS functioning domain (i.e., family and school functioning), and CANS youth strengths (e.g., wellbeing) domain were the strongest predictors of remission outcome. According to the UniODA analysis, change in the youth's wellbeing from Time 1 to termination (or the last data point available) emerged as the single strongest predictor of remission from clinically significant antisocial behavior on the CANS. Youth with no change or negative change in their wellbeing score (difference less than "1") were more likely to *not* experience remission, while those youth with positive change in their wellbeing score (difference of "1", "2", and "3") were significantly more likely to remit from antisocial behavior on the CANS.

Change in wellbeing entered the multivariate analysis first, as it was the single best predictor of remission from antisocial behavior according to the overall uniODA analysis (see Figure 4). The subgroups created by the inclusion of this variable were then submitted to additional uniODA analyses. However, for the subsample of youth predicted to remit (wellbeing difference score of "1", "2", or "3"), all youth were correctly classified. As a result, additional uniODA analyses were not necessary (see node D).

Change in family functioning emerged as the next best predictor of remission from antisocial behavior according to an additional UniODA analysis and, therefore, entered the multivariate analysis next, on the left side of the tree. Youth with positive

Figure 4. Predictors of outcome in a sample of youth with antisocial behavior: Optimal Data Analysis (ODA) results



change in family functioning (difference of "1", "2", or "3") formed the group predicted to remit (labeled node C) and those with a difference score less than "1" comprised the group predicted to not experience remission. The subgroup predicted to remit was not subjected to additional uniODA analyses because all youth in this subgroup were correctly classified (i.e. 100% of those with positive change in family functioning experienced remission). An additional uniODA was run for the group predicted to not remit from antisocial behavior (those with a family functioning difference score less than "1"). Change in adjustment to trauma entered the multivariate analyses next as it emerged as the next best predictor of remission for this subgroup. Youth with positive change in their adjustment to trauma score (difference of "1", "2", or "3") formed the subgroup predicted to remit while those with no change or negative change in their adjustment to trauma score (difference of less than "1") comprised the subgroup predicted to not experience remission. Additional uniODA analyses for both groups did not reveal any variables that further classified the sample significantly. Those with no change or negative change in their adjustment to trauma score (difference of less than "1") were predicted to not experience remission with 82% accuracy (labeled group A) and those with positive change in their adjustment to trauma score (difference of "1", "2", or "3") were accurately predicted to remit from antisocial behavior on the CANS in 75% of cases (labeled group B).

Classification performance statistics were computed for the full CTA model for antisocial behavior, as well as the statistics for each of the remission and no remission group (see Table 13). The overall model was predicted with 89.3% accuracy. The mean sensitivity across classes was 90.8%, with a sensitivity of 87.2% for the remission from

Table 13

Classification performance summary for the classification tree model of remission versus no remission from antisocial behavior (N=75)

Performance Index	Performance Parameter	Effect Strength
Overall Classification Accuracy	67/75 (89.3%)	78.6%
Sensitivity (Remission)	41/47 (87.2%)	74.4%
Sensitivity (No Remission)	34/36 (94.4%)	88.8%
Mean Sensitivity Across Classes	90.8%	81.6%
Specificity (Remission)	39/45 (86.7%)	73.4%
Specificity (No Remission)	28/30 (93.3%)	86.6%
Mean Specificity Across Classes	90.0%	80.0%
Mean Performance Across Classes	90.4%	80.8%

Overall cross-classification table

		Predicted Status	
		No Remission	Remission
Actual Status	No Remission	28	2
	Remission	6	39

Note. Overall classification accuracy is the percentage of the total sample that is correctly classified by the overall tree model. Sensitivity is a predictive indicator of the percentage of the predicted classifications into a given category that were correct. Specificity is a descriptive index of the percentage of the actual members of a given category (i.e., those whose problem behavior remitted) that the classification tree correctly categorized. Effect strength is a standardized index of the performance of the model, defined as the percentage above chance that the model correctly predicts, on a 0-100 scale, where 0 is the performance expected by chance and 100 is perfect classification accuracy. The statistic is computed using the following formula: [(1-{(100-model performance statistic)/(100/C)}) x 100%], where C is the number of response categories for the class variable (Yarnold, Soltysik, & Bennett, 1997, p. 1454). Effect strengths of 25% or less are considered weak, values between 25% and 50% are considered moderate, and those above 50% are considered strong (Yarnold & Soltysik, 2005).

antisocial behavior group and 94.4% for the group that did not remit. The mean specificity across classes was similar, with a mean of 90.0% for the full CTA model. Specificity for the remission group was 86.7% and 93.3% for the group whose antisocial behavior did not remit. The overall classification tree predicted remission 78.6% above chance, which is considered a "strong" effect strength according to parameters set forth by Yarnold and Soltysik (2005).

CHAPTER VI

DISCUSSION

The foster care youth in the current study were referred to an intensive community-based treatment program (SOC) because they were at risk of stepping up to higher levels of care. The particular subsample of youth represented in this study entered treatment in the clinically significant range on one of the following presenting problems variables of a measure known as the Child and Adolescent Needs and Strengths (CANS): psychosis, attention problems, depression, or antisocial behavior. A longitudinal design was then used to explore the demographic, clinical, risk, caregiver needs, and strengths variables from the CANS that were associated with either positive or negative treatment outcomes from intake to the final data point using a classification method known as Optimal Data Analysis (ODA; Yarnold & Soltysik, 2005). Previous research with this population has examined trajectories of change using composite measures of outcomes and has not adequately explored the potentially moderating role of individual demographic, clinical, risk, caregiver needs, and strength variables on outcome (e.g., Sieracki et al., 2008). The approach used in this study explored outcome at the item level, disaggregating statistically and clinically distinct variables (i.e., the psychosis, attention problems, depression, or antisocial behavior items on the CANS), and exploring which variables were associated with remission versus non-remission from these symptoms at follow-up. The exploratory approach of ODA allows for the inclusion of all

variables assessed in the CANS, without compromising the likelihood of Type I error, and permits unique interactions to emerge across a wide range of variables.

Overview of results

Two overarching themes emerged from the results. First, difference scores, rather than Time 1 CANS scores, emerged as the primary predictors of remission. Although Time 1 CANS scores are not controlled for when using ODA, as they are in logistic or linear regression, the results of the multivariate analyses clearly indicate that CANS difference scores have a larger impact, in terms of effect size, on outcome than the Time 1 score only. The results suggest that it matters less how youth enter SOC treatment in terms of clinical severity (e.g., risk behaviors and presenting problems), caregiver needs and strengths, or strengths deficits, but rather how much they change during their episode of care on these key variables that predicts remission status. These difference score findings are intuitive to some degree because the difference score incorporates more information than a Time 1 score; both Time 1 score and change in Time 1 score over time. Nonetheless, these findings suggest that improvement on the clinical presentations studied here (psychosis, depression, attention problems, and antisocial behavior) is strongly correlated with improvement on distinct sets of clinical and strengths variables. This has implications for treatment planning and monitoring, and can inform theories of psychopathology and our understanding of the change process. Several of these implications are addressed in the sections that follow.

The second overarching theme to emerge from the results is that the CANS items that correlated with outcome across the four clinical presentations studied here represent a wide range of intra-individual and broader social and environmental variables. For

clinicians, these findings point to the importance of working at multiple contextual levels (child, family, and broader social environment) when treating youth with psychopathology. Further, the use of ODA in this study to create classification trees makes an additional contribution to the literature because it creates subsamples of youth (the endpoints of the trees), and identifies the contextual level that matters the most to that particular subsample. For example, change in family functioning consistently emerged as a predictor in the results, but only for some of the youth in the sample and not others.

At the individual level, clinical needs (e.g. symptoms and risk variables) and strengths both predicted remission. For example, change in adjustment to trauma, or symptoms of PTSD, emerged as the most consistent youth needs variable across the analyses, while wellbeing emerged as the most consistent youth strengths factor. Regarding the family context, change in overall family functioning predicted remission status in three of the four classification trees. As for the broader social context, school functioning and educational strengths were associated with remission in two of the classification trees. The pattern of results found in this study suggests that the intra-individual, family, and broader social environment all figure prominently in the amelioration of symptomatology, and highlights the importance of using treatments that are able to work at each of these levels. For example, the Oregon Multidimensional Treatment Foster Care (MTFC; Chamberlain, 2003) model, described more below in the antisocial behavior section, takes a multi-contextual approach to the treatment of youth and families with complex needs.

The unique pattern of results found is consistent with the significant trauma and stress experienced by youth in child welfare. Adjustment to trauma consistently emerged as a predictor of remission status in both the univariate and multivariate analyses across all four problem presentation variables examined in this study. This finding is intuitive in that entry into foster care is contingent upon the experience of a traumatic event, be it child abuse or neglect. Additionally, the experience of foster care can be traumatic in it of itself. Entry into care, disruption of educational and mental health services, multiple foster home placements, and abuse within the system all contribute to the experience of trauma for children in foster care (Benedict, Zuravin, Somerfield, & Brandt, 1996; Newton, Litrownik, & Landsverk, 2000; Roberts, 1993; Skarbo, Rosenvinge, Holte, 2004). The identification of adjustment to trauma as a factor in remission from problem behavior supports the use of trauma-focused care in this population. The unique role of trauma for each of the problem behaviors examined in this study will be discussed below. Although causality cannot be determined through the use of ODA, the associations found between adjustment to trauma and remission across all four symptoms supports the use of a trauma-centric model, such as Trauma-Focused Cognitive-Behavioral Therapy (TF-CBT, Cohen & Mannarino, 1996) detailed below, when working with the foster care population.

In addition to directly working to relieve symptoms of trauma, the development of coping skills may also be particularly important for this population, as change in the CANS wellbeing variable was found to be a predictor of remission in three of the four multivariate analyses conducted. Due to the significant stress of entering into the foster care system and the ongoing stress associated with being in the system, the development

of coping strategies to manage stress may directly contribute to the reduction of emotional and behavioral symptoms for youth in the system, who will likely continue to experience challenging environmental stressors. Because of this, strengths-based work focusing on the fostering of coping skills and psychological strengths may also be particularly appropriate for this population.

According to the uniODA analyses performed, none of the hypotheses proposed were fully supported (see Table 5). The hypotheses put forth were driven by the literature, which, to date, has focused on Time 1 intake characteristics of youth in predicting treatment outcomes rather than difference scores. However, the results of this study suggest change in key variables to be a better prognostic indicator than intake characteristics and explain the lack of support for the proposed Time 1-driven hypotheses. The hypotheses that were partially supported by the uniODA analyses (those with a p-value of 0.05 or less) came from a range of contextual levels, including the individual youth (e.g., interpersonal strengths), family (e.g., caregiver knowledge and family organization), and school (e.g., school functioning). These results highlight the complexity of the needs of youth in this population and support a multidimensional treatment approach.

Interestingly, none of the demographic variables (i.e., age, gender, or agency) emerged as significant predictors of remission across the four multivariate analyses. This finding is consistent with previous research involving this specific population (Sieracki et al., 2008) and with the broader child treatment literature. For example, none of the major meta-analyses studying the effects of psychotherapy among youth have shown a significant effect for gender or age (see Weisz, McCarty, & Valeri, 2006). The provider

of care (e.g., therapist, coordinating agency) has become a recent focus of study in the mental health treatment literature and has accounted for as much as 8% of the variance in adult psychotherapy outcomes (e.g., Lutz, Leon, Saunders, et al., 2008). However, recent research with the Illinois SOC population has found that the SOC agency coordinating care has a nominal effect on clinical outcomes of foster care youth (Sieracki et al., 2008). Nonetheless, this study explored whether agency would differentially impact the outcomes of the specific presenting problems studied here (e.g., antisocial behavior or depression), a finding that would have supported the hypothesis that agencies vary in their treatment competencies in terms of presenting problems. However, the agency variable was among the lowest effect sizes across the analyses (see Tables 5-8). The remainder of the multivariate section discusses the subgroups that emerged from each multivariate analysis and explores why change in the variables identified promotes remission.

Multivariate analyses results

Remission from psychosis. Remission was achieved in 55% of the sample of youth who exhibited clinically significant symptoms of psychosis at Time 1. The child treatment psychosis literature is much less extensive than for other clinical conditions. The extant literature shows a wide range of recovery rates from psychosis, from 19%-70%, across studies (Correll et al., 2008; Malla et al., 2002). One reason for the widely varying rates may have to do with the two pathways to childhood psychosis proposed in the literature. The first is organically derived and is marked by a presentation with predominately negative symptoms, while the second pathway is thought to be driven by the experience of psychosocial trauma is childhood, and is associated with fewer negative

symptoms (Read et al., 2003). Psychotic symptoms among children in foster care are likely the result of the second pathway, due to the experience of abuse and neglect that precedes the entry of these youth into care. The current study offers support for this trauma driven pathway: Change in the adjustment to trauma score on the CANS (i.e., PTSD) over the course of treatment was the variable most associated with psychosis remission status.

Two psychosis typologies emerged from the multivariate classification trees. The first indicates a subgroup of youth whose symptoms of psychosis are associated with the experience of trauma (see endpoint C, Figure 1). For this group of youth, remission from psychosis was associated with concurrent change in their adjustment to trauma score on the CANS. The Self-Trauma Model (Briere, 2002) of psychosis may explain the potential role of trauma in the development and maintenance of psychotic symptoms. The Self-Trauma Model suggests that abuse memories and flashbacks are attempts to integrate the experience of trauma and that avoidance and numbing strategies, such as dissociation, are efforts to regulate the affect activated in the process (Briere, 2002). Psychotic symptoms could serve the same psychological function. This subgroup of youth may develop a depersonalization response to regulate the negative affect brought about by memories of the event, bringing the experience into the present as hallucinations, rather than the past as flashbacks, and effectively taking the experience out of its traumatic context, thereby serving as a coping mechanism (Read et al., 2003). The results of this study indicate that for this subgroup of youth whose improvement in trauma symptoms are associated with improvement in their symptoms of psychosis, assessment of comorbid PTSD will be important due to the treatment implications

regarding the primary diagnosis. While it is not clear whether change in symptoms of PTSD cause change in psychotic symptoms or visa versa, it does suggest change in PTSD symptoms to be a prognostic indicator for these youth and that trauma-focused interventions may be warranted as a part of the treatment plan.

Among youth who did not experience improvement in their CANS adjustment to trauma scores, change in attention problems emerged as the best predictor of remission from psychosis (see endpoint B, Figure 1). This subgroup of youth can be understood to have an executive dysfunction typology of psychosis. A study of youth with psychosis found that poor executive functioning predicted conversion from psychotic disorder NOS or brief psychotic disorder to schizophrenia, indicating an association between schizophrenia and poor executive functioning (Correll et al., 2008). Research also suggests that attention problems are the result of impairments in executive functioning (Levy & Hay, 2001). Therefore, it may be the correlation between psychosis and executive functioning deficits that accounts for the comorbidity of psychosis and attention problems in the study sample. For this subgroup of youth, the experience of the hallmark features of psychosis, hallucinations and delusions, may be interfering with the youth's ability to concentrate, leading to attention problems. Alternatively, attention problems may exacerbate the experience of psychosis. Regardless, the findings propose change in attention to be a key prognostic indicator for improvement of psychosis and suggest executive functioning to be an important consideration in treatment planning and case monitoring.

Remission from attention problems. Remission was achieved in 30% of the sample of youth who exhibited clinically significant attention problems at Time 1.

Research has found the diagnosis of ADHD to be highly unstable during adolescence, with stability rates ranging from between 20% to 80% (Steinhausen et al., 2003). The remission results found are fairly consistent with the 37% remission rate found in a study of youth with attention problems enrolled in a nine-month treatment program (Taylor et al., 1991). Again, the reduced remission rate found in this study may be due the complexity needs of youth in this population, as well as the high rates of comorbid depression and oppositional behavior in this sample.

Four typologies of attention problems emerged from the multivariate classification tree. The first identifies a subgroup of youth whose attention problems are associated with symptoms of depression (see right side of the classification tree, Figure 2). Change in depression score emerged as the best predictor of remission from attention problems in the uniODA analysis. Research has found a 20% to 30% comorbidity rate between ADHD and mood disorders (Cuffe et al., 2001). The increased comorbidity in this sample (42%) is not surprising due to the increased rates of mental illness found in the child welfare population. Research has found similar levels of inattention and hyperactivity-impulsivity in youth with and without comorbid depression, suggesting that the comorbidity between the two conditions is not due to a shared association of anxiety or externalizing symptoms (Blackman, Ostrander, & Herman, 2005). However, changes in parenting practices and disruptions in school functioning that are the results of symptoms of ADHD have been found to contribute to the comorbidity between the two conditions in young children (Ostrander, Crystal, & August, 2006). Children with ADHD tend to have impaired peer relationships due to their inability to engage in self-regulation (Barkley, 2003) and impaired psychosocial functioning in general (Rasmussen &

Gillberg, 2000). With age, negative appraisals of social competence by the self and others are proposed to be responsible for the comorbidity between ADHD and depression (Ostrander, Crystal, & August, 2006). Youth with comorbid depression are markedly impaired in social functioning, supporting interpersonal theories of comorbidity between the two disorders (Ostrander, Crystal, & August, 2006). The finding in the current study that improvements in depression scores correlate with improvements in attention problems, such as those consistent with a diagnosis of ADHD, may promote the application of interpersonal theories when treating this subgroup of you and suggest that attention and depression problems be treated conjointly. For example, interventions for these children should address the negative social reputations of these youth by targeting the child's maladaptive behavior, the judgments of others, and the youth's own negative evaluation of their social competence (Ostrander, Crystal, & August, 2006).

