PREDICTING YOUTH ADJUSTMENT FOLLOWING SERVICE DISCHARGE IN A SYSTEM OF CARE

by

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ABSTRACT

JENNIFER TAYLOR BISHOP SCOTT. Predicting youth adjustment following service discharge in a system of care. (Under the direction of DR. RYAN P. KILMER)

Systems of Care (SOC) have demonstrated modest benefits for youth with serious emotional and behavioral disturbances; however, it is uncertain that youth benefit more when they receive treatment in a SOC relative to traditional treatment. Although considerable research has examined the degree to which youth enrolled in a SOC improve over time, no published studies were found that specifically investigated the degree to which improvements were maintained following SOC discharge. The maintenance of treatment gains could further support the use of SOC principles, and variability in the degree to which treatment effects are maintained may encourage greater emphasis on long-term sustainability of treatment effects. In theory, implementation of SOC principles should promote sustained treatment gains (e.g., by building a support system outside formal service provision); however, prior research has documented inconsistent implementation of specific elements of the philosophy that are expected to contribute to the maintenance of treatment gains. As such, the present study sought to examine the degree to which treatment effects were maintained or lost following SOC discharge, and the factors that predicted youths' post-discharge trajectories.

The present study found that youth who were enrolled in the SOC improved in functioning (reduced symptoms) over time (i.e., between the time of enrollment and up to three years following); however, it was necessary to account for trajectory changes occurring post-discharge to provide a more accurate estimation of improvements. Initially, without accounting for discharge, significant improvements over time were not

detected because improvements were measured as a constant rate, and a diminished rate of improvement following discharge produced error that masked significant improvements. Examining the trajectory change following discharge suggested that youth improved significantly over time, but that the rate of improvement decreased following discharge. That is, youth did not tend to "relapse" or worsen in functioning following discharge but, rather, often continued improving, albeit at a slower rate than during treatment. Older youth improved more during SOC enrollment than younger youth; while younger youth improved more than older youth following discharge from the SOC. The discrepancies between system-level enrollment data and caregiver-reported services also were used in predicting youth improvement trajectories before and after discharge. Youth who were reportedly not served for at least one 6-month period prior to the date of discharge (as reported by the SOC; i.e., served inconsistently) improved more slowly during SOC enrollment and improved less overall compared to youth who received services consistently throughout enrollment. In addition, youth who reportedly received services following the date of discharge tended to experience greater overall severity of symptomatology over time; however, they improved relatively quickly during SOC enrollment, were discharged sooner, and later exhibited a lower rate of post-discharge improvement compared to youth who did not receive post-discharge services.

A number of caregiver-reported ecological variables were also examined in relation to youth trajectories, including the proportion of days youth were treated in out-of-home placements (e.g., residential care), the quality of family interactions, familial risk factors (e.g., homelessness, domestic violence), the degree to which caregivers experienced strain in caring for their child, and the amount of natural support (i.e., not

from paid providers) caregivers reportedly received. The predictor variables of focus did not relate significantly to youth trajectories in these analyses. Missing data and the large number of parameters tested may have limited the ability to detect relationships between youth functioning trajectories and predictor variables.

The results from the present study have implications for the way in which longer-term improvements in treatment settings are evaluated, as they underscore the need for longitudinal analytic designs to account for trajectory changes at discharge. If such models omit the effect of discharge, they assume improvements are made at a continuous rate over time, which can mask treatment effects or relative advantages of an intervention over time. Furthermore, results suggest that improving the consistency of service receipt during SOC enrollment may be a relatively tangible mechanism for quality improvement in service provision.

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CHAPTER 1: INTRODUCTION

The present study examined predictors of youth adjustment following service discharge in a system of care (SOC). It grew out of a larger, longitudinal study evaluating changes in child functioning among those enrolled in a local SOC. SOCs are designed to serve youth with severe emotional disturbances (SED) – who, as part of their clinical presentation, evidence internalizing symptoms (e.g., depression, anxiety), externalizing problems (e.g., behavior problems, aggression, oppositionality, acting out), or some combination of both types of difficulties. SOCs are intended to coordinate services across multiple systems (e.g., mental health, social services, education, juvenile justice) via teams that incorporate community-based services, natural supports, and youth strengths in the development of treatment plans (Cook & Kilmer, 2004; Stroul & Friedman, 1986). Research has revealed considerable variability in the implementation of the SOC philosophy and, in turn, in youth outcomes. For instance, some studies report functional improvements among SOC-enrolled children (e.g., Manteuffel, Stephens, Brashears, Krivelyova, & Fisher, 2008; Vishnevsky, Strompolis, Reeve, Kilmer, & Cook, 2012), whereas others have not identified an advantage of a SOC-guided approach over traditional services and have criticized the added expense of SOC implementation (e.g., Bickman, Bickman, Noser, & Summerfelt, 1999).

Overall, national data provide support for the effectiveness of the SOC philosophy as a guide for communities' approach to care for children and youth with significant

mental health challenges. In general, data point to modest improvements across domains. For instance, youth tend to spend fewer days in inpatient hospitalization and experience fewer arrests one year following service entry, which translates into cost savings (Miller, Blau, Christopher, & Jordan, 2012; also see United States Department of Health and Human Services [US DHHS], 2005). Additional cost savings may accumulate if SOC-served youth maintain treatment benefits and, thus, experience a reduced need for subsequent services or hospitalization.

The sections that follow discuss: a) background regarding the SOC philosophy, b) previous research investigating changes in functioning among youth enrolled in a SOC, c) supporting theory and evidence for the sustainability of treatment gains when SOC principles are implemented with fidelity, d) general evidence for the sustainability of treatment gains among youth with SED and conditions that appear to support maintenance of treatment effects, e) the context for the present study, and f) its research questions and hypotheses.

1.1 Background: System of Care

The system of care (SOC) philosophy is characterized by the establishment of a comprehensive and coordinated "continuum of care" that addresses physical, emotional, social, and educational needs of children and adolescents with severe emotional disturbances (SED; Stroul & Friedman, 1986). Prior to the development of SOC, many children with SED were not receiving services; if they were, they frequently received inappropriate, excessively restrictive care in uncoordinated service systems (Cooper et al., 2008; Stroul & Friedman, 1986). The SOC philosophy was developed to address problems meeting the needs of children with SED by emphasizing community-based

services and supports and better coordination between and among child- and family-serving systems, such as mental health, child welfare, juvenile justice, and education (Stroul & Friedman, 1986).

SOC is not a specific practice per se; rather, it is a philosophy that outlines a set of guiding principles (e.g., tailoring services to the needs of each family; Stroul & Friedman, 1986) and is most often carried out through the wraparound practice model (Bruns et al., 2010; Cook & Kilmer, 2004; VanDenBerg & Grealish, 1996). Service plans are expected to include access to an array of comprehensive, individualized, adaptable, and least restrictive services that are based on the needs and strengths of the child (Stroul & Friedman, 1986). Although not explicitly defined as a guiding principle, there is a need for addressing broad community and environmental factors that contribute to child adjustment. For instance, SOCs are expected to be family-driven, with the needs of the child and family dictating services; however, the focus is typically on the target child's needs (Kilmer, Cook, & Palamaro Munsell, 2010; Stroul & Friedman, 1986). Greater emphasis is needed on supporting families' broader contextual needs and building or utilizing their naturally-occurring support systems, which are not deemed a "medical necessity" when treating youth mental disorder (Cook & Kilmer, 2010a; Kilmer et al., 2010). In a similar vein, family needs often reflect diverse ecological influences on child functioning, such as parent employment or safe and affordable housing, and are often beyond the scope of traditional mental health care provision models (Cook & Kilmer, 2010a; 2010b). In general, few resources are typically allocated to addressing family needs beyond services for the youth with SED (Cook & Kilmer, 2010a; Kilmer et al., 2010).

In order to address ecological influences on child functioning, SOCs need to provide services and supports that enable youth and their families to be fully involved in their communities (Cook & Kilmer, 2010a). These supports are expected to extend beyond formal service providers. In fact, in the context of a SOC, an effective child and family planning team should emphasize the development of natural supports and relationships in the child's community (Farmer & Farmer, 2001). Such connections can provide support that professionals cannot (e.g., tangible assistance; Cook & Kilmer, 2009; as cited by Cook & Kilmer, 2010b), and may be able to link families with community services and supports of which professionals are not aware (VanDenBerg & Grealish, 1996). Furthermore, natural supports may be a critical resource when the family is not in crisis and may help to stem a budding crisis.

1.2 Relevant Research on Outcomes of Youth Enrolled in Systems of Care

Research about the outcomes of youth enrolled in a SOC is mixed, but findings suggest that youth generally evidence modest improvement (Cook & Kilmer, 2004; 2012; Suter & Bruns, 2009). According to national data, drawn from 45 SOC communities initially funded in 1997-2000 (US DHHS, 2005), youth tended to improve in overall adjustment and, more specifically, these youth improved in strengths and general functioning an average of 17% within the first year of receiving services. There was also a significant decrease in reported delinquent behaviors, such as bullying, fighting, and skipping school, as well as number of arrests. In addition, the number of youth placed out of home and days spent in inpatient hospital care decreased. Furthermore, short-term improvements were evidenced among 25 communities initially funded in 2002-03, as the number of children with clinically significant impairment was reduced by 77% within the

first 6 months of treatment. Such findings suggest substantial impact of programs guided by the SOC philosophy, while also suggesting cost savings by reducing incarcerations and hospitalizations (US DHHS, 2005; see also Miller et al., 2012).

Although considerable research has provided support for the SOC philosophy, findings vary considerably across communities. In a recent study using data reported from participants in a county-wide SOC initiative (Vishnevsky et al., 2012), caregivers reported modest improvements in their child's strengths, resources, and clinical presentation (about ½ a standard deviation reduction in problems a year after service entry). The overall effect was not large, but increased when youth received case management services (i.e., service provider coordinates services and supports). Case management was associated with improved adjustment among youth above and beyond that found for youth in traditional mental health treatment, such as individual or family therapy (Vishnevsky et al., 2012). That study bolstered support for approaches embodying the SOC philosophy, particularly because case management services are not typically offered with traditional mental health services and were most associated with functional improvements in this sample. That said, results from a single community do not necessarily generalize to all communities. A meta-analysis of controlled studies comparing youth with SED who received wraparound services to those who received conventional treatment supported the general utility of the SOC philosophy; wraparound care (the primary practice approach in SOCs) was found to have a small to medium overall effect, yielding an advantage over typical services (Bruns & Suter, 2009).

Although multiple theoretical and empirical works have provided support for the SOC philosophy, other sources report little support for SOC effectiveness over time. For

instance, one prominent study found no differences in the rates of improvement among children in one SOC compared to those receiving treatment as usual (Bickman et al., 1999). In that work, youths in the SOC neither experienced more gains than their counterparts, nor demonstrated different types of change across time (Bickman et al., 1999). However, the study has been criticized because the comparison or "treatment as usual" group was exposed to broader community-level dimensions of the SOC, such as utilization of the same providers; therefore, the results may not accurately reflect SOC impact (Foster, Stephens, Krivelyova, & Gamfi , 2007). In addition, some participants assigned to the control group actually received SOC services even when they agreed they would not seek SOC services (Bickman et al., 1999).

In light of the mixed evidence, the SOC philosophy has been criticized for costs that exceed those for standard treatment because children utilize more services (Bickman et al., 1999; Rosenblatt, 2010). If there is little meaningful difference between SOC implementation and treatment as usual, it would be difficult to justify such costs. Costs of implementing a SOC may be more justifiable if functional improvements are sustained following treatment termination, which would sustain improvements in youths' quality of life as well as reduce the costly need for re-enrollment in services. Documenting the duration of treatment effects could bolster policies that support the adoption of SOC principles by justifying the associated expense.

It is clear from the existing research that there is substantive variability in effectiveness across SOC sites and systems. In that same vein, effect sizes vary across individual studies of wraparound care for youth with SED (in evaluations of SOCs using this practice model, effects range from a medium detrimental effect to a large favorable

effect); overall effects appear to be modest and positive for youth in wraparound care (Suter & Bruns, 2009).

The wide variability of effectiveness across SOCs may reflect differences in system implementation (Cook & Kilmer, 2012; Foster et al., 2007), which may also impact the degree to which treatment gains are maintained post-discharge. Although SOC principles have become integrated into practice in many communities, the implementation is inconsistent across sites and varies considerably in quality across specific principles (e.g., collaboration versus natural supports; Brashears, Davis, & Katz-Leavy, 2012; Cook & Kilmer, 2010b). However, when SOC principles are implemented with high fidelity, parents of enrolled youth tend to report lower symptomatology and impairment one year following service enrollment (Stephens, Holden, & Hernandez, 2004).

Consistency in the implementation of SOC principles may be bolstered by policies that support and enhance fidelity in actual practice, in light of the fact that some existing policies may prevent systems from serving youth effectively. As one case in point, many challenges faced by families in SOCs are not typically addressed with Medicaid-funded services (e.g., parental employment, safe and affordable housing, peer support). This limitation is particularly problematic considering that many mental health difficulties among children relate to ecological adversities such as poverty (Cook & Kilmer, 2010a, 2010b). Additionally, such funding structures may prevent an emphasis on building and utilizing a network of informal or natural supports (Cook & Kilmer, 2010b; Cooper et al., 2008; Kilmer et al., 2010). Additional research supporting practices that align with SOC principles could provide justification for policies that reduce the

barriers to implementation (e.g., funding streams) and may also help establish a rationale for expanding coverage to include services that are not traditionally reimbursable by Medicaid or other providers.

1.3 Theoretical Model

There is a crucial distinction to be made between improvements over the course of service utilization and improvements that are sustained following service discharge. The degree to which treatments produce lasting changes in symptom levels – and, in turn, well-being and quality of life – is a valuable aspect of treatment effectiveness because symptoms of disorder may persist or return following service termination (Westen & Morrison, 2001). Put another way, if treatment is to have practical value, its effects must be durable and persist beyond treatment termination (Weisz, Weiss, & Klotz, 1987). Examining the degree to which treatment gains are sustained provides information about how well services promote a long-term improvement in quality of life among children with SED. This pursuit also provides information about the degree to which children are less likely to re-enroll in services, which would likely provide cost savings over time.

The present study is based on the notion that SOCs should ideally be guided by an ecological framework that assesses the interrelationships between an individual and his or her environment (Cook & Kilmer, 2010a; see Bronfenbrenner, 1977, 1979). Services that ameliorate environmental factors contributing to problems in youths' emotional and behavioral functioning are expected to help to sustain treatment effects following service termination. For instance, the value of least-restrictive service placements promotes the use of treatments delivered within youths' natural environment (Stroul & Friedman, 1986). It is expected that skills or knowledge acquired in natural settings may allow

youth to better generalize what is learned because skills are learned within the context in which they are needed (Shelden & Rush, 2001). Theoretically, skill development in natural environments is thought to help youth maintain treatment gains following service termination because learned skills do not need to be transferred from an unfamiliar setting back into the natural environment. Figure 1 depicts a conceptual model for changes in youth adjustment between SOC enrollment and discharge, and how improvements in ecological factors may contribute to sustained youth adjustment post-discharge.

Grounded in a rationale similar to that supporting the importance of connecting youth with their natural environment, community-based services and supports should be located in the youth's home community and, optimally, close to the home to help maximize potential family involvement in treatment and bolster the youth's integration and connections with the community (Stroul & Friedman, 1986). Community connections may help to link the child and family with natural supports, individuals who are important to and a part of the family's environment or social contexts, are not paid for their involvement, and provide ongoing support to the family in capacities that formal services do not (Cook & Kilmer, 2010a; Vishnevsky et al., 2012). In principle, SOC objectives should include enhancing families' networks of supports beyond formal services (Cook & Kilmer, 2010b); however, many families are not connected with a range of informal resources and supports (Cook, Kilmer, DeRusso, Vishnevsky, & Meyers, 2007; Walker & Schutte, 2010), which unfortunately, may contribute to declines in functioning following service discharge.

Support from a youth's natural environment is particularly important following discharge, as a gap in support can occur when professional services end. Natural supports can provide sustainable support after professionals leave, and serve as essential resources for families after they are no longer linked with formal services (Cook & Kilmer, 2010b). It is expected that transition from formal, paid service provision to informal, natural, community-based support prior to service termination would promote the sustainability of functional gains following treatment termination (Cook & Kilmer, 2004).

Through enhancing support in a child's natural environment, a parallel need for addressing the broader environmental, educational, and family contexts of problems becomes apparent (Stroul & Friedman, 1986). SOCs can help to reduce environmental risk factors that contribute to or exacerbate emotional and behavioral disturbances by providing assistance to children and their families that extends beyond mental health service provision. Research suggests that family-centered service planning, which underscores the importance of tailoring services and supports to families' unique needs and strengths, is another SOC principle that is not implemented adequately (Cook & Kilmer, 2004; Kilmer et al., 2010). Multiple factors (e.g., restrictive funding streams) influence the capacity of SOCs to meet the needs of the whole family (Kilmer et al., 2010) and, in more recent years, there has been increasing emphasis on "family-driven" (instead of family-centered) care, whereby family members guide the selection of services, but are not necessarily the target of service planning. Regardless of the specific terminology employed, the SOC philosophy outlines the need to provide a comprehensive array of services and supports, which, in this population, would include the broader contextual needs of the family.

1.4 Post-Discharge Functioning Among Youth with SED

The research base regarding post-discharge functioning for youth involved in SOCs is quite limited. In fact, no empirical articles about adjustment following SOC discharge were found for the present review. Although multiple studies examine longitudinal outcomes in SOCs (e.g., Bickman et al., 1999; Vishnevsky et al., 2012), they do not specifically explore discharge or the maintenance of treatment effects following service termination, and the research about post-discharge adjustment is limited. For example, Bickman and colleagues (1999) found no evidence that supported the use of SOC services over conventional treatment at six months following enrollment; however, they noted that differences became evident 24 months following enrollment. At that time, fewer problem behaviors were reported for youth who had received services in the SOC than those receiving treatment as usual (Bickman et al., 1999). Nevertheless, that study did not include time of discharge as a predictor of functioning or how youth functioning changed, or was maintained, subsequent to discharge.

In contrast, some research has examined the sustainability of effects obtained via wraparound, a frequently used model for implementing SOC principles, though the base of evidence is not well-developed. For example, a review of effective interventions for children with SED concluded that team-based, case management approaches utilizing wraparound to address the needs of children with emotional and behavioral problems appear to be effective (Burns, Hoagwood, & Mrazek, 1999). One study noted that youth receiving wraparound had significantly fewer behavioral symptoms and greater improvements in overall functioning at 18 months or at the time of discharge (whichever came first) than children who received conventional treatment (Johnson, 1998; as cited

by Burns et al., 1999). That study demonstrated that improvements in long-term functioning, along with reductions in costly services, yielded a cost-benefit of wraparound over treatment as usual (Burns et al., 1999); however, it did not provide insight about the sustainability of treatment gains following service discharge.

Overall, in the broader literature base, few studies have examined the effects of psychological treatment 12 months or more following treatment completion. This limitation is most salient for literature pertaining to internalizing problems among children and youth, as most studies examining the duration of treatment effects have sampled adults (Westen & Morrison, 2001) or children with externalizing problems (e.g., Hood & Eyberg, 2003; Feinfield & Baker, 2004; McMahon, 1994; Sayger, Horne, Walker, & Passmore, 1988). In general, little is known about how to *sustain* effective treatment effects over a long period of time (Burns et al., 1999).

Gaps in longitudinal research may be related to the claim that treatment gains are sustainable and, therefore, follow-up data add little information beyond the effects that are immediately observed (Nicholson & Berman, 1983). This perspective may depend on the methods used to assess psychological disorder, as there is a tendency to categorize individuals according to diagnostic criteria rather than examining adjustment on a continuum (Shapiro, Rees, Barkham, & Hardy, 1995). In other words, the full range of symptoms is not captured because disorder is classified according to discrete episodes in which specific criteria are met. Restricting the range of the outcome by classifying a disorder as either occurring or not, rather than allowing a range of an outcome to occur (i.e., an individual may have sub-clinical levels of symptoms) reduces the likelihood that changes will be detected. Therefore, much research examining post-discharge functioning

is restricted in its ability to detect symptomatic changes that do not cross clinical thresholds (Shapiro et al., 1995).

This issue is a particularly salient limitation given that many individuals continue to experience mild symptoms of disorder following treatment (Westen & Morrison, 2001), even when treatment is beneficial. Although Westen and Morrison's (2001) work specifically involved adults with internalizing problems, this issue likely holds true for a broader range of problem presentations as well as for children. Similarly, longitudinal studies for children experiencing disorder often find that problems are recurrent and may continue into adulthood (Kazdin, 2000). Essentially, existing findings support the notion that treatment may not eliminate problems, as they may reoccur or increase over time following the end of treatment.

Another noteworthy limitation of the knowledge base pertaining to youth with SED is the relative paucity of literature pertaining to youth psychotherapy in real-world settings (Ash & Weis, 2009). Real-world settings present the challenge of serving individuals with comorbid disorders; however, many studies exclude patients with co-occurring disorders in order to preserve controlled conditions. Consequently, these studies limit the degree to which results can be generalized to common practice (Westen & Morrison, 2001). Exclusion of comorbidities is particularly problematic given that many states struggle to serve children with co-occurring disorders appropriately (Cooper et al., 2008), and the developmental pathways of children with concurrent disorders may differ from those with only one disorder (Ollendick & King, 1994). In general, there is a clear need to supplement efficacy studies with effectiveness studies (Westen & Morrison,

2001). Examining youth functioning in the context of a SOC helps to address these gaps, as youth range in symptomatology and are treated in real-world settings.

That said, existing research on treatment effectiveness and sustainability of effects among youth suggests that treatment effects (i.e., gains) for externalizing disturbances are sustained following treatment termination for most youth (e.g., Hood & Eyberg, 2003; Ogden & Hagen, 2006); however, findings are mixed regarding the stability of treatment gains for internalizing disorders. For instance, a meta-analysis of youth receiving psychotherapy for depression found that youth tended to maintain treatment effects for two to three months following service termination, but essentially no treatment effect was apparent one year following treatment (Weisz, McCarty, & Valeri, 2006). In contrast, some studies report that treatment gains are maintained for internalizing disturbances for two years (e.g., Ogden & Hagen, 2006; Ollendick & King, 1994), though the findings regarding symptom levels vary meaningfully across reporters (i.e., parents, teachers, youth; Ogden & Hagen, 2006). While research on externalizing disturbances more consistently suggests sustainability of treatment effects than research on internalizing disturbances, many of the observed benefits appear to be connected with the involvement of the family (e.g., Feinfield & Baker, 2004; Henggeler, 2011; McMahon, 1994; Ogden & Hagen, 2006). For example, interventions that target parent-child interactions may promote short-term improvements in externalizing problems, and these effects have been found to be maintained over the course of a year (Feinfield & Baker, 2004).

In sum, although considerable literature supports the benefits of treatment and the maintenance of treatment gains among youth, there is variability in the duration and degree to which gains are maintained. Youth who “maintain” treatment gains may

fluctuate in their manifestation of symptoms, even when symptoms fail to meet clinical threshold. More research is needed to understand the factors that contribute to the sustainability of treatment effects among youth with emotional and behavioral problems.

Exploring predictors of post-discharge functioning can provide insight about the degree to which gains have been maintained and, of particular relevance, ways to improve the maintenance of treatment gains among greater numbers of youth. It is expected that influencing a child's context or environment may be essential for promoting sustained adjustment. For example, Burns and colleagues (1999) reviewed literature pertaining to child treatment and concluded that intervening in a child's community (i.e., pertaining to conditions of the school, family, and supportiveness of the local community) was one of the most important factors contributing to the sustainability of treatment gains among children treated in residential facilities. In general, support from the youth's post-discharge environment promotes continued adjustment following treatment. Additionally, the benefits of intensive treatments such as partial hospitalization and day treatment are more likely to persist when the family is involved in treatment (Burns et al., 1999).

Overall, a multitude of risk and supportive factors – that is, no single cause, condition, or influence – contribute to an individual's functioning following service termination. Generally, problems result from patterns of multiple risk and supportive factors, which also serve to maintain conditions that reinforce or contribute to the problem initially engendered by the conditions (e.g., negative interactions with parents could lead to a child exhibiting problem behaviors, which in turn reinforce the negative interactions between child and parent; Farmer & Farmer, 2001). Risk factors increase the

likelihood of dysfunction (e.g., negative family interactions), whereas supportive factors decrease the likelihood of dysfunction by constraining the negative impact of risks (e.g., supportive relationships, sufficient resources; Farmer & Farmer, 2001).

A wide range of factors contribute to individual well-being, including a range of contextual or environmental elements, consistent with an ecological framework on development and adaptation (Bronfenbrenner, 1979; also see Cook & Kilmer, 2010a). In the present study, selected factors reflecting youths' ecologies were examined in relation to youth functioning following SOC discharge. The review of risk and supportive factors that follows describes selected proximal influences, those that directly affect the child (e.g., family environment), and distal influences, which include broader, indirect forces (e.g., socioeconomic status; see, e.g., Bronfenbrenner, 1979). Individual-level, child-specific factors, while not of primary focus in the present study, are also included in the review, as these factors have the potential to be important contributors to youths' post-discharge functioning.

1.4a Individual Factors

According to a results from a national study, using data drawn from 90 SOC communities funded between 1993-2004, there are multiple individual-level, demographic factors that predict adjustment over time, including age, race, and gender (Walrath et al., 2009). Specifically, age was found to have a curvilinear relationship with psychological adjustment among youth in SOCs (including externalizing and internalizing problems), such that functioning was lower among older children between birth through ages 10 and 12, when youth functioning was lowest (for externalizing and internalizing disturbances respectively). From that point on, youth functioning was higher

among older children through age 21 (Walrath et al., 2009). Age may also play a role in the long-term success of therapeutic interventions, as some have found greater long-term effectiveness of treatments with younger children than adolescents (McMahon, 1994; Weisz et al., 1987).

Another demographic factor, race, may also be related to functioning, as non-white children in SOCs were more likely to be rated as having more externalizing behavior problems (Walrath et al., 2009). This same study found greater externalizing problems among girls than boys; a finding that contrasts with a significant body of research that indicates that males tend to exhibit greater levels of externalizing behavior problems (Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993), whereas female adolescents tend to endorse internalizing concerns, such as depression symptoms (e.g., Twenge & Nolen-Hoeksema, 2002). Considering the potential for race, age, and gender to influence youth functioning, these factors were examined in the present study in order to better understand the nature of the relationship between post-discharge functioning and broader ecological factors.

1.4b Proximal Factors

Proximal risk factors are defined here as characteristics or situations that impact the child directly and may consequently increase the likelihood of behavioral or emotional problems. Included in this review are restrictiveness of treatment (i.e., placement out-of-home) and family risk factors. The level of restrictiveness of treatment (i.e., the degree to which treatment moves the youth out of a family-like environment) may also contribute to post-discharge adjustment. For example, youth treated in residential, out-of-home placements often do not maintain treatment gains when there are

no modifications made in the post-discharge environment (Bates, English, & Kouidou-Giles, 1997); however, youth receiving less restrictive treatments (e.g., outpatient therapy) and those otherwise able to stay in their homes during treatment, more often maintain treatment gains (e.g., Feinfield & Baker, 2004; McMahon, 1994; Ollendick & King, 1994; Weisz et al., 1987). These findings are qualified by the fact that these groups inherently differ in the level of severity of problems (i.e., those with more serious concerns are involved in the more restrictive settings).

It bears mention that results are mixed in this area. For instance, another recent study compared youth receiving intensive family-based services as an alternative to out-of-home placement and did not find in-home treatment to be more effective. Both groups evidenced similar patterns of improvement between admission, discharge, and at two years following discharge. Although that study was not designed to evaluate the differences between treatment groups (i.e., youth in the residential treatment group experienced greater severity at baseline and were more likely to have been placed out of home prior to treatment; Preyde, Frensch, Cameron, Hazineh, & Riosa, 2011), its findings contrast with prior investigations which have found greater duration of treatment effects among youth treated with outpatient care compared to youth receiving more restrictive care (e.g., Feinfield & Baker, 2004).

In short, the prior research investigating the degree to which youth fair better in less intensive treatment settings is inconclusive. For the present review, no randomized studies were found that examined out-of-home treatment with treatments in which youths remained in their homes. Although random assignment to different treatment groups was not possible and groups receiving the least restrictive treatment may have experienced

less severe challenges than those receiving more restrictive treatments, studies tend to suggest that greater restrictiveness (i.e., less like a family environment) and out-of-home services may be related to poorer post-discharge adjustment (Ringle, Huefner, James, Pick, & Thompson, 2012). That said, poorer results might be explained by the need for the youth to transfer lessons learned in treatment to his or her natural environment (Shelden & Rush, 2001), which is expected to decrease the likelihood of maintaining treatment gains. Although this area of research is not well-developed, the level of restrictiveness appears to be an important consideration in maintaining treatment gains; therefore, the present study includes a variable that accounts for the number of days treatment occurred out of the home, while controlling for initial severity of symptoms, to approximate differences attributable to the context of treatment. While such results are not able to provide conclusive evidence to support less restrictive placements, they could bolster support of least-restrictive placements within the context of a SOC.

Beyond individual characteristics of the youth, familial risk factors may also contribute to adjustment. Events or circumstances that mark dysfunction or instability in the youth's family or home, including abuse or neglect, homelessness, parental arrest, domestic violence, caregiver substance abuse, and parental psychopathology, act as a proximal risk factors for psychological dysfunction (e.g., Buckner, Mezzacappa, & Beardslee, 2003; McWhirter, McWhirter, McWhirter, & McWhirter, 2007). For example, exposure to family violence, homelessness, parental psychopathology, and household members' criminal or substance use behavior have all been linked with increased vulnerability for psychological and behavioral disturbances among children (Kilmer, Cook, Crusto, Strater, & Haber, 2012; McWhirter et al., 2007; McLoyd, 1998;

McWhirter et al., 2007; Van Dorn et al., 2010). In light of their risk potential, these factors may also influence youths' post-discharge adjustment.

In contrast to risk factors, supportive factors (also known as protective factors) promote positive adaptation in the face of adversity and, in turn, help to reduce the potential negative impact of risk factors (and the likelihood of developing problems in adjustment). For example, the degree to which the family helps and supports one another and encourages open and direct expression of feelings has been found to promote positive post-treatment adjustment, whereas family relationships characterized by conflict and disagreement relate negatively to post-treatment adjustment (Billings & Moos, 1985). In that same vein, positive parent-child interactions may be an essential asset in maintaining a supportive family environment, and may also help to explain how youth maintain reductions (i.e., improvements) in externalizing behavior problems (Feinfield & Baker, 2004) and depressive symptoms (Birmaher et al., 2000). Because previous research has emphasized the importance of treatment context and the family environment and support in predicting post-discharge functioning, these factors will be examined as predictors in relation to post-discharge adjustment in the present study.

1.4c Distal Factors

Circumstances that have an indirect negative impact on child adjustment include risk factors such as socioeconomic conditions and stress related to caregiving. For instance, poverty contributes to multiple stressors that affect the family environment and indirectly influences child adjustment via proximal factors such as the parent-child relationship (see, e.g., Luthar, 1999 for more; see also Eamon, 2001; McLoyd, Jayaratne, Ceballo, & Borquez, 1994). Because poverty relates to a number of factors and

conditions that can affect youth adjustment but cannot be examined in the present study (e.g., parenting practices), the present study included family income as a control variable when examining the relationship between post-discharge functioning with other ecological factors.

An additional stressor of interest is a parent's strain related to caregiving, which is associated with more negative child adjustment, even after controlling for such factors as parenting practices, parental employment status, caregiver self-efficacy, or caregiver-reported perceived support, in both families of children with SED and families of children who have not been diagnosed (see, e.g., Blader, 2006; Feinfield & Baker, 2004; Jackson, 2000). Generally, changes in caregiving strain relate highly to changes in child behavior problems (Blader, 2006; Feinfield & Baker, 2004; Jackson, 2000), as decreases in strain tend to occur alongside decreases in child behavior problems. It is difficult to interpret the potential causal linkages in the relationship between caregiver strain and child functioning, as it is unclear which precedes the other, difficulties in child adjustment or caregiver strain. What is notable, however, is that caregiver strain may be somewhat attenuated by maternal caregivers' experiences of support from friends (Jackson, 2000; Palamaro Munsell, Kilmer, Cook, & Reeve, 2012). It is unknown to what extent reductions in caregiver strain may promote youth functioning following service termination; therefore, the present study aimed to examine this relationship.

Support provided to the caregiver was a distal supportive factor of interest in the present study, particularly because the research on parental emotional support among disadvantaged groups is somewhat limited, and a relationship between maternal emotional support and youth adjustment has been found in a nationally-representative

sample (Bandy, Andrews, & Moore, 2012). Research about support provided to caregivers within the context of a SOC is also limited, and prior research found that a caregiver's desire for additional support predicted youth perceptions of treatment ineffectiveness and dissatisfaction with services (Cook & Kilmer, 2010b). Support to caregivers may be an important distal predictor of youth functioning because support is directly related to parental depression, which can impact parenting practices that are linked with a youth's internalizing and externalizing behavior problems (Herwig, Wirtz, & Bengel, 2004). Therefore, it may be that maternal emotional support provided by individuals outside the family (e.g., kin, neighbors, friends) serves to protect children from maladjustment by reducing maternal stress and depression, which, in turn, helps caregivers to engage in more effective parenting practices (Bandy et al., 2012; Eamon, 2001). Of particular salience to the present study, naturally occurring informal supports may help to sustain the effects of treatment over time by buffering the impact of stress on the family's relations and interactions (Cook & Kilmer, 2010b).

1.5 Context of the Present Study

The present study grew out of a larger, multi-year evaluative effort of a local SOC in Mecklenburg County, North Carolina. This SOC, MeckCAREs, was initiated by County leaders and subsequently received funding from the Substance Abuse Mental Health Services Administration (SAMHSA) for six years, which required participation in the National Longitudinal Study of Systems of Care (i.e., the National Evaluation; U.S. DHHS, 2005). The SOC was overseen by the County's Area Mental Health Authority, and served children aged 10-21 years of age with at least one *DSM-IV* Axis I diagnosis who were also targeted for additional specialized services via at least one other major

system (i.e., special education, juvenile justice, or child protective services). Each enrolled child was assigned a Care Coordinator trained in SOC who was responsible for planning and coordinating services to meet the needs of the child and family. Children were disenrolled or discharged from the SOC when the Care Coordinating agency reported the family discontinued mental health services, usually subsequent to completing treatment (i.e., treatment was discontinued because goals were met), but also as a consequence of moving to another county or the family's dissatisfaction with and discontinuation of services.

1.6 Statement of Purpose and Research Questions

The present study examined changes in youth adjustment following discharge from a SOC. Changes in several ecological factors during SOC enrollment were investigated as potential contributors to post-discharge changes in adjustment, including child demographic characteristics (i.e., age, gender, and race), restrictiveness of treatment, familial risk factors (i.e., homelessness, domestic violence, physical or sexual child abuse, caregiver psychopathology, or a household member's involvement in crime or substance abuse), and contextual factors salient within SOCs, including the nature of family interactions, parental stress related to caregiving, and natural support for caregivers. The possible roles of these contextual factors as predictors of youth adjustment following service discharge are of central interest because they reflect factors and qualities thought to be relevant to SOC principles that are not typically addressed in traditional mental health services.

Prior to completing the study's core analysis examining predictors of post-discharge adjustment, the first step mirrored the intent of Vishnevsky and colleagues

(2012) – to assess the degree to which youth improved following SOC enrollment. The present study differs from the previous study by (a) examining a broader subsample of youth (the prior study excluded individuals with missing data), (b) including additional follow-up time points following SOC enrollment, and (c) using a different analytical approach. It was expected that the present study's findings would be consistent with the previous findings – that is, that the youth in this SOC experienced modest beneficial treatment-related effects.

Next, curvilinear change in youth functioning was examined to determine whether or not treatment gains were sustained or if youth functioning declined following service discharge. This analysis also examined the degree to which there was systematic variability in youth's post-discharge trajectories, a necessary step for examining predictors of their adjustment following service discharge. Thus, the present study was guided by the following questions and hypotheses:

Research Question 1

To what degree do youth tend to improve in functioning over time, following enrollment in the SOC, after controlling for individual-level factors such as age, gender, race, and baseline symptom severity?

Hypothesis 1. It was hypothesized that youth enrolled in the SOC would, on average, improve in global functioning (i.e., including both internalizing and externalizing behavior problems).

Research Question 2

Does youth functioning change meaningfully following service discharge after controlling for individual-level factors such as age, gender, race, and baseline symptom severity?

Hypothesis 2. It was hypothesized that significant changes in trajectory would be detected as youth exited the SOC. More specifically, it was expected that, on average, youth improved in functioning until service discharge, and that functioning exhibited little change (i.e., remained stable) following SOC discharge.

Research Question 3

To what degree did selected contextual factors, including (a) context of treatment (i.e., out-of-home placement), (b) familial risk factors, (c) positive family interactions, (d) parental strain in caring for a child, and (e) informal support to caregivers, uniquely contribute to youths' post-discharge functioning after controlling for individual-level factors such as age, gender, race, and baseline symptom severity?

Hypothesis 3a. It was hypothesized that greater use of out-of-home placements or restrictive settings during SOC enrollment (i.e., the proportion of days the youth was reportedly treated in an out-of-home placement relative to the total number of days treatment occurred) would predict greater declines in functioning following service discharge.

Hypothesis 3b. It was hypothesized that reductions in familial risk factors reported during SOC enrollment (i.e., specifically, homelessness, domestic violence, physical or sexual child abuse, or living in a household with someone involved in crime, caregiver

psychopathology, or engaging in substance abuse) would reduce the likelihood that youth functioning would decline following service discharge.

Hypothesis 3c. It was hypothesized that increases in positive family interactions reported by caregivers over the course of treatment would reduce the likelihood that youth would decline in functioning following service discharge.

Hypothesis 3d. It was hypothesized that reductions in caregivers' strain due to caring for the target child would reduce the likelihood that youth would decline in functioning following service discharge.

Hypothesis 3e. It was hypothesized that increases in caregivers' informal support (i.e., provided by friends, family, neighbors and other nonprofessionals) would reduce the likelihood that the youth would decline in functioning following service discharge.

CHAPTER 2: METHOD

2.1 Participant Recruitment and Procedures

Participants included caregivers of youth who were enrolled in the SOC in Charlotte, North Carolina. They were recruited for the National Evaluation via a multi-step process. During the service enrollment process, they were asked whether or not they would like to be contacted to be part of the evaluation. If they indicated interest, caregivers were contacted by telephone and provided with a description about the study and asked to schedule an interview. Within 30 days of enrollment, an interview was scheduled with consenting caregivers. Trained interviewers met participants in a location preferred by the interviewees (usually their home, but also libraries, treatment facilities, or other public spaces) in order to administer the National Evaluation's semi-structured interview protocols. Caregivers were informed of the voluntary nature of the interviews and the longitudinal nature of the evaluation (i.e., lasting up to three years following enrollment, with interviews conducted every six months). They also received a $30 gift card for every interview completed.

2.2 Participant Selection

Participants who completed the baseline interview (i.e., Time 1) included 319 caregivers of youth enrolled in the SOC. The sample selected for the present study excluded caregivers who did not participate in the study beyond baseline interviews, and those for whom no discharge date was available. The final sample included 203

caregivers of youth with SED. No differences were found for age, gender, race, or primary diagnosis between those who were selected for this analysis and those who did not meet inclusion criteria.

At baseline, participating caregivers were primarily female (92.1%) biological parents (65.0%). Foster parents (9.9%) and grandparents (9.4%) were also interviewed. Other caregivers included adoptive or step parents, other family members, or friends (8.9%). Few caregivers self-identified as Hispanic (6.4%); the vast majority identified themselves as African American (75.4%), and a sizable proportion reported they were Caucasian (17.2%). Most participating caregivers completed high school (28.1%) or some education beyond that (43.8%). About a quarter (26.7%) reported not completing high school. Participants' self-reported annual family income from all sources was computed by doubling baseline-reported income from the last six months in order to facilitate interpretation. The distribution of annual household income (from all sources) was as follows: less than $10,000 (23.6%), $10,000 to $19,999 (12.3%), $20,000 to $29,999 (9.9%), $30,000 to 39,999 (13.3%), $40,000 to $49,999 (8.4%), $50,000 to $69,999 (8.4%), $70,000 to $99,999 (9.9%) or greater than $100,000 (8.9%). The majority of caregivers reported their family received Medicaid (88.2%), with smaller proportions reporting receipt of Social Security Income (3.9%) or Temporary Assistance for Needy Families (TANF; 2.0%). Few families reported having private insurance (5.4%).

Ethnicity of the youth about whom caregivers responded to questions was as follows: 78.8% African American, 14.8% Caucasian, 1.5% Hispanic, 1.5% Native American, and 2.5% "other background". Youth in the selected sample were between 9

and 18 years old, and mean age of the youth was 13.93 years (*SD* = 2.23) at the time of initial enrollment. The majority of youth were male (61.1%), and the most frequent mental health diagnoses among youth included mood disorders (42.9%), Oppositional Defiant Disorder (40.4%), and Attention Deficit Hyperactivity Disorder (35.5%). The majority of youth (83.3%) in the sample carried more than one diagnosis.

2.3 Measures

The National Evaluation interviews at intake and follow-up were extensive. For the purposes of the present study, measures assessing youth adjustment, services received, family interactions, caregiver strain, and social support are of particular relevance. Caregivers were also asked questions about the home environment and where the child had lived since the last interview. The present study draws on the following caregiver-completed measures:

2.3a Individual Characteristics

Demographic Data: Participant characteristics were provided by the County, including caregiver-reported gender, age, and race or ethnicity for system-involved target children. Due to the low proportion of non-African American youth, only two race categories are used for analysis: White and others.

Youth Adjustment: The Child Behavior Checklist (CBCL) is a widely-used, norm-based measure completed by caregivers of youth aged 6-18. It is designed to measure childhood functioning and progress in a variety of mental health problem areas, via 113 items rated on a 3-point scale (0 = not true, 1 = somewhat/sometimes true, and 2= very/often true). Scores are converted into T scores according to normative samples, such that the mean score is 50 and increments of 10 represent a standard deviation from the

mean. Dimension scores include internalizing and externalizing scores, and a total problem score summarizes functional challenges more globally (Achenbach & Rescorla, 2001). Validity for the measure has been demonstrated in numerous ways; the results produced have been found to be related to DSM clinical diagnoses (Achenbach, Dumenci, & Rescorla, 2003), and the measure has demonstrated comparable results across diverse cultures (Ivanova et al., 2007). In the present study, the total problems score, which is comprised of internalizing and externalizing dimensions, was used as the dependent variable. Alpha obtained with this sample = .997.

2.3b Proximal Variables

Restrictiveness of services: The restrictiveness of services was indicated by the proportion of days a youth was treated in an out-of-home placement (e.g., residential treatment) of the total days the youth was enrolled in the SOC. These data were derived from the Multi-Sector Services Contacts-Revised (MSSC-R), a 45-item measure on which caregivers indicated the services, among a wide array of service types (e.g., outpatient therapy, hospitalization), their child or family had received across service sectors in the last 6 months. The validity of this measure has been supported by documentation of the correspondence between caregiver-reported data and information collected by the mental health sector. r = .98 (Center for Mental Health Services, 2007).

Enrollment and Discharge dates: The County Participant Database provided dates of youth enrollment in and discharge from the SOC. The Enrollment Coordinator for the SOC recorded enrollment and discharge dates into a participant database, which was shared with the evaluation team. Data used for the time of discharge were obtained during the interview that immediately proceeded the date of discharge.

Discrepancy in reported service utilization: Discrepancies were evident between caregivers' reported services (i.e., MSSC-R) and the service duration reported in the County's SOC database. Even though participant youth were all enrolled in the SOC for a time, some caregivers reported periods prior to discharge during which services were not received. As such, a time-invariant variable, "served inconsistently", was computed to control for the number of time periods a caregiver reported that no services were received for the child / family prior to SOC discharge. Another time-invariant variable, "served post-discharge", was computed to control for the number of time periods a caregiver reported that services were received following the County's reported date of SOC discharge.

Family Risk Factors: During each interview, caregivers were asked about the system-identified youth's experience of various specific adversities. They reported if the youth had been exposed to domestic violence or was a victim of physical or sexual abuse. They were also asked whether or not a member of the household showed signs of depression or another mental illness, had abused substance, or had been convicted of a crime. Later in the interview, caregivers reported where the youth had lived or moved over the previous six months, which could shed light on any time the youth experienced homelessness or spent in emergency shelters. For each time point, each of these factors was dichotomized and summed into a continuous variable that ranged from 0 to 6. Items included in this composite variable were developed by the Center for Mental Health Services (CMHS; 2007).

Family Life Questionnaire (FLQ): The FLQ is a 10-item measure designed to assess aspects of family life affected by