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Measuring Mental Health Improvement Among Children Receiving
Community-Based Services in a System of Care; An Idiographic Approach

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Abstract

The system of care (SOC) approach for treating children and adolescents with emotional and behavioral disorders has been implemented in counties, cities, and states throughout the United States. The goal of this study was to assess the predicted course of improvement for individuals enrolled in a statewide program that purports to adhere to SOC principals. 595 children and adolescents (mean = 11.3 years at time of initial contact) receiving community-based SOC services from 26 different agencies throughout Illinois were evaluated using the Child and Adolescent Needs and Strengths (CANS). Hierarchical linear modeling was utilized to measure course of improvement; the problem behaviors factor score of the CANS as the outcome measurement. The results indicate that initial clinical severity, and demographics such as age and gender after controlling for initial clinical severity, predict improvement, and agencies differ in client symptom reduction and in client initial problem behaviors. Future research will explore the factors associated with variability in outcomes at the agency level.

Measuring Mental Health Improvement Among Children Receiving
Community-Based Services in a System of Care; An Idiographic Approach

The system of care (SOC) approach is the most widely employed method of mental health service delivery to children and adolescents with severe behavioral and emotional disturbances in the United States (Stroul & Friedman, 1986; Stroul & Friedman, 1994). The SOC philosophy stresses the involvement of families as part of the treatment process in providing culturally competent services, permanency for children within their own community, and placement in the least restrictive clinically appropriate setting (see Table 1). Therefore, in keeping with these guidelines, communities rich in resources and effective services are seen as the centerpiece of a healthy SOC.

The SOC program is designed to optimally serve children and adolescents' needs; and certainly the vast majority of policy makers that adapt SOC principals have the best interests of children in mind. However, outcome research on SOC programs is necessary to determine if the SOC framework is effective in terms of individual improvement, implementation, and dissemination in real world settings. The research on SOC outcomes is limited overall; previous literature has compared SOC treatment with treatment as usual (e.g., Bickman, Noser, & Summerfelt al., 1999), and these findings provided only modest support for the SOC model. However, this body of research did not provide an idiographic model of outcome that would offer individualized expected courses of improvement for children utilizing SOC. An idiographic approach would allow for the study of how child and ecological variables (i.e., agency providing services) moderate the impact of behavioral health outcomes in an SOC model.

Prior research indicates that the recipient of care and his or her presenting clinical characteristics and demographics play a role in the study of behavioral healthcare outcomes (Clarkin & Levy, 2004). Differences in the average course of improvement may exist depending on demographic (gender, age, ethnicity) and clinical (initial severity, diagnosis) variables (Leon, Kopta, Howard, & Lutz, 1999). Therefore, an approach to outcomes management in a SOC should model outcomes at the individual level.

In addition to differences that may exist at the individual level, variability in outcome may also be attributable to the provider or organization that the individual receives services from. Despite its groundbreaking role in current approaches to service organization and delivery, the SOC model was designed to be a broad philosophy. SOCs are not intended to fit one specific population, and the SOC concept does not utilize strict therapeutic guidelines and does not advocate a particular model of prevention or intervention (e.g. empirically supported treatments; Lemanek, Kamps, & Chung, 2001) or organizational practices. Therefore, it is reasonable to assume that within the context of the multilayered SOC system (Rosenblatt, 1998) service providers operating under the SOC banner approach the implementation of SOC principals and the utilization of empirically supported treatments with significant variability, and that this variability may influence individual outcomes.

The aim of the present study is to assess the real world effectiveness for individuals enrolled in a statewide program that purports to adhere to SOC principals. The two units of analysis are youth receiving a variety of therapeutic interventions and their service providers operating within the context of SOC. A model containing these two units of analysis has two primary applications: (1) to model variability in youth

outcomes (slopes) as a means of providing individualized expectations for improvement for every unique youth in the system and; (2) to model variability in outcomes across providers of care as a point of departure for quality improvement efforts. In addition, variability in outcome measures at the point of initial contact (intercepts) is obtained in order to assess any baseline differences that may exist between individuals. A model for the prediction of individualized outcome data for adolescents involved in SOC would benefit policy makers, clinicians, and families by providing expectations for change tailored to the individual. Furthermore, if variability exists at the level of the provider, these results could be used to develop and export best practice models among agencies or support existing best practices and treatments.

The subsequent literature review first explores the history of mental health service delivery for youth and the emergence of the SOC philosophy in the mid-1980s. It then addresses variability across service providers as a starting point for future efforts to study differences relating to SOC model adherence, provider organization and climate, and decisions relating to type of intervention utilized within the core framework of SOC. Established empirically effective treatment options that fit well within the SOC framework exist and are summarized briefly. In addition to the influence of service provider, the previous research that has demonstrated the influence of demographic and clinical variables on outcomes is discussed. An idiographic, multi-level approach to outcomes monitoring is presented based on prior research that includes both the provider and the individual as levels of analysis. The aim of this approach is to shed light on the differences that may exist between service providers, and create a method for predicting

expected individual course of improvement for children receiving SOC community-based care.

System of Care Background and Overview

Community mental health approaches for the treatment of at risk adolescents grew out of early services for homeless and immigrant children that were first in place at the turn of the twentieth century (Terpstra & McFadden, 1993). In the 1950s, advancements in drug treatment led to decreases in hospitalization. Therefore, the U.S. Congress established the Community Mental Health Center Construction Act of 1963 in order to meet the needs of deinstitutionalized individuals living in the communities. This Act created a nationwide network of community mental health centers (CMHCs). Because the Act did not specifically include children, and many of the CMHCs did not offer services for children or served them in inappropriately restrictive settings, an amendment to the Act, Part F, was passed in 1972 to include programs for children with serious mental health needs (Lourie, 2003).

Although legislation was now in place pertaining specifically to children with behavioral and emotional disorders, a turning point in the history of community services for children occurred when the Children's Defense Fund published a report indicating that children and their families were not provided adequate services (Knitzer, 1982). The report, *Unclaimed Children: The Failure of Public Responsibility to Children and Adolescents in Need of Mental Health Services*, indicated that nearly two thirds of children in need of services were either not provided with services or placed in inappropriately restrictive settings. Furthermore, the report noted that most state mental health offices did not have policies specifically for children and adolescents. In response

to these findings, in 1984, the federal government started another program, the Child and Adolescent Service System Program, better known as CASSP. A goal of the CASSP was to ensure that multiple agencies work with each other and the families of the children in order to facilitate the most appropriate treatment (Day & Roberts, 1991). It was designed to be community focused and to discourage fragmented service delivery. In addition, the program placed emphasis on family involvement at the system level and the recognition of the importance of cultural diversity. It is from this framework that the system of care model for children with severe emotional disturbances was developed (Stroul & Friedman, 1986).

The SOC model encompasses a range of services and treatments guided by an underlying philosophy (Stroul & Friedman, 1986). In keeping with the provisions set forth by the CASSP, the philosophy involves the coordination of multiple agencies and multiple services in order to facilitate a comprehensive, cohesive treatment effort. The multiple agencies that may be employed in the context of community-based SOC treatment include educational agencies, juvenile justice services, mental health, vocational, child welfare, and primary health care (Holden, 2001; Hansen, Litzelman, Marsh, & Milspaw, 2004). These agencies work collaboratively to develop an SOC plan for their clients and families. Some of the many services that these and other agencies operating within the framework of SOC may perform include diagnosis/assessment/evaluation, therapy, case management, in school services and crisis services. The model is a general framework; it does not prescribe a detailed structure for assembling these services. Individual clients will differ on the types of services that they

receive and the majority will not utilize all of the services available to them within the context of their SOC service provider.

SOC treatment, despite the size, location, or structure of the service provider, relies on a set of core values and guiding principals (Stroul and Friedman, 1986) (see Table 1). The set of core values associated with treatment are that service systems are client centered and family focused, community based, and culturally competent. The needs of the child and his or her family drive the program and influence the types of services provided. Participation of family members and family involvement in both treatment planning and service delivery is emphasized. Families assist in the decision making of professionals and policy makers and are viewed as full partners in the treatment process. The model also stresses comprehensive community-based care as opposed to inpatient or residential treatment. An emphasis is placed on the least-restrictive service setting that is clinically appropriate and every attempt is made to utilize services within or close to the client's home community. In addition to SOC intervention and treatment, community outreach and prevention programs are promoted. Furthermore, all SOC programs aim to be responsible and sensitive to the cultural, racial, and ethnic differences of the populations they serve (Pumariiega, 2003). Staff and providers should be knowledgeable, skilled, and aware of the cultural issues in the community. The diversity of the clients, as well as the community and the agencies themselves, are valued and acknowledged throughout the course of treatment (for a complete discussion of core values and principals see Stroul & Friedman, 1996).

The CASSP and SOC framework, core values, and principals have had a major impact on treatment of children and adolescents with serious behavioral and emotional

disturbances and have been utilized in all 50 states (Davis, Yelton, Katz-Leavy, & Lourie., 1995). However, because SOC was designed to be broad in focus, providers may vary greatly in many aspects including: the implementation of SOC principals, the types, quality, and quantity of interventions offered within the SOC, variability in organizational and culture climate, and supervisory, hiring and training practices.

Assessing the differences in treatment outcomes between individuals receiving services from the same and different agencies is an important step in determining the differences that exist at the agency/provider level. Although the present study does not address specific differences that may exist between providers, understanding potential differences at the level of the provider is necessary before studying the variability in provider characteristics or treatments that might be driving these differences. Therefore, the following sections explore reasons why variability may exist at the agency level, and offer support for the hypothesis that the provider (level 3) will predict a significant amount of variability in outcome.

Human Resource Variability

Agencies that purport to adhere to SOC principals are free to refer out to collaborating agencies for services that they cannot adequately provide or choose to build in-house. For example, an agency that does not provide drug and alcohol treatment may refer an adolescent with a substance abuse problem to a provider that operates within the same SOC sphere. In addition, providers may also differ in the ways they use their human resource capital to deliver services (Foster, 2001). For example, almost all system of care programs utilize case managers, but approaches to the implementation of case

managers can vary from site to site, and can include a dedicated case manager, the therapist acting as case manager, or group or shared case management (Vinson, 2001).

Variability in Adherence to SOC Principals

Fidelity checks assessing the implementation of SOC principals in real world settings are important for establishing the effectiveness of SOC. The shift from traditional service delivery to SOC can be a difficult transition for service providers (Lourie, Stroul, & Friedman, 1998). Without fidelity checks, it could be possible that SOC principals are not effectively disseminated to agencies. Research has indicated that SOC providers successfully fulfill certain aspects of the framework in real world settings (Bickman et al., 1999; Vinson, 2001). Vinson studied 27 sites that received federal funds to establish a SOC. A qualitative analysis revealed after a five-year period, most of the sites successfully involved families in service planning and expanded the array of services available. However, no site had fully implemented the entire SOC model. Aspects of the model that sites had difficulty establishing include involving family in system governance and achieving fully culturally competent services.

Variability in Cultural Climate

Regardless of the types of services available or the degree to which an agency has implemented SOC principals, the organizational climate and culture of the provider play a large role in influencing child improvement (Glisson & Himmelgarn, 1998). Factors such as clarity of employee roles and employee opportunities for growth and advancement within the provider positively influence the organizational climate. In addition, Glisson and Himmelgarn (1998) found that staff level of conflict, and personalization were the best predictors of positive adjustment of youth receiving care.

Although the impact of organizational climate and culture in community-based SOC treatment is an area that future research would need to address, assessing the outcomes of individual clients receiving services from different providers is the first step in studying the impact of the provider/organization on outcomes. Data obtained utilizing an idiographic approach to measuring SOC outcomes could be used to document providers that perform better or worse than expected on client outcomes. Future studies could then explore the organizational variables within these service providers that explain client outcomes.

Variability in Interventions: System of Care and Empirically Supported Treatments

Even if a program has a strong organizational framework and is following SOC principals, clinicians may rely on the treatment that they believe is the most effective, without regard to controlled scientific research. Therefore, a program operating under the SOC banner may not adequately implement studied treatments or may even implement treatments found to be ineffective (Rogers, 2003). Although considerable debate exists regarding the utility of empirically supported treatments (ESTs; Bohart, O'Hara, & Leitner, 1998; Chambless & Ollendick, 2001; Garfield, 1996) clinicians are encouraged to use interventions that are based on evidence and empirical science, especially with the increased role of managed care (Hayes et al., 1999). ESTs are developed for a specific population and tested using experimental design (Chambless, Sanderson, Shoham, Bennett-Johnson, & Pope, 1996), and a list of ESTs for children with emotional and behavior disturbances was produced by a task force of the American Psychological Association's Division 12 Section on Clinical Child Psychology (Chambless et al., 1996; Lonigan, Elbert, & Johnson, 1998).

The current study does not explore the effectiveness of ESTs for youth receiving SOC treatment in Illinois. However, a brief survey of these treatments is meant to suggest that great variability exists in potential approaches to treatment; variability that may drive outcome differences at the provider level for the unique recipient of service studied here. Commonly employed empirically supported methods for community-based interventions with children with behavioral and emotional disorders successfully incorporate multiple systems in the treatment modality; examples include multisystemic therapy, wraparound, and treatment foster care. Multisystemic Therapy (MST) is an intensive time limited approach that is effective with chronic and violent juvenile offenders and their families (Henggeler & Borduin, 1990, Henggeler, Melton, Smith, Schoenwald, & Hanley 1993, Borduin, Henggeler, Blaske, & Stein, 1995). MST is based on the concepts of social ecology and views individuals as nested within interconnected systems (Bronfenbrenner, 1979). Therefore, treatment is conducted directly at these levels, in the homes, schools, and communities of the adolescent and his or her family. The wraparound approach encompasses a team of individuals, including the family, who know the youth well and can identify the strengths that he or she possesses (Burns & Goldman, 1999). Families are seen as full partners in creating a program plan for their child and community members (such as ministers, coaches, or teachers) may also be on the treatment team (Hansen et al., 2004). The team determines the nature of care to be offered to the child, purchases the care, and seeks treatment consultation (Huffine, 2002). The model emphasizes that all children have strengths, and interventions are built around the strengths of the client. Finally, treatment foster care is designed to meet the needs of children who require the structure of residential care but would also benefit from the

influence of a family environment (Reddy & Pfeiffer, 1997). It is primarily a skills-based and behavioral approach to treatment that teaches both parents and youth how to communicate effectively with one another and create consistent expectations for positive reinforcement.

MST, wraparound, and treatment foster care therapy are documented to be more efficacious compared to control groups in several randomized clinical trials. However, this design fails to address the question of whether the treatment works in real world situations. This question concerns treatment effectiveness. A treatment that is efficacious in controlled clinical trials may not always be effective in the real world (Hoagwood, Hibbs, Brent, & Jensen, 1995). This may be especially true if a service provider does not follow all of the recommendations for the EST. Therefore, it would be incorrect to equate the multisystemic therapy that is efficacious in controlled studies with the therapy that is provided by the agency unless the agency adhered to the implementation and treatment protocol of the EST as prescribed in the efficacy studies.

Efficacy Research of Community-Based System of Care

The literature on efficacy and effectiveness of SOC programs is relatively new. Because the SOC philosophy does not represent a discrete program, evaluation of the framework can be complex and early attempts to evaluate the success of the SOC model were qualitative and more concerned with SOC implementation, assessing whether a budget was in place or if increased intercommunication between agencies was occurring (Lourie et al., 1998). Although the system of care ideology for community-based treatment is almost twenty years old, there are relatively few studies that assess the efficacy of the model and even fewer that measure the effectiveness (Bickman, 1995). A

notable exception is the Fort Bragg and Stark County Evaluations (Bickman, Summerfelt, & Noser (1997); Bickman et al., 1999). Fort Bragg and Stark County demonstrated an ideological commitment to providing integrated services, involving the family, and cultural competence. The evaluators of both of these studies concluded that the children receiving SOC treatment had access to more comprehensive services than the control group. However, neither study documented significant clinical outcome differences between SOC and control treatments. A potential reason why significant differences were not obtained is that the ideals of the treatment may not be effectively disseminated from the higher levels of the organization to the lower levels. The findings of this study were in line with previous research that has found small to nonexistent effects of community-based interventions in real world settings (in contrast to medium to large treatment effects obtained in university efficacy studies) (Weisz, Weiss, Han, Granger, & Morton, 1995). Although studies have demonstrated support for the idea that children receiving SOC services are getting more comprehensive services (Vinson, 2001); the question of whether or not SOC care treatment actually leads to clinical improvements in real world settings has not been adequately answered in the literature. Clearly more research is needed in this area.

A limitation of efficacy research is that it fails to provide a full picture of optimal outcome or suggestions for outcome improvement. In addition, it does not address individual improvement or lack thereof. A method for the measurement of individual outcome improvement is important for several reasons. It may be used as a source of feedback to the children and their families. If the technique documents that the child is performing below expectations, clinicians may use this information to change the course

of treatment goals and the course of action. The agency can also utilize the outcome measurement for system modification, or Continuous Quality Improvement (CQI) (Bickman et al., 1997). CQI refers to making use of measurement and interpretation in order to provide feedback and improve services. In addition to providing feedback to the clinicians, this approach allows for an effective way of communicating between clinicians. A method for the measurement of individual course of improvement during treatment must take into account individual variables, such as severity at intake and demographic factors.

Clinical Characteristics and Demographic Information in SOC Outcome Measurement

Evidence suggests that variability in outcomes exist across severity of initial clinical symptoms and type of presenting problem, therefore it is expected that these variables will predict client improvement. Initial clinical variables, such as problem behaviors, symptom severity, and level of functioning significantly influence treatment outcomes (Lyons, Griffin, Quintenz, Jenuwin, & Shasha, 2003), are significantly associated with symptom scores after 12 months of SOC treatment (Stephens, Holden, & Hernandez., 2004), and can be used to successfully predict client improvement in psychotherapy (Leon et al., 1999). Therefore, using an instrument that measures clinical variables such as patient symptoms, well-being, and level of functioning is necessary when modeling individualized outcomes in order to assess potential relations between initial characteristics and trajectories for improvement.

Demographic variables such as gender and initial age when entering treatment can be examined as predictors of treatment outcome (Clarkin & Levy, 2004). For example, previous research has documented stronger positive outcomes in psychotherapy with

adolescent girls compared to boys (Weisz et al., 1995; Ponton, 1993). The evidence with respect to the influence of age on the effectiveness of psychotherapy and treatment is mixed (Weisz et al., 1995). Researchers and practitioners have speculated that older adolescents are more cognitively prepared to participate in the therapeutic process than their younger counterparts, while it could also be argued that adolescents may grow more uncooperative as they grow older, and they may be more difficult to treat because they have had problem presentations for longer. Previous research has indicated that older adolescents show less positive changes in treatment than younger children (Weisz, Weiss, Alicke, & Klotz, 1987). Overall then, a model that assesses clinical and demographic is necessary for the optimal prediction of outcomes among youth receiving community-based SOC treatment.

An Individual Approach to Measuring the Effectiveness of SOC

Previous research has measured the effectiveness of system of care treatment in real world situations (i.e. the Stark County and Fort Bragg studies) by comparing SOC treatment either to a control treatment or to populations that do not receive any treatment. A criticism with this type of research from the therapy literature is that the design only explains whether the intervention works for the average patient (Leon et al., 1999). These studies are designed to answer the question “Does this intervention work?” but they fail to answer the more idiographic question “Is this intervention working for this client?” (Leon et al., 1999). This question can be useful to provide feedback and information to the agency/provider regarding clients’ progress relative to pre-treatment expectations and will have the potential to be used in Continuous Quality Improvement efforts.

Examples of efforts to tailor outcome expectations to the individual can be found in the psychotherapy literature (Howard, Kopta, Krause, & Olinsky, 1986; Leon et al., 1999; Kopta, Howard, Lowry, & Beutler, 1994). Howard and colleagues (1986) describe an idiographic approach to outcome measurement known as *patient profiling*. The technique allows for the prediction of the expected course of improvement for a typical patient. This prediction is based on client clinical characteristics that are assessed using a therapeutic outcome measure and other demographic information collected at the onset of treatment. Clinical characteristics include such variables as severity of disturbance at baseline and amount of previous treatment. Demographic information can include age, gender, and race/ethnicity. In patient profiling, the predicted course of improvement is calculated using hierarchical linear modeling (HLM; Bryk & Raudenbush, 1992). At level 1, outcome is modeled as a function of treatment sessions, with increases occurring logarithmically. At level 2, slopes at level 1 are predicted using first session clinical characteristics. At level 3, leftover variability can be modeled as a function of agency/provider. Therefore, the data must contain multiple timepoints and multiple predictors in order for an expected outcome score for each patient to be obtained using HLM.

The theoretical reasoning behind the logarithmic increase in client improvement across time or sessions in treatment studies has been explained using the dosage and phase models of treatment effectiveness (Howard et al., 1986). According to the dosage model, a lawful linear relationship exists between the log of the number of sessions and the normalized probability of patient improvement (Howard et al., 1986). The effect of the relationship is diminished positive returns at higher levels (i.e. number of sessions).

The phase model of psychotherapy addresses the reasons why the dose-effect curve exists (Howard, Lueger, Maling, & Martinovich 1993). The model proposes that improvement occurs in three distinct phases. Remoralization occurs quickly after initial treatment, as the patient begins to feel more hopeful about his or her situation. The second phase of treatment, remediation of the patient's symptoms, results in slower, gradual improvement. Rehabilitation results in increased life functioning. According to this conceptualization, clinicians should treat the distinct phases differently and have different treatment goals depending on the stage of improvement that the client is in.

Using the patient profiling curve and HLM, the expected course of improvement can be compared to the actual course of improvement. For example, suppose Child A, 14 year old, African American female was enrolled in the SOC program. Her clinical diagnosis was depression. Figure 2 depicts her predicted and her actual course of improvement utilizing a hypothetical outcome measurement. Her clinical characteristics predicted that treatment would be more effective than her estimated observed progress score would indicate. This child is performing poorer than expected. The provider could use this information to restructure her individual treatment plan in order to find a more effective solution. Figure 3 depicts Child B, a 16 year old European American male. His clinical diagnosis was conduct disorder. During the first portion of treatment he made steady improvement. However, during the course of his treatment his mother died suddenly. It is likely that the dip in score is attributable to this cause.

The patient profiling technique has been used to create norms for outpatients in individual psychotherapy (Leon et al., 1999; Kopta et al., 1994); however, similar curves have not been constructed for children and adolescents receiving SOC community-based

intervention. The goal of the present study is to accurately plot the typical course of client improvement for children receiving SOC services using the patient profiling technique. The first hypothesis is that such a model can be accurately and reliably applied to this population (Hypothesis #1). The patient profiling curves are constructed using logarithmic data transformation. Therefore, I expect that a logarithmic function of treatment days will fit the data better than a linear function (Hypothesis #2). By examining slopes, the method enables for the prediction of improvement across time-periods on the basis of initial clinical characteristics, such as pretreatment symptom severity, and demographic variables, including age and gender. I hypothesize that pretreatment severity, as measured by time 1 clinical factors, will significantly predict improvement across time (Hypothesis #3). In line with previous research, I expect that girls will improve at faster rates than boys, and that younger children will improve at faster rates than older adolescents (Hypothesis #4). In addition, by examining intercepts, any statistically significant differences in baseline severity between clients that vary in clinical, demographic, or provider/agency factors can be documented. I hypothesize that boys will display significantly higher baseline severity than girls (Hypothesis #5).

Because information on the service providers that each child is utilizing have been collected, the data can also be employed for the assessment of client outcome variability that is due to individual service provider. Therefore, I hypothesize that a significant amount of variability will be due to service provider (Hypothesis #6). Because agencies in SOC are providing a multitude of treatment options and the providers themselves may vary greatly in service delivery, SOC implementation, and treatment strategy, the service provider should strongly influence client course of improvement. In addition, it is likely

that agencies do not receive the same type of clients, both in terms of demographic characteristics and initial clinical characteristics. Therefore, I expect that at the agency/provider level there will be significant variability in the intercept for age, gender, and initial clinical characteristics (Hypothesis #7).

Hypotheses

1. Overall, implementation of HLM will significantly model outcomes across multiple levels. Level 1 includes time as the independent variable; level 2 includes clinical (CANS) and demographic independent variables; level 3 includes service provider as the nesting variable.
2. It will be necessary at level 1 (time) to determine the best fitting curve assumption (i.e., line, logarithmic). I hypothesize that a logarithmic curve with a transformation of treatment days will provide the best fit to the data at level 1.
3. Clinical variables at time 1 (intake) will successfully predict level 1 slopes.
4. Additionally, demographic variables such as gender and age will predict level one slopes. Girls will display higher slopes than boys and younger children will display higher slopes than older adolescents.
5. Demographic variables such as gender and age will be significantly related to intercepts. Specifically, boys will display higher baseline problem behaviors than girls.
6. After accounting for the variance attributable to the first and second level factors, the third level variance will also be significant; indicating that provider placement of the youth is associated with level 1 slopes at a third level in the HLM analyses.

7. Provider placement of the youth will be significantly related to intercepts.

Different providers/agencies will vary on the clients that they receive with respect to initial characteristics.

Method

Participants

Total Sample

The overall sample consisted of 3,950 children and adolescents that were referred to SOC treatment through the Illinois Department of Children and Family Services (DCFS) between September, 1999 and December, 2004. DCFS takes youth who are Illinois citizens into custody when caregiver abuse (physical or sexual) and/or neglect have been indicated by a caseworker. Children entering into the DCFS system have a comprehensive screen to identify mental, developmental, and behavioral healthcare needs. DCFS then becomes legally responsible for all of the youths' needs, including the provision of safe and stable placements as well as medical and mental health treatment.

The total sample was 45% female and 55% male. The average age of the clients at the point of initial contact was 11.3 years old. Race/ethnicity was not reported in the vast majority of cases (90%); the demographics of the cases in which race was reported were; African American 71%, European American 21%, Latino/a 4%, Asian American 3%. The DSM diagnosis given to each client after the point of initial contact is presented in Table 2. The most common diagnoses were Adjustment Disorder, Oppositional Defiant Disorder, and Attention Deficit/Hyperactivity Disorder. DSM diagnosis is determined by the DCFS SOC workers usually after meeting with the Child and Family Team. The team consists of important people in the child's life, such as parents, caregivers, caseworkers, or extended family.

Illinois' SOC Program

When youth begin to demonstrate emotional or behavioral problems, an array of mental health service options are typically available. Beginning in 2002, DCFS implemented a community-based System of Care (SOC) service option. A major priority of Illinois DCFS is maintaining a statewide system of care, which adequately assesses and responds to the needs of a changing child welfare program (State of Illinois DCFS, 2004). SOC was developed with the intent of serving youth in their communities in an effort to prevent placements at more restrictive levels of care and as part of an overall effort to implement CASSP principals. The Illinois SOC program was designed for children and adolescents that were capable of community functioning but would benefit from outpatient care. The program exists on a continuum of care that includes foster care, SOC, specialized foster care, group homes, residential treatment, and psychiatric hospitalization.

All clients that are admitted to the DCFS SOC program reside in the homes of relatives, traditional foster care placements, or DCFS managed foster homes. Children that live in these settings may require more intensive services to supplement the services provided by the Foster Care Agency, or they may be on the brink of transitioning to a more intensive placement. Although the primary clientele of the SOC programs are in community-based foster care; SOC agencies also serve clients in more restrictive settings, including DCFS managed specialized foster care homes, the Department of Corrections, or Institution/Group Home placements. In order to be eligible for the SOC program, children residing in more restrictive settings must be transitioning to the home of a relative or traditional foster care living arrangement. Children living with their biological

parents are not eligible to participate in the program; other resources exist to support this population.

DCFS contracted with local providers (i.e., Community Mental Health Centers, foster care agencies) to serve eligible youth in circumscribed catchment areas known as Local Area Networks (LANs). These contracts were essentially “capitated” service agreements such that providers agreed to serve any eligible youth in the LAN who was referred by a caseworker. Each region of the state is divided into LANs (State of Illinois DCFS, 2003). Whenever possible clients are then assigned to SOC providers in the community, school district, and LAN in which they reside. The client’s caseworker refers the client to the SOC provider serving the LAN within which the client resides.

The mission statement of the Illinois DCFS advocates for a comprehensive continuum of services and family involvement (whether biological or adoptive). A Family Centered Services (FSC) Initiative aims to develop, support, and maintain a coordinated and integrated statewide network of child-centered, family focused and community-based services. The goal of the FCS is to keep children in their communities and to deflect families from entering the state child protection system. Regular Child and Family Team meetings are a vital part of the program, and families are also involved in Administrative Case Reviews. As discussed previously, an important component of the Illinois’ SOC program is the Child and Family Teams. They include core team members, such as parents, caseworkers, and SOC staff, and extended team members. Extended team members are other people that are concerned about the child or youth’s safety and may include probation officers, teachers, siblings, or grandparents. The treatment goals

of Illinois' SOC and program initiatives adhere to the provisions set forth by the SOC founders.

Foster caregivers or caseworkers make referrals to the SOC providers. If the client is accepted into the SOC program, the provider is responsible for planning, organizing, staffing, and administering a community-based SOC that provides an array of therapeutic services to emotionally and behaviorally disturbed clients for whom the DCFS is legally responsible. The provider may offer the services and interventions directly or may arrange selected services through subcontracts or other formal arrangements. Agencies are responsible for providing "wraparound services", which "wrap" youth in their communities while providing comprehensive coverage.

All clients for whom DCFS is legally responsible have an Individual Plan of Care (IPC). This written document specifies the client's strengths, needs, service goals, service provider, and frequency and duration of service provision. The Child and Family Team helps to develop the IPC. The IPC is updated at a minimum of every six months. It is revised to reflect the current needs and strengths of the client as indicated by the CANS and to reflect current service needs.

The Illinois community-based "System of Care" initiative subscribes to the basic principals of SOC as first laid out by Stroul & Friedman (1986). The LAN system is designed to keep the child in his or her community. Wraparound services insure that the child's needs are met in a comprehensive manner. Regular meetings with the Child and Family Team include the family in the course of treatment, and the program is based on child strengths. Illinois' DCFS SOC program meets the goals of the SOC model.

Assessment

Child outcomes were assessed using the Child and Adolescent Needs and Strengths (CANS; Lyons, 1999). The CANS was developed to assess clinical and environmental factors related to adolescent development. The CANS instrument evaluates 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, 2003). The CANS consists of 44 dimensions across six factors; symptoms, risk factors, functioning, care intensity & organization, placement/system factors (caregiver needs and strengths), and child strengths. The average score of the dimensions in each factor was used in the present study in order to obtain average factor scores across each of the five factors. The alpha levels for the combined factors scores are presented in Table 3. Severity ratings are based on a 0 to 3 scale. Across all dimensions, a score of 0 indicates no need for action, a 1 indicates the need for watchful waiting to see whether action is warranted, a 2 indicates need for action, and a 3 indicates the need for immediate or intensive action (see Appendix A). Detailed descriptions for what constitutes each numerical rating for each dimension are provided in the CANS manual.

The CANS has been documented to be a reliable and valid measure (Lyons et al., 1999) It is a useful tool for predicting the level of care that a child is placed in and is correlated with another measure of child outcomes (the Child and Adolescent Functional Assessment Survey: CAFAS; Hodges, McKnew, Cytryn, Stern, & Klein, 1982). It has also demonstrated to be sensitive to change, and therefore, a useful outcome-monitoring tool.

In the Illinois DCFS SOC programs, the CANS is completed when a client is accepted into the program and when he or she is discharged from the program. In addition, the CANS is also administered at intervals throughout each child's placement. The CANS is completed after the client's Individual Plan of Care (IPC) is updated or reviewed. The primary therapist and the Child and Family Team typically complete it. In addition, a full CANS must be completed for any client receiving SOC services for six months. All Illinois DCFS SOC staff are expected to know how to administer the CANS. Northwestern University offers a CANS training, and each provider is expected to designate an individual to receive training to become a CANS Certified Trainer. This CANS Certified Trainer is then responsible for ensuring that all staff are trained on the use of the CANS.

Procedures

The outcome measurement was administered at intake, during the course of treatment, and at the conclusion of treatment. The collection of data at multiple timepoints allowed for the use of hierarchical linear modeling (HLM). Professionals at the agency in which the client was receiving treatment administered the measurement. They received training from an individual at the agency that had completed a "train-the-trainer" course at Northwestern University.

Among other applications, HLM may be utilized in order to understand how people change over time and how that change may be related to other variables (Bryk & Raudenbush, 1992). The dependent variable is the score on the outcome measure at the time of the measurement; the present study utilizes problem behaviors on the CANS as the dependent variable. The independent variables include demographic, clinical, and

agency/provider factors. These factors are used to predict individual differences in change. The level one model of HLM is a within-subjects model expressed as the equation of a line that best fits an individual time path. The slope of the line describes the rate of change in the outcome variable for every one unit increase in time (β_0). The intercept of the line is the outcome variable at baseline (β_1).

Each individual's intercept and slope at level 1 is predicted by the individual characteristics in the level two model. The goal of the second level tests is to ascertain whether differences in the amount of change in the outcome measure can be explained by the other variables. The model consists of the estimated population average intercept (β_{00}) plus random deviation and the estimated population average slope (β_{10}) plus random deviation plus the second level variables. The second level variables in the present study are gender, age, symptoms, risk factors, functioning, child strengths, care intensity and organization, and placement/system factors (the six factors of the CANS). If the predictors differ significantly from zero, there is indication that there is variation at baseline (intercept) or amount of change (slope). In addition, maximum likelihood chi-square tests are conducted in order to assess whether individuals differ significantly in either intercept or slope (i.e. random effects). The null hypothesis is that the intercepts or slopes are the same for all of the individuals in the analysis.

The third level of the HLM analysis describes the amount of variance that cannot be explained by individual and second level factors. In the present study, the third level represents the amount of variance at baseline (intercept) and amount of change (slopes) between different service providers operating within the Illinois DCFS community-based SOC system.

Results

Sample Information

3,950 children and adolescents were documented in the DCFS SOC system during the timeperiod of the study (2001 to 2004). 989 of these children and adolescents were administered the outcome measurement at three or more timepoints during this period, a requirement for inclusion in this study. However, not all of these cases met the inclusion criteria for the present study. One hundred and fifty seven clients (15.9% of the 989 that had three or more datapoints) received services from multiple agencies, and were not administered the outcome measure three or more times at one agency. These cases were excluded from the analyses because the provider variable could not be assessed as a unit of analysis due to the use of multiple providers. In addition, although 100 (10.1%) of the clients received services from only one agency and were administered the outcome measure three or more times, they had multiple treatment episodes. This group of clients did not have three or more datapoints within each treatment episode. These cases were excluded from analyses in order to keep each treatment episode independent. Ninety-six clients (9.7%) received treatment from multiple agencies or underwent multiple treatment episodes, but were administered the outcome measurement three or more times at one of their agencies or during the course of one of their treatment episodes. Only the information pertaining to the episode with sufficient outcome measurements was included in 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. Finally, 5 (.5%) cases were deleted because they contained missing

data. The remaining 595 clients were included in all analyses. These clients received treatment from 26 different providers.

Hypothesis 1: Overall, implementation of HLM will significantly model outcomes across multiple levels.

HLM was conducted in order to analyze the differences in maladaptive behaviors over time. The problem behaviors factor of the CANS was utilized as the outcome measure. Descriptive statistics for all of the variables are presented in Table 4. A model was first tested examining a level one null model; this model consists of treatment days (β_0) plus random variability around this average (representing within-person variability) plus error. There was significant variability in slopes (i.e. random effects, or slopes as outcomes) between individuals ($\chi^2=1027.38, p < .001.$). The children and adolescents receiving services varied on their amount of improvement over time. There was also significant variability in the intercepts (i.e. random effect, or intercepts as outcomes) at level one ($\chi^2=1954.05, p < .001.$). The level of problem behaviors differed significantly between individuals in the present sample. There was a significant drop in problem behavior scores over time ($\gamma = -.003, t = -6.09, p < .001$). The average equation for the sample of 595 clients, without any predictors (i.e., unconditional model), was equal to

$$Y = 6.92 - .003(\text{Days of treatment}) \quad (1)$$

For every day of treatment, the problem behavior factor score on the CANS dropped an average of .003 across all of the children and adolescents receiving services.

The second level model included stable characteristics, such as CANS factor scores at time one, age and gender. The results of the two level HLM with all of the stable characteristic variables included in the model are presented in Table 5. The results

of the trimmed HLM with only the significant level two factors included are presented in Table 6. In both results, the fixed effects are estimated with robust standard errors because the sample size is large (i.e. level two units greater than fifty; Liang & Zieger, 1986). The results indicate that clinical and demographic factors can be utilized to model outcomes. The specific variables that were associated with the outcome will be discussed in Hypotheses 3, 4, and 5.

The level three model assessed the differences in problem behavior that could not be explained by level one or level two factors. Therefore, these differences could be attributed to variability in agencies. The results of the complete level three model are presented in Table 5; the trimmed model with only the significant level three factors is presented in Table 6. At level three, the third level of the HLM analysis (random effect) was significant ($\chi^2 = 3003.78, p < .001$). There is evidence of leftover variance not explained by the individual, clinical, or demographic variables. After accounting for first and second level factors, the individual child remained significantly associated with problem behavior slopes. In addition, there was significant variability around the average problems intercept as a function of agency ($\chi^2 = 363.43, p < .001$). Agencies differed on the amount of average client improvement. The specific findings and variables that were associated with level three outcomes will be discussed in Hypotheses 6 and 7.

Hypothesis 2: A logarithmic transformation of treatment days will provide the best fit to the data.

The previous analysis tested the data without using a transformation of treatment days. However, previous patient profiling research suggests that a logarithmic transformation of treatment days may be more accurate when plotting course of

improvement in treatment (Howard et al., 1986). Therefore, an HLM was conducted in order to analyze the differences in maladaptive behaviors over time using the log of treatment days. Using the level one null model, there was significant variability in slopes between individuals ($\chi^2=925.03$, $p < .001$.) and significant variability in the intercepts at level one ($\chi^2=1286.16$, $p < .001$.). However, neither of the chi square results were as large as the results from the linear model, indicating that fixed effects were larger and random effects were smaller in this model. As in the linear model, there was a significant drop in problem behavior scores over logarithmically transformed days of treatment ($\gamma = -.595$, $t = -6.07$, $p < .001$). The average equation for the sample of 595 clients, without any predictors (i.e., unconditional model), with days of treatment logarithmically transformed was equal to

$$Y = 7.47 - .595(\text{Log of treatment days}) \quad (2)$$

For every log of treatment day, the problem behavior factor score on the CANS dropped an average of .595 across all of the children and adolescents receiving services. The t value of the logarithmically transformed model was not as large as the value in the linear model.

The results of the second level model with all of the stable characteristic variables included in the model and treatment days logarithmically transformed are presented in 7. The results of the trimmed HLM with only the significant level two factors included are presented in Table 8. All of the clinical and demographic factors that were significant in the linear model remained significant in the logarithmic model with the exception of placement/system factors (caregiver needs and strengths) at time one intercept. The time

one risk factors intercept variable, which was nonsignificant in the linear model, was significant in the logarithmic model ($\gamma = .565$, $t = -3.101$, $p < .01$).

At level three, the factors that were significant in the linear model remained significant in the logarithmic model. No variables that were not significant in the linear model were significant in the logarithmic model. The results of the complete logarithmically transformed treatment days level three model is presented in 7; the trimmed model is presented in Table 8. With treatment days logarithmically transformed, after accounting for the influence of the first and second level factors, the HLM analysis remained significant ($\chi^2 = 1899.93$, $p < .001$). In addition, as in the linear model, there was significant variability around the average problems intercept as a function of agency ($\chi^2 = 194.06$, $p < .001$). Other significant effects (see Table 7), include time as a function of agency and time one problem behaviors as a function of agency.

Although there is no test of direct comparison between the two models, the deviance statistic for the logarithmically transformed model (7416.60) is higher than the deviance statistic for the linear model (7284.31). Furthermore, because the chi-square values and t-ratios are higher in the linear model, the hypothesis that a logarithmic transformation of treatment days would provide the best fit to the data is not supported.

Hypothesis 3: Clinical variables at time one will successfully predict level one slopes.

The second level of the HLM was utilized in order to test the hypothesis that clinical variables, at the point of initial contact, would be significantly associated with level one slopes. Because a linear model of treatment days fit the data better than a logarithmic transformation, the linear model was used. As discussed previously, the results of the trimmed HLM with only the significant level two factors included are

presented in Table 6. After trimming the model, the results indicate that problem behaviors at time 1 significantly predicted problem behavior slopes ($\gamma = -.002, t = -7.95, p < .001$). The more problem behaviors displayed at intake, the quicker the problem behaviors decrease on average. In addition, the results indicate that risk at time 1 significantly predicted problem behavior slopes ($\gamma = .0002, t = 3.96, p < .001$). The more risk behaviors displayed at intake, the slower the problem behaviors decrease on average. The other factors of the CANS, functioning, care intensity and organization, organizational factors, and strengths were not significantly related to problem behavior slopes.

Hypothesis 4: Demographic variables will predict level one slopes. Girls will display higher slopes than boys, and younger children will display higher slopes than older adolescents.

The second level of the HLM was utilized in order to test the hypothesis that demographic variables would be significantly associated with level one slopes. Again, the linear model of treatment days was utilized. After trimming the model, the results indicate that age at time 1 significantly predicted problem behavior slopes ($\gamma = .0003, t = 2.99, p < .01$). The older the child or adolescent was at the point of initial contact, the slower the problem behaviors decreased on average. In addition, the results indicate that gender significantly predicted problem behavior slopes ($\gamma = .001, t = 3.34, p < .01$). On average, males' problem behavior slopes decreased at a slower rate than females' problem behavior slopes, indicating that boys improved at a slower rate than girls did. Because race/ethnicity and DSM diagnosis after initial point of contact were unreported in the majority of the cases, these variables were not included in the analyses.

Hypothesis 5: Demographic variables will be related to intercepts. Boys will display higher baseline problem behaviors than girls.

Again, the second level of the HLM was utilized in order to test the hypothesis that demographic variables, specifically gender, would be related to intercepts. In the complete model, the results indicate that gender was not significantly associated with level of problems ($\gamma = .003$, $t = .04$, $p > .05$) (see the results of the HLM with all of the variables included in the analyses; Table 5). Because the intercept of gender was not significantly associated with problem behaviors, the variable was not included in the final, trimmed model. In this sample, there was not evidence that boys began the SOC treatment with higher problem presentation levels than girls. In addition, no specific directional hypothesis was made regarding the relation between the other demographic variable included in the study, age, and intercepts; and no significant relation was found between these variables. In this sample, there was no relation between age at the point of initial contact with the SOC system, and initial levels of problem behaviors.

Hypothesis 6: Third level slope variance will be significant, after accounting for first and second level factors.

As discussed in hypothesis 1, utilizing a linear model the third level of the HLM analysis was significant after accounting for the first and second level factors (random effects; $\chi^2 = 3003.78$, $p < .001$). There is evidence of leftover variance not explained by the individual, clinical, or demographic variables. Although the variance cannot be directly attributed to differences between provider/agencies, it is reasonable to suggest that there were significant differences in the rate of average client improvement between providers. The provider is most likely associated with differences in problem behavior

slopes, although covariates associated with the provider level (such as geographic region of the state) cannot be ruled out.

Hypothesis 7: Provider placement will be related to intercepts.

According to the three level HLM, the variance in intercepts of the provider/agency variables was statistically significant (random effects; $\chi^2 = 38.41$, $p < .05$). There is evidence to suggest that agencies differ in the children and adolescents problem behavior scores at the point of initial contact.

Discussion

Level 1 Discussion

The results of the level one HLM analysis suggest that children and adolescents receiving community based SOC services improve over time, although the gains are modest. According to the coefficients obtained from the study, it takes the average child about a year (333 days) to go down one point in the problem behaviors dimension of the CANS (the outcome measurement). These results are in line with previous meta-analytic findings suggesting that psychotherapeutic treatment for children and adolescents are beneficial in general, but that the effects are relatively weak (Weisz et al., 1995). Several factors could explain why the children and adolescents in the present study and in previous studies improved, on average, at such a low rate. Three broad explanations include the characteristics of the population studied, the fact that the majority of youth were most likely not receiving empirically supported treatments (e.g., MST or Wraparound), and problems with the outcome measurement.

Due to the stress of removal from their home, as well as abuse or neglect that may have occurred prior to their removal, children in foster care are at an increased risk for psychological problems. Estimates indicate the youth in the child welfare system are as much as 8 times more likely to have a mental health diagnosis than the population overall (Burns, et al 2004; Landsverk & Garland, 1999). Additional adversities often exist for maltreated youth entering the child welfare system. Research suggests that the possibility of multiple foster placements, disrupted medical and educational services and the potential for abuse while in foster care all place wards at risk for increased adversity and concomitant psychiatric symptomatology (Newton, Litrownik & Landsverk, 2000;

Benedict, Zuravin, Somerfield & Brandt, 1996; Roberts, 1993). Therefore, the youth in this sample are highly disadvantaged and in this respect even slight improvement might be encouraging. To date there is not enough outcomes research with youth in the child welfare system to adequately provide a benchmark for the current set of findings; however this fact alone argues for the importance of the current study.

Second, as discussed above, there now exists a substantial literature demonstrating efficacious treatments for specific populations. And while the SOC is a guiding philosophy for conceptualizing the organization of services, it is the specific treatments such as MST, Wraparound, and Treatment Foster Care that arguably have the largest impact on youth's mental health outcomes. Weisz & Weiss (1989) conducted a classic study of treatment as it normally occurs in typical community settings. Unlike studies of established treatments conducted in more controlled research settings, the results did not show significant main effects for therapy. The findings raise questions about the generalizability of results from research to practice. Extrapolating to the present study, it is likely that the youth in the current sample were not receiving empirically supported treatments.

In the present study, clinical improvement is measured in days (according to the linear model); therefore, it is not surprising that the negative slope was small. However, even after over a year, the average problem behavior score on the CANS fell by only about a point. The CANS was typically administered once every six months unless special circumstances (transfer of placements, new case conceptualization, etc.) necessitated it. Perhaps if the measurement was administered more frequently, improvement would have been more readily detected.

Although the results of the study do suggest a significant decrease in problem behavior over time, the lack of a pattern of rapid initial improvement followed by a period of leveling off but continued improvement (logarithmic transformation) is not consistent with the patient profiling research (e.g., Howard et al., 1996). Psychotherapy studies utilizing the patient profiling technique have documented steep initial increases in functioning that eventually level off over time. Therefore, the purpose of transforming treatment days logarithmically was to assess if this model held for the community-based SOC sample. Although the results of the analyses were significant, they did not support the notion that SOC treatment fit the patient profiling model any more accurately than a standard linear model. Because of their initial severity, the children receiving services may have needed more time to benefit from treatment. Therefore, in this sample, a pronounced initial spike in CANS score that eventually leveled off did not fit the data as well as a regular linear model. Another potential explanation is that many of the patient profiling studies measured outcome on more frequent basis (Leon et al., 1999; Kopta et al., 1994). Perhaps the spread of time between assessments did not facilitate an accurate representation of a true logarithmic function.

Level 2 Discussion

The individual children and adolescents in the present study that received community based SOC services improved at significantly different rates. The level two results assessed differences that could be attributed to baseline clinical severity and demographic factors. Several initial clinical factors were significantly related to outcomes. The results indicated that higher initial problem behavior scores were associated with increased rate of improvement. The most likely explanation for this

finding is the regression to the mean effect. The individuals that started out displaying higher rates of maladaptive behavior had more ground to make up during treatment. For example, clients that may be initially rated as a three on a particular item of the CANS when they first receive treatment, indicating the need for immediate action by the staff or treatment team, may quickly be downgraded to a score of two, indicating need for staff monitoring and action if necessary, once treatment begins. Risk behaviors, including danger to self, danger to others, and elopement, were associated with slower average rate of improvement. Self-harm risk or risk of harm to others is associated with poorer prognosis in child outcome studies (Lewinsohn et al., 1990). These risk behaviors may moderate the effect of treatment on client improvement. Children and adolescents displaying these behaviors are less likely to display higher negative slopes (indicating improvement) than their counterparts that do not display these behaviors. Identifying children that display high risk behaviors at the onset of community based treatment therefore has important implications for treatment conceptualization and prognosis.

Demographic factors were also associated with rate of improvement. As hypothesized, older adolescents improved more slowly on average than younger children. Teenagers may be more reluctant to attend sessions and less responsive to interventions, and they might have had symptomatology for a longer period of time (Kazdin, 2004). However, the research is inconclusive on the effect of age on treatment outcome, and previous community-based studies have found a lack of evidence or contradictory evidence for age effects on the course of treatment (Greenbaum et al., 1998). Therefore, the effectiveness of community-based treatment across age range is an area for continued exploration.

The hypothesis that boys would display more symptomatology than girls was not supported. Although boys had slightly higher CANS problem behavior scores, the difference was not significant. It is likely that there may have been differences between the genders on individual items of the CANS (for example, antisocial behavior and substance abuse); however, in the present study the individual items of the CANS domains were combined to form one factor score.

Level 3 Discussion

The level three results indicate that agencies differ on the both the level of problem behaviors at time 1 and the decrease in problem behaviors. Therefore, although certain providers may have clients with higher initial problem behaviors, there is a difference in the reduction of problem behaviors between agencies. The evidence that initial problem behaviors and initial risk behaviors are related to slopes, is an indication that certain clinical variables at time one predict slopes as a function of agency. These results are important for several reasons. Agencies that are not particularly successful in treating clients might claim that they "receive the worst kids", and therefore, have a more difficult job. Although the results of the present study confirm that certain agencies operating within the Illinois SOC program had clients with higher problem presentation scores at intake, agencies significantly differed on the amount of improvement after controlling for initial problem behaviors. Children and adolescents in certain agencies improved at a faster overall rate than counterparts receiving services elsewhere did. As discussed earlier, potential reasons for the difference in improvement include provider adherence to SOC principals, organizational climate and culture factors, and implementation of effective treatments. The present study is not a randomized clinical

trial of SOC or EST principals, and it does not address the efficacy of the SOC program. However, it serves as a foundation for establishing differences in outcomes at the individual level based on service provider, and future research will study the provider in detail in order to assess variability in outcomes due to specific agency factors.

Limitations

This study had several limitations. Diagnosis, race/ethnicity, and region were not included in the analyses. The fact that over 40 percent of the population did not have a diagnosis made it impossible to use as a predictor variable. However, DSM diagnosis is often not a reliable measure, especially the diagnosis that is received immediately following the point of initial contact with the system. Previous research has documented differences in clinical improvement based on diagnosis, although others have not found a difference in outcomes between externalizing and internalizing children (Kazdin, 2000). In addition, the lack of coding for race or ethnicity on the majority of cases prevented this from being included as a variable. Although not specific to the hypotheses in the present study, it would be important to know if clinical improvement differed as a function of client race or ethnicity. Ethnicity and race may have an impact on risk and protective factors and course of improvement in children and adolescents (Tharp, 1991). Using a dichotomous variable for ethnicity, the national adolescent and child treatment study (NACTS) found that minority children's problem behaviors declined at a more rapid rate than non-minority children (Greenbaum et al., 1998). The minority and non-minority children did not differ on the outcome measurement at time 1, therefore the regression to the mean effect was most likely not the explanation for the discrepancy. The inclusion of a race/ethnicity variable in this sample would have been useful for confirming the

reliability of their findings. Although the study contained information about what providers the children and adolescents received services from, a variable for region or location of the state was not included in the analyses. Although not specific to the hypotheses in the present study, it is possible that clients receiving services in different parts of the state (Chicago, the Chicago suburbs, downstate, etc.) are different in terms of initial symptom severity and/or clinical improvement, and that this regional variation is a contributor third level agency/provider variation. Controlling for this factor would have provided stronger evidence for the conclusion that level three variance is due to agency/provider factors and not other extraneous variables.

The CANS is the only outcome measurement utilized in the study. Although the CANS protocol is familiar to the majority of Illinois SOC professionals, and it has sufficient reliability and validity (Lyons et al., 1999), it has historically been used for decision support (i.e., appropriateness of admission versus deflection from the hospital) and has not previously been used to monitor outcomes on the scales used here. This is one reason for the limited psychometric statistics available for the CANS scales. Previous research has used interclass correlations to establish the reliability of domain scores for the CSPI, a similar measurement tool to the CANS (Lyons, Rawal, Yeh, Leon, & Tracy, 2002). Future research should establish the internal consistency and construct validity of the CANS scales used here through exploratory and confirmatory factor analysis.

In addition, it would have been useful to have complementary measures of client outcome. Similar studies have used the CBCL (Greenbaum et al., 1998), the CSPI (Lyons, 1998), or the Ohio Scales (Karpenko and Ogles, 2006) rating indices to measure

child and adolescent behaviors and symptoms. However, the fact that the CANS has multiple uses (decision management, outcomes, etc.) makes it a valuable tool in an SOC agency environment in which the staff have many obligations. More objective measures such as placement stability, the probability of "stepping up" to higher levels of care (i.e. from community based SOC treatment to a residential treatment facility or psychiatric hospitalization), contact with a SASS (Screening, Assessment and Support Services) worker (Leon et al., 2006), contact with law enforcement, or educational attainment (Greenbaum et al., 1998) would also be useful to complement the more subjective CANS.

As discussed previously, it would have been useful for the purposes of the study if the CANS would have been administered on a more regular basis throughout the course of treatment (especially in determining if a logarithmic transformation in treatment days fit the data more accurately than the linear model). However, professionals in the system of care are busy with a multitude of tasks and demands; therefore, in reality it may be too much of a time commitment to complete a CANS for every child on a weekly basis. In addition, given the item structure, the CANS is not sensitive to change over shorter time periods than three months (Buddin Pread Foundation, 2006). Perhaps future research could utilize a shortened form of the problem behaviors scale administered on a more frequent basis, such as every three months, to complement the less frequent administering of the complete CANS. In addition, as discussed previously, for the purposes of this study, the factor scores of the CANS were combined into one variable. Although the alpha levels were acceptable, this strategy has not been used in previous research using this outcome measurement.

The results indicate that agencies differ in the amount of client improvement and initial clinical characteristics. However, beyond the fact that there are differences between agencies, the present study does not include information on other facets of the SOC providers. As discussed previously, there could be specific agency variables such as organizational climate, use of empirically supported treatments, and implementation of SOC principals that could be related to improved outcomes.

Although the study includes information from all of the DCFS SOC service providers in the state of Illinois, there were disparities in the quantity of useable data from each provider. Several of the providers did not administer the CANS three or more times to any of their clients. Certain agencies may not have administered the CANS every six months as they were instructed or some agencies may not have had the resources to care for the children and adolescents for the period of time necessary to obtain three CANS measurements. However, because the study does not have information pertaining to the specific providers/agencies, the reasons why the disparity exists in the current analysis can only be speculated.

A final limitation is the lack of fidelity checks to assess the implementation of SOC principals at the agency level. Although the providers utilized in the study purport to adhere to the SOC model as prescribed by the state of Illinois, without a fidelity check it cannot be certain that they actually did this in practice. A tool for measuring the degree to which service and support planning and delivery is consistent with SOC values, the System of Care Practice Review (SOCPR), has recently been developed (Hernandez et al., 2005). The SOCPR assesses the real world implementation of SOC. Interviews are conducted with the child, the primary caregiver, the service provider, and any other

entities providing treatment. The measurement may be used in future studies for assessing the adherence to the SOC model and for providing constructive feedback to the service provider regarding implementation of SOC concepts.

Future Directions

The present study has several important implications for both future research directions and program implementation in applied settings. The finding that children and adolescents involved in the Illinois DCFS community-based SOC program improve over time, even if the resulted gains are relatively modest, are encouraging. The evidence that certain demographic characteristics and baseline clinical characteristics significantly predict improvement has implications for treatment. Treatment providers can offer more intensive treatment to those individuals that display characteristics that are associated with slow progress or negative improvement, for example children and adolescents that display high risk behaviors. Future research should continue to explore the extent to which clients of different demographic backgrounds and clinical variables differ in terms of severity and clinical improvement.

Further, in keeping with the uses of the patient profiling in the adult psychotherapy literature (Howard et al, 1996), the results developed here can be used to create expectations for change among future youth entering the system. This idiographic approach to outcomes management allows us to create an expected change trajectory derived from time 1 characteristics. Using these expected courses of improvement will allow for empirically-derived quality assurance management. For example, if a youth who is expected to make rapid improvement actually begins to deteriorate, we can use this information to intervene more quickly (see Figure 1).

In addition, the present study offers evidence that receiving services from community-based SOC treatment agencies are significantly associated with certain aspects of individual improvement. Among other factors, the amount of individual improvement depends on the particular treatment provider. Therefore, a logical progression in the research is to explore the agency/provider factors that are associated with outcomes. As discussed previously, a limitation with the current study is the lack of specific variables associated with the agencies operating within the Illinois DCFS SOC program. Future research planned by the research team will gather data on the agencies in order to explore the reasons why certain agencies perform better or worse than expected. Information on the organizational climate, demographics of the agency, implementation of SOC principals and core values, and use of empirically supported treatments will be obtained. Once data is collected on factors that lead to agencies performing better or worse than expected based on client characteristics, the information could be utilized for agency quality improvement and modification. For example, if a significant link is found between use of empirically supported treatments and better than expected outcomes, then this information can be disseminated to the service providers in order to improve services. The goal of the research program would be an improvement in the service delivery of community based treatment options for children and adolescents and increased understanding about the effectiveness of these treatment options for the individual child. The present study is an important first step toward the realization of that goal.

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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 Principals

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. xxiv), by B. Stroul and R.M. Friedman, 1986

Table 2

Initial Diagnosis of Clients in Overall Sample

<u>Diagnosis</u>	<u>Cases</u>	<u>% of Total</u>
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

<u>Diagnosis</u>	<u>Cases</u>	<u>% of Total</u>
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

<u>Diagnosis</u>	<u>Cases</u>	<u>% of Total</u>
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

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

Table 4

Descriptive Statistics

	<i>Mean</i>	<i>SD</i>
Level 1 variables		
Problem Behavior	6.44	3.19
Level 2 variables*		
Problem Behavior	6.92	3.11
Risk Factors	3.08	2.31
Functioning	3.66	1.77
Care Intensity & Organization	3.43	2.15
Placement Factors	3.21	2.96
Strengths	12.42	4.48
Age	11.58	3.95
Gender		

* at time one

Table 5

Three-Level Analysis Using a Linear Model of Treatment Days with Everything in Model

<i>Fixed Effect</i>	<i>Coefficient</i>	<i>se</i>	<i>t Ratio</i>	<i>p value</i>
Level 1				
Average problem behavior	7.10	.286	24.85	.001
Level 2				
Problem behavior intercept	.970	.018	52.35	.001
Risk behavior intercept	-.041	.023	-1.81	.081
Functioning intercept	.045	.026	1.86	.074
Caregiver intensity intercept	-.020	.020	-1.00	.327
CG intercept	.025	.016	1.61	.120
Strengths intercept	-.009	.006	-1.48	.152
Age intercept	.002	.008	.254	.802
Gender intercept	.003	.082	.039	.969
Problem behavior slope	-.002	.001	-8.17	.001
Risk behavior slope	.001	.001	3.70	.001
Functioning slope	-.001	.001	-.158	.877
Caregiver intensity slope	.001	.001	1.49	.150
CG slope	.001	.001	.116	.909
Strengths slope	.001	.001	.455	.652
Age slope	.001	.001	3.10	.005
Gender slope	.001	.001	1.73	.096

Table 5

*Three-Level Analysis Using a Linear Model of Treatment Days with Everything in Model**(cont.)*

<i>Random Effect</i>	<i>Var. Comp.</i>	<i>df</i>	χ^2	<i>p value</i>
Time as a function of child	1.37	15	261.12	.001
Average problems as a function of agency	.056	15	8.88	>.500
Average risk as a function of agency	.057	15	6.00	>.500
Average functioning as a function of agency	.087	15	7.74	>.500
Average caregiver intensity as a function of agency	.049	15	5.64	>.500
Average CG as a function of agency	.044	15	6.44	>.500
Average strengths as a function of agency	.009	15	3.62	>.500
Age as a function of agency	.022	15	4.60	>.500
Gender as a function of agency	.250	15	5.31	>.500
Time as a function of agency	.002	15	32.11	.006
Time as a function of problems	.001	15	13.14	>.500
Time as a function of risk	.001	15	10.80	>.500
Times as a function of functioning	.001	15	9.70	>.500
Time as a function of caregiver intensity	.001	15	16.22	.368
Time as a function of CG	.001	15	14.54	>.500
Time as a function of strengths	.001	15	25.88	.039
Time as a function of age	.001	15	15.00	>.500
Time as a function of gender	.002	15	5.96	>.500

Table 6

Three-Level Analysis Using a Linear Model of Treatment Days, Trimmed Model

<i>Fixed Effect</i>	<i>Coefficient</i>	<i>se</i>	<i>t Ratio</i>	<i>p value</i>
Level 1				
Average problem behavior	-.003	.001	-6.09	.001
Level 2				
Problem behavior intercept	.950	.028	33.35	.001
Problem behavior slope	-.002	.001	-7.95	.001
Risk behavior slope	.001	.001	3.96	.001
Age slope	.001	.001	2.99	.003
Gender slope	.001	.001	3.34	.001
<i>Random Effect</i>	<i>Var. Comp.</i>	<i>df</i>	χ^2	<i>p value</i>
Time as a function of child	.001	563	3003.78	.001
Average problems as a function of agency	1.906	22	363.425	.001
Time one problem behaviors as a function of agency	.006	22	44.718	.003
Time as a function of agency	.001	22	38.405	.016

Table 7

Three-Level Analysis Using a Logarithmic Transformation of Treatment Days with Everything in Model

<i>Fixed Effect</i>	<i>Coefficient</i>	<i>se</i>	<i>t Ratio</i>	<i>p value</i>
Level 1				
Average problem behavior	7.48	.335	22.37	.001
Level 2				
Problem behavior intercept	1.17	.046	25.51	.001
Risk behavior intercept	-.122	.055	-2.19	.038
Functioning intercept	.047	.049	.97	.339
Caregiver intensity intercept	-.052	.052	-1.01	.323
CG intercept	.01	.019	.88	.385
Strengths intercept	-.03	.019	-1.58	.125
Age intercept	-.03	.200	-1.57	.127
Gender intercept	-.25	.125	-2.01	.055
Problem behavior slope	-.25	.100	-8.03	.001
Risk behavior slope	.11	.035	3.19	.004
Functioning slope	.003	.044	.077	.939
Caregiver intensity slope	.04	.386	1.04	.311
CG slope	.016	.021	.767	.450
Strengths slope	.017	.022	.778	.444
Age slope	.043	.016	2.68	.013
Gender slope	.248	.082	3.03	.006

Table 7

Three-Level Analysis Using a Logarithmic Transformation of Treatment Days with Everything in Model (cont.)

<i>Random Effect</i>	<i>Var. Comp.</i>	<i>df</i>	χ^2	<i>p value</i>
Time as a function of child	1.56	15	109.86	.001
Average problems as a function of agency	.149	15	17.18	.308
Average risk as a function of agency	.177	15	11.08	>.500
Average functioning as a function of agency	.115	15	9.12	>.500
Average caregiver intensity as a function of agency	.155	15	15.01	.451
Average CG as a function of agency	.070	15	6.98	>.500
Average strengths as a function of agency	.058	15	12.24	>.500
Age as a function of agency	.061	15	9.80	>.500
Gender as a function of agency	.385	15	7.59	>.500
Time as a function of agency	.387	15	33.41	.004
Time as a function of problems	.099	15	16.45	.353
Time as a function of risk	.102	15	13.73	>.500
Times as a function of functioning	.121	15	13.56	>.500
Time as a function of caregiver intensity	.115	15	20.69	.147
Time as a function of CG	.081	15	15.46	.419
Time as a function of strengths	.073	15	23.96	.065
Time as a function of age	.050	15	14.05	>.500
Time as a function of gender	.254	15	5.88	>.500

Table 8

Three-Level Analysis Using a Logarithmic Transformation of Treatment Days,

Trimmed Model

<i>Fixed Effect</i>	<i>Coefficient</i>	<i>se</i>	<i>t Ratio</i>	<i>p value</i>
Level 1				
Average Problem Behavior	-.595	.098	-6.067	.001
Level 2				
Problem behavior intercept	1.19	.049	24.53	.001
Risk factors intercept	-.175	.057	-3.10	.002
Problem behavior slope	-.264	.032	-8.15	.001
Risk behavior slope	.156	.038	4.06	.001
Age slope	.027	.009	2.95	.004
Gender slope	.145	.046	3.15	.002
<i>Random Effect</i>	<i>Var. Comp.</i>	<i>df</i>	χ^2	<i>p value</i>
Time as a function of child	.541	538	1899.93	.001
Average problems as a function of agency	2.17	22	194.060	.001
Time as a function of agency	0.135	22	60.606	.001
Time one problem behaviors as a function of agency	.002	22	34.780	.041

Figure 1
Course of Improvement for Client A

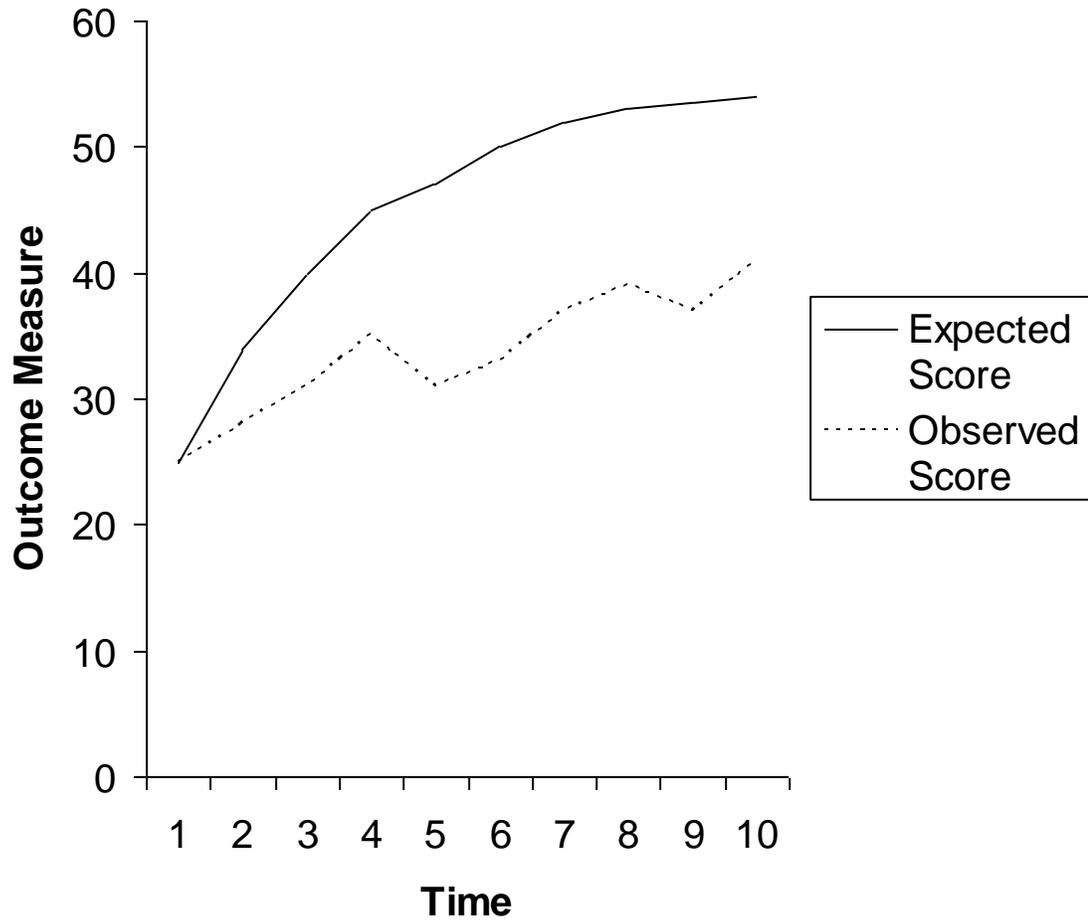
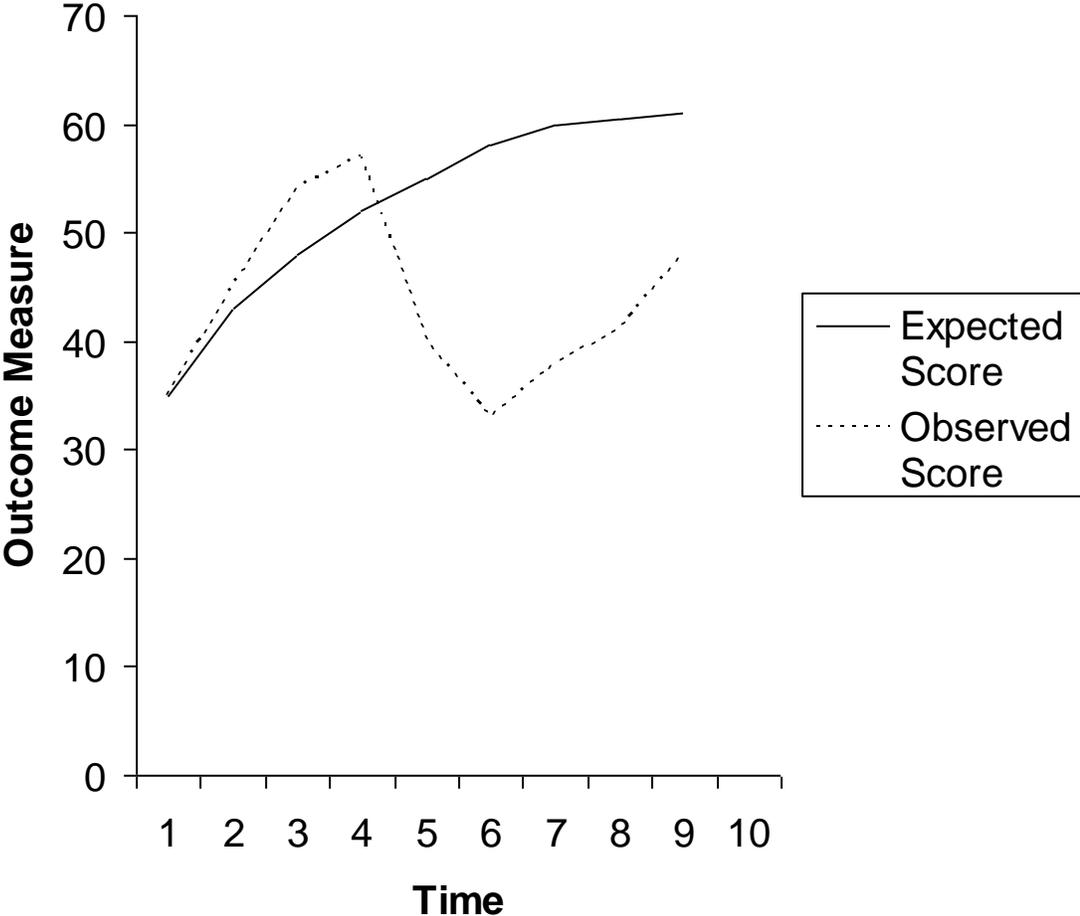


Figure 2

Course of Improvement for Client B



Appendix A

Child and Adolescent Needs and Strengths (CANS) - Examples

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.

DANGER TO SELF

This rating describes both suicidal and significant self-injurious behavior. A rating of 2 or 3 would indicate the need for a safety plan.

- 0** Child has no evidence or history of suicidal or self-injurious behaviors.
- 1** History of suicidal or self-injurious behaviors but no self-injurious behavior during the past 30 days.
- 2** Recent, (last 30 days) but not acute (today) suicidal ideation or gesture. Self-injurious in the past 30 days (including today) without suicidal ideation or intent.
- 3** Current suicidal ideation and intent in the past 24 hours.

Buddin Praed Foundation (2001). [Child and Adolescent Needs and Strengths](http://www.buddinpraed.org/form/cans-mhman.asp)

Retrieved August 15, 2005 from <http://www.buddinpraed.org/form/cans-mhman.asp>