The second typology of attention problems identified in this sample is a subgroup of youth whose attention problems are associated with academic functioning (see endpoint D, Figure 2). Change in educational strengths score on the CANS emerged as the next best predictor of remission from attention problems for youth who experienced no change or negative change in their CANS depression score. Youth with ADHD, particularly those with the hyperactive/impulsive subtype, consistently demonstrate more impairment in both academic and social functioning compared to their same-aged peers (Blackman, Ostrander, & Herman, 2005; Steinhausen et al., 2003). Between 19% and 26% of youth with ADHD also qualify for a learning disability (Barkley, 1990). Educational strengths, as defined by the CANS, may be strengths of the school system and/or the youth him/herself. Therefore, adoption of an Individualized Education Plan

(IEP) to address the academic needs of these youth could account for change found on this variable. It may have been the case that these youth entered SOC treatment without appropriate education interventions (e.g., IEPs) and that the services received by the SOC team led to improved education services, which then led to greater likelihood of remission for this subgroup of youth. Therefore, these findings demonstrate the importance utilizing strengths-based programming to promote the buildup of educational strengths of youth with attention problems as well as providing environmental support and specialized educational services for these youth.

The third typology that emerged identifies a subgroup of youth whose attention problems are associated with their experience of wellbeing (see endpoint C, Figure 2). For those youth who experience no change or negative change in educational strengths (and depression scores from earlier in model development), change in wellbeing emerged in the multivariate analyses as the variable most associated with remission from attention problems. The wellbeing variable of the CANS, considered an indicator of "psychological strengths," measures the youth's ability to cope with negative experiences and savor positive experiences. This subgroup of youth may rely on the buildup of psychological strengths to manage their attention difficulties (i.e., ADHD), but it may also suggest that for a subsample of youth, the absence of psychological strengths, such as coping, may be what is centrally associated with their attention problems and therefore essential to the amelioration of the condition. These findings point to the need for the development of coping skills in the treatment of youth with this typology of attention problems.

Finally, an oppositional typology of attention problems emerged from the multivariate tree analysis (see endpoint B, Figure 2). For those youth who experienced no change or negative change in their depression score, no change or negative change in their educational strengths score, and no change or negative change in their wellbeing score, change in oppositional behavior emerged as the last significant predictor of remission from attention problems. The 55% comorbidity of ADHD and externalizing disorders in this sample is consistent with the 55%-75% comorbidity reported in the literature (Angold et al., 1999). Although symptom severity did not emerge as a predictor of remission, this subgroup of youth may be predominately hyperactive-impulsive subtype, which has been associated with a more chronic course of ADHD (Moffitt, 1990; Steinhausen et al., 2003). Remission from attention problems in this subgroup of youth is associated with concurrent improvement in oppositional behavior, suggesting that behavioral interventions be the focus of treatment for this subsample of youth.

Remission from depression. Remission was achieved in 46% of the sample of youth who exhibited clinically significant depression at Time 1. This remission rate is within the range of remission rates (from 37% to 65%) reported for randomized clinical trials of antidepressants and cognitive behavioral therapy in the literature for youth with moderate to severe MDD (see Kennard et al., 2006). Change in adjustment to trauma emerged as the optimal predictor of remission from depression in the UniODA analysis.

Four typologies of depression emerged from the multivariate classification trees. For a subgroup of youth, remission from depression was associated with change in adjustment to trauma (see endpoint F, Figure 3). Research supports the relationship

between trauma and depression in youth, linking exposure to trauma with higher rates of MDD in adolescence (Lewis et al., 2010). As previously stated, the experience of trauma is ubiquitous in the foster care system, from entry into care to youth experiences while in care (Benedict, Zuravin, Somerfield, & Brandt, 1996; Newton, Litrownik, & Landsverk, 2000; Roberts, 1993; Skarbo, Rosenvinge, Holte, 2004). The association between trauma and depression and the prevalence of trauma in the foster care population supports the finding of adjustment to trauma as the best predictor of remission from trauma in this population. Additionally, research has found that the experience of being victimized makes an independent contribution to depressive symptomotology, above and beyond that accounted for by comorbid PTSD, suggesting that the association is due to more than diagnostic overlap (Boney-McCoy & Finkelhor, 1996). According to the learned helplessness theory of depression (Abramson, Seligman, & Teasdale, 1978), the onset and maintenance of symptoms of depression is the result of an interaction between an external locus of control and a negative event, such as trauma. Those with an external locus of control believe that they lack control over the outcome of events in their lives, resulting in a negative attributional style and leaving them more vulnerable to experience depression. The finding that, for a subgroup of youth, remission from depression is associated with concurrent improvement in symptoms of PTSD supports this diathesis-stress model of depression as well as the use of a cognitive approach, such as TF-CBT, with this subgroup of youth to address dysfunctional beliefs and attributions of these youth.

Change in family functioning score emerged as the next best predictor of remission from depression for those youth who exhibited no change or negative change

in their adjustment to trauma score (see endpoint E, Figure 3). However, the subsample of youth in this branch of the classification tree could be further classified with the composite strengths score at Time 1. These findings suggest a family environment subtype of depression and support the behavioral model of unipolar depression (Lewinsohn, Youngren, & Grosscup, 1979). The model proposes that depression results from a stressor, which for this subtype may be the result of stress associated with family dysfunction, that leads to the disruption of normal behavior patterns, resulting in a reduction of positive reinforcement. This negative reinforcement pattern leads to self-criticism and behavioral withdrawal that is socially reinforced by the youth's family through negative feedback and enabling (Antonuccio, 1998). It may be that the youth in this sub-sample who remitted from depression did so because the treatment was able to improve family functioning and engage the youths' strengths to disrupt the pattern of withdrawal and connect the child to his or her positively reinforcing strengths. Taken together, the evidence supports utilizing a family systems approach in treating youth with this subtype of depression, with an emphasis on using strengths to break negative behavioral patterns.

For youth who reported no change or negative change in adjustment to trauma score and no change or negative change in family functioning, change in sexually abusive behavior emerged as a secondary variable associated with remission from depression for a subgroup of youth (see endpoint C, Figure 3). Depression may be related to experience of trauma that resulted in the sexual behavior problems of this subgroup of youth. Sexualized behavior is considered to be a primary indicator of a history of sexual abuse, however, sexual behavior problems have been found in youth with physical abuse

histories as well as those without histories of abuse (Kendall-Tackett, Williams, Finkelhor, 1993). The sexually abusive behavior of youth without abuse histories is suggested to be a part of more global disruptive behavior patterns (ATSA, 2006). For youth with abuse histories, this subgroup of youth may not have experienced many of the classic symptoms of PTSD and, instead, act out their abuse as an attempt to process their experience (Coleman, 2009). The Traumagenic Dynamics Model of child sexual abuse (Finkelhor & Brown, 1985) proposes that rather than manifest traditional symptoms of PTSD, some youth experience change in their cognitive and/or emotional attributional style as a result of sexual abuse (Finkelhor, 1987). According to the model, these changes may result in four dynamics: traumatic sexualization, betrayal, stigmatization, and powerlessness. This subgroup of youth may be responding to an experience of sexual abuse through traumatic sexualization. Remission of depression is associated with concurrent improvement in sexual behavior problems in this subgroup of youth. Treatment efficacy trials have shown that outcomes vary depending upon whether or not sexual behavior problems are the result of trauma or generalized disruptive behavior, emphasizing the need for the assessment of trauma history with these youth. Youth whose sexualized behavior is primarily the result of a history of traumatic stress are best served by TF-CBT infused with sexual behavior problem components to bring about the needed changes in home environment, supervision, and self-control skills (ATSA, 2006). Alternatively, for youth whose sexual behavior problems are merely a part of more pervasive disruptive behavior pattern, a behavioral treatment approach should be used with added components specific to sexual behavior problems (ATSA, 2006). Regardless

of the impetus of such behavior, these results suggest that sexual behavior problems be considered and addressed in the treatment of youth with this subtype of depression.

Finally, a school environment typology of depression was identified from the multivariate analyses (see endpoint B, Figure 3). Change in school functioning emerged as the final significant predictor of remission for those youth did not experience change (or actually experienced negative change) in adjustment to trauma score, no change or negative change in family functioning score, and no change or negative change in sexually abusive behavior. The depression experienced by this subgroup of youth may be the result of negative self-evaluation due to impaired academic functioning. Alternatively, the youth's symptoms of depression may be driving their impaired academic functioning. Depression is associated with a loss of motivation and disruptions in thinking and concentration, which may impair school performance and diagnostic criteria requires symptoms to interfere with functioning across domains, including academic (APA, 2000). Remission of depression for this subgroup of youth is linked to simultaneous improvement in school functioning. Regardless of the causality, treatment of depression for this subgroup of youth should focus on bolstering school functioning and self-concept regarding academic performance.

Remission from antisocial behavior. Remission was achieved in 60% of the sample of youth who exhibited clinically significant antisocial behavior at Time 1. The rate found in this study is consistent with the 58% remission rate of CD reported in the literature (Biederman, Mick, Faraone, & Burback, 2001). Three typologies of antisocial behavior were identified by the multivariate analyses. Change in youth's wellbeing score emerged from the uniODA analysis as the best predictor of remission from antisocial

behavior. For this subgroup of youth, remission of antisocial behavior is associated with coping skills and psychological strengths (see endpoint D, Figure 4). Remission from antisocial behavior was associated with concurrent improvements in wellbeing of the youth, supporting the use of behavioral interventions to control anger and develop effective coping skills and problem solving abilities. Theorists propose that dysfunctional social-cognitive processing contributes to the expression of aggressive and antisocial behavior (Coie & Dodge, 1998). For this subgroup of youth, an evidence-based treatment that focuses on the impaired social cognitions and behaviors that accompany antisocial behavior, such as interpersonal deficits, identification of social cues, generating solutions to social problems, and a negative cognitive bias, such as Problem-Solving Skills Training (PSST; Spivak & Shure, 1974), may allow youth to develop more adaptive coping skills, bolster psychological strengths, and reduce antisocial behavior.

For those youth who reported no change or negative change in their wellbeing scores, change in family functioning emerged as the next predictor associated with remission (see endpoint C, Figure 4). For this subgroup of youth, a dysfunctional family environment may be driving their antisocial behavior. The association between impaired family functioning and antisocial behavior is consistently found in the literature. Youth with childhood-onset CD report inconsistent and insecure family relationships (Moffitt, 1993). Additionally, parenting style and quality of parent-child interactions have been found to mediate the effects of poverty and family structure variables on antisocial behavior (Coie & Dodge, 1998; Rutter et al., 1998). According to the coercive model of family processes, parental involvement, supervision, and discipline strategies mediate

youth behavioral outcomes (Patterson, 1982; Patterson, Reid, & Dishion, 1992). The relationship proposed in the coercive model is bi-directional in nature, with harsh parenting practices exerting a negative influence on the parent-child relationship and children retaliating with noncompliant behavior, prompting the parent to make further demands on the child (Keiley, 2007). This coercive cycle brings about increased family context and decreased family cohesion, which is associated with a more persistent course of antisocial behavior (Biederman, Mick, Faraone, & Burback, 2001). The case becomes additionally complex within a foster care context since biological as well as foster parents enter into the model. Multidimensional Treatment Foster Care (MTFC; Chamberlain, 2003) was developed specifically to address negative coercive processes within the foster care population, providing behavioral training and support for foster parents, family therapy for biological parents, skills training and support for youth, school-based interventions and support, and psychopharmacological consult and management when necessary. Evidence supports the use of MTFC to reduce antisocial behavior and promote appropriate behavioral expression (Leve, Fisher, Chamberlain, 2009). The current study supports the use of empirically supported family interventions in the treatment of foster care youth with antisocial behavior problems.

Change in adjustment to trauma emerged as the final significant predictor of remission for those youth who reported no change or negative change in family functioning (see endpoint B, Figure 4). A history of child abuse and neglect, an experience shared in the foster care population, has been found to predict antisocial behavior and is associated with poorer behavioral outcomes (Coie & Dodge, 1998; Hinshaw & Lee; Moffitt, 1993). A traumatic experience may interact with a biological

predisposition to exhibit antisocial behavior in these youth (Coie & Dodge, 1998; Rutter et al., 1998). Therefore, for a subgroup of youth in this sample, antisocial behavior may be in reaction to a traumatic event, rather than embedded and fueled by a family environment, supporting the use of trauma-focused services for this subsample of youth exhibiting antisocial behavior.

Implications

This study identified variables that were consistently associated with remission across four distinct clinical presentations. Change variables were found to be better predictors of remission than Time 1 variables. It may be that when key factors improve, psychopathology in general is reduced. These findings suggest that treatments should focus on improvement of target variables, such as comorbid conditions, trauma, and internal strengths, to promote remission from psychological disorders. The emergence of both individual and environmental factors as predictors of remission status supports treatment across contexts and the bolstering of home, school, and social supports as well as psychological strengths. The identification of predictor variables across contexts also supports training in multiple modalities, including trauma-focused care, school-based interventions, and family-systems models, for service providers working with this population. Service providers can use the multivariate classification trees presented here to identify the key factors to focus on in treatment based on youth's problem behavior typology to better individualize treatment plans. By utilizing the classification trees, service providers have the potential to focus on core variables at different levels in the youth's life (e.g. individual, family, school) to promote internal strengths and reduce problem behaviors.

Change in adjustment to trauma emerged as a significant predictor in all four classification trees created. As previously stated, the experience of trauma is embedded within the foster care system and, therefore, may be foundational in the manifestation of psychopathology in this population. Trauma-Focused Cognitive Behavioral Therapy (TF-CBT; Cohen & Mannarino, 1996) aims to address the biopsychosocial needs of children with histories of trauma through combined trauma-sensitive, cognitive-behavioral approach, as the name suggests. TF-CBT has been found to reduce symptoms of PTSD in 80% of traumatized children after 12 to 16 hour to hour-and-a-half sessions and is also associated with improvement of depression, anxiety, externalizing behavior, and sexualized behavior (Cohen, Deblinger, Mannarino, & Steer, 2004). Researchers at Northwestern University recently evaluated TF-CBT for children within Illinois' SOC and found youth who received TF-CBT to report significantly greater improvement in PTSD symptoms, internalizing symptoms, and externalizing behavior, as measured by the CANS, compared to those receiving treatment as usual (Northwestern University Mental Health Services and Policy Program, 2008). This evaluation directly tested the effectiveness of trauma-focused treatment in the exact population the sample for this study was taken from, providing strong support for use of this approach with youth in foster care whose problem behaviors are associated with the experience of trauma.

Predictors also consistently emerged from the context of the school environment (e.g. educational strengths and school functioning), supporting the implementation of school-based supports for foster care youth. The Cognitive Behavioral Intervention for Trauma in Schools (CBITS; Jaycox, 2003) is an evidence-based, skills-focused, group format intervention that works to reduce symptoms of PTSD, depression, and anxiety in

youth exposed to trauma. Through relaxation training, thought challenging, and social problem solving, youth develop a skill set to assist them in processing the traumatic event they experienced. In addition to group sessions, CBITS offers individual services for the youth, as well as a parent and teacher psychoeducation component, addressing the multidimensional needs of these youth. The implementation of school-based prevention programs promote inclusion and tolerance within the classroom for youth with emotional and behavioral problems and promote the development of trauma-sensitive school culture, while providing school-based support for youth in need (Jaycox, 2003).

Coping skills interventions may also be particularly suited to meeting the individual needs of youth in the foster care system. Wellbeing, an internal youth strengths variable, emerged as a predictor of remission status across many the multivariate classification trees, supporting coping skills training as a focus in treatment of youth in this population. The Coping Power program (Lochman & Wells, 2002) is an empirically supported prevention intervention targeting youth at risk of substance abuse and delinquency, typically delivered in a school-based setting. The Coping Power program teaches youth social competence and coping skills through structured cognitive-behavioral group and individual sessions and instructs caregivers in positive parental involvement through behavioral parent training groups and individual support. There is evidence to support the use of the Coping Power program in reducing externalizing behavior, preventing substance abuse, and improving social competence (Lochman & Wells, 2002), providing support for the use of this intervention for foster care youth with externalizing symptoms and problem behaviors related to coping skills impairment.

The results of this study have implications on the application of the empirically supported treatment approaches for this population of youth. For example, the Oregon MTFC model is a promising, evidence-based intervention for use with youth with disruptive behavior problems in the foster care population. MTFC addresses the complex needs of these youth through a multi-context intervention approach, providing individual services and support for the youth, family therapy and parent training, and school-based services. However, youth with a family dysfunction typology of disruptive behavior, for example, may be in need of more family therapy than those youth with a trauma typology. This points to the need for individualization of multidimensional models, such as MTFC, to meet the unique needs of youth. These interventions need to be flexible and address the specific variables associated with remission from that typology of problem behavior. The SOC philosophy is founded on the provision of individualized services; therefore, treatment plans of youth within the SOC should personalized to meet the individual needs of these youth. The results of this study can help service providers to personalize multidimensional treatment plans by identifying key variables for intervention (i.e. family environment) and focusing treatment in these areas. Empirically supported treatments need to allow for flexibility in the application of the intervention so that youth can get multidimensional services according to their specific needs.

Limitations and future directions

Although this study extends the current literature by examining outcomes at the item-level and identifying unique interactions predicting remission from problem behaviors, it has several limitations. The primary limitation is in the use of the CANS to

measure predictor and outcome variables. The CANS is a single-informant measure, completed by the caseworker of the foster care youth. Although provider agency did not emerge as a predictor of remission status, the CANS is subject to clinical judgment. Use of a single informant allows for the examination of only one perspective. Future research should include both parent and teacher reports to assess the youth's behavior across contexts and explore the environmental variables, such as family and school functioning, which emerged in multiple classification trees. Youth report measures should also be used, especially when assessing internalizing symptoms. Second, each of the factors included in the analysis was measured by one item. Although there is evidence of unique variability in the individual items within the subscales of the CANS (Miller, Leon & Lyons, 2007), use of a multi-item measure of the domains assess would increase reliability and validity of the results found. Third, the nature of the trauma experienced by the youth in this sample is unknown. A study by Lewis and colleague (2010) of teens with a trauma history and clinically significant symptoms of depression found that youth responded differently to different treatments (e.g., combined treatment, anti-depressants, cognitive-behavioral therapy) based on the type of trauma they experienced. With evidence for differential treatment outcomes based on the nature of the trauma experienced, knowledge of the form of trauma would inform treatment planning. Researchers in the future should explore differences in outcome pathways for youth with different trauma histories. Fourth, causality cannot be inferred using ODA. The results indicate that co-occurring changes in key variables predict remission. For example, the results of this study suggest that for a subgroup of youth, remission from antisocial behavior is associated with concurrent improvement in family functioning (see endpoint

C, Figure 4). However, the results cannot determine if change in family functioning causes change in antisocial behavior or if it is change in the youth's antisocial behavior that causes change in family functioning. Knowledge of causality would make a major contribution to treatment planning and would determine at what level (e.g., individual youth or family-system) the intervention should focus. Future studies should use a longitudinal approach to monitor change in the variables identified as predictors and determine causality. Lastly, ODA is limited to identifying moderating variables and does not provide any information regarding the process that leads to positive outcomes. For example, what is it about improving family functioning for youth with greater Time 1 strength scores that interacts with their typology of attention problems to promote remission (see endpoint E, Figure 3)? Future studies should explore the effects of potential process variables, such as attributional style for this subgroup, on clinical outcomes using a mediational model. Information on mediating variables would identify the key ingredients driving change and would inform the development of individualized treatment plans for youth.

The multivariate classification trees created using ODA identified subgroups of youth whose remission from problem behaviors is associated with co-occurring change in other variables. These subgroups are presented as different "typologies" of the problem behavior. In the future a nomenclature around these typologies should be developed and service providers should be trained on the classification system to allow for consistency in referring to and identifying these subgroups of youth. Future research should explore group differences in clinical and demographic characteristics at intake for these different

typologies of problem behaviors so that youth can be identified early and directed to the appropriate treatment according to their clinical presentation typology.

Finally, the results of this study may inform the future direction of intervention research. For example, subjects with comorbid conditions historically have been ruled out of treatment studies; however, the results of this study suggest that comorbidity may be part of a typology that cannot be overlooked as it plays an integral part in how the condition improves (e.g. trauma-typology of depression). Future intervention research should use the typologies presented here to develop inclusion criteria that allows for comorbidity and evaluates treatment effects for subgroups of youth, providing a more nuanced look at the effectiveness of interventions.

APPENDIX A

SELECTION FROM CANS-MH MANUAL

Following are a summary of the dimensions of the CANS-MH. Unless otherwise specified, each rating is based on the last 30 days. Each of the dimensions is rated on a 4-point scale after routine service contact or following review of case files. The basic design is that '0' reflects no evidence, a rating of '1' reflects a mild degree of the dimension, a rating of '2' reflects a moderate degree and a rating of '3' reflects a severe or profound degree of the dimension. Another way to conceptualize these ratings is that a '0' indicates no need for action, a '1' indicates a need for watchful waiting to see whether action is warranted, a '2' indicates a need for action, and a '3' indicates the need for either immediate or intensive action. In order to maximize the ease of use and interpretation, please note that the last two clusters of dimensions, Caregiver Capacity and Strengths, are rated in the opposite logical manner to maintain consistency across the measure. Thus, in all cases, a low rating is positive. The basic structure of the CANS-MH is:

A. Problem Presentation
- Psychosis
- Attention Deficit/Impulse Control
- Depression
- Oppositional Behavior
- Antisocial Behavior
- Substance Abuse
- Adjustment to Trauma
- Attachment
- Situational consistency of problems
- Temporal consistency of problems

B. Risk Behaviors
- Danger to Self
- Danger to Others
- Elopement
- Sexually Abusive Behavior
- Social Behavior
- Crime/Delinquency

C. Functioning
- Intellectual/Developmental
- Physical/Medical
- Family
- School
- Sexual Development

D. Care Intensity and Organization
- Monitoring
- Treatment
- Transportation
- Service Permanence

E. Caregiver Needs and Strengths
- Behavioral Health
- Supervision
- Involvement with Care
- Knowledge
- Organization
- Resources
- Residential Stability
- Safety

F. Strengths
- Family
- Interpersonal
- Relationship Permanence
- Education
- Vocational
- Wellbeing
- Optimism
- Spiritual/Religious
- Talents/Interest
- Inclusion

CODING CRITERIA

PROBLEM PRESENTATION

PSYCHOSIS

This rating is used to describe symptoms of psychiatric disorders with a known neurological base. DSM-IV disorders included on this dimension are Schizophrenia and Psychotic Disorders (unipolar, bipolar, NOS). The common symptoms of these disorders include hallucinations, delusions, unusual thought processes, strange speech, and bizarre/idiosyncratic behavior.

0 This rating indicates a child with no evidence of thought disturbances. Both thought processes and content are within normal range.

1 This rating indicates a child with evidence of mild disruption in thought processes or
content. The child may be somewhat tangential in speech or evidence somewhat illogical thinking (age inappropriate). This also includes children with a history of hallucinations but none currently. The category would be used for children who are below the threshold for one of the DSM IV diagnoses listed above.

2 This rating indicates a child with evidence of moderate disturbance in thought process or content. The child may be somewhat delusional or have brief intermittent hallucinations. The child's speech may be at times quite tangential or illogical. This level would be used for children who meet the diagnostic criteria for one of the disorders listed above.

3 This rating indicates a child with a severe psychotic disorder. Symptoms are dangerous to the child or others.

ATTENTION DEFICIT/IMPULSE CONTROL

Symptoms of Attention Deficit and Hyperactivity Disorder and Impulse Control Disorder would be rated here. Inattention/distractibility not related to opposition would also be rated here.

0 This rating is used to indicate a child with no evidence of attention/hyperactivity problems.

1 This rating is used to indicate a child with evidence of mild problems attention/hyperactivity or impulse control problems. Child may have some difficulties staying on task for an age appropriate time period.

2 This rating is used to indicate a child with moderate attention/ hyperactivity or impulse control problems. A child who meets
DSM-IV diagnostic criteria for ADHD or an impulse control disorder would be rated here.

3 This rating is used to indicate a child with severe impairment of attention or impulse control. Frequent impulsive behavior is observed or noted that carries considerable safety risk (e.g. running into the street, dangerous driving, or bike riding). A child with profound symptoms of ADHD would be rated here.

DEPRESSION

Symptoms included in this dimension are depressed mood, social withdrawal, anxious mood, sleep disturbances, weight/eating disturbances, loss of motivation. This dimension can be used to rate symptoms of the following psychiatric disorders as specified in DSM-IV: Depression (unipolar, dysthymia, NOS), Bipolar.

0 This rating is given to a child with no emotional problems. No evidence of depression.

1 This rating is given to a child with mild emotional problems. Brief duration of depression, irritability, or impairment of peer, family, or academic function that does not lead to gross avoidance behavior.

2 This rating is given to a child with a moderate level of emotional disturbance. This could include major conversion symptoms, frequent anxiety attacks, obsessions, rituals, flashbacks, hypervigilance, depression, or school avoidance. This level is used to rate children who meet the criteria for an affective disorder listed above.

3 This rating is given to a child with a severe level of emotional disturbance. This would include a child who stays at home or in bed all day due to depression or one whose emotional symptoms prevent any participation in school, friendship groups, or family life. More severe forms of depressive diagnoses would be coded here. This level is used to indicate an extreme case of one of the disorders listed above.

ANTISOCIAL BEHAVIOR (COMPLIANCE WITH SOCIETY'S RULES)

These symptoms include antisocial behaviors like shoplifting, lying, vandalism, cruelty to animals, and assault. This dimension would include the symptoms of Conduct Disorder as specified in DSM-IV.

0 This rating indicates a child with no evidence of behavior disorder.

1 This rating indicates a child with a mild level of conduct problems. Some antisocial behavior in school and/or home. Problems recognizable but not notably deviant for age and sex and community. This might include occasional truancy, lying, or petty theft from family.

2 This rating indicates a child with a moderate level of conduct disorder. This could include episodes of planned aggressive or other anti-social behavior. A child rated at this level should meet the criteria for a diagnosis of Conduct Disorder.

3 This rating indicates a child with a severe Conduct Disorder. This could include frequent episodes of unprovoked, planned aggressive or other anti-social behavior.

ADJUSTMENT TO TRAUMA

This rating covers the reactions of children and adolescents to any of a variety of traumatic experiences from child abuse and neglect to forced separation from family. This dimension covers both adjustment disorders and post traumatic stress disorder from DSM-IV.

0 Child has not experienced any trauma or has adjusted well to significant traumatic experiences. If the child is separated from parents, he/she has adjusted to this separation.

1 Child has some mild adjustment problems to separation from parent(s) or other caregivers or as a result of earlier abuse. Child may be somewhat distrustful or unwilling to talk about parent(s) or other caregivers.

2 Child has marked adjustment problems associated either with separation from parent(s) or other caregivers or with prior abuse. Child may have nightmares or other notable symptoms of adjustment difficulties.

3 Child has post-traumatic stress difficulties as a result of either separation from parent(s), multiple other caregivers, or prior abuse. Symptoms may include intrusive thoughts, hypervigilance, constant anxiety, and other common symptoms of Post Traumatic Stress Disorder (PTSD).

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THESIS APPROVAL SHEET

The thesis submitted by Alison M. Dunleavy has been read and approved by the following committee:

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The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis is now given final approval by the committee with reference to content and form.

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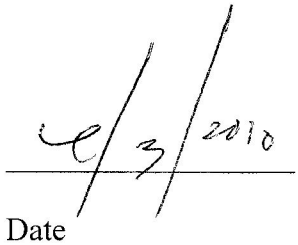

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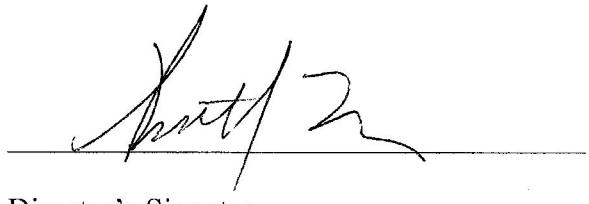

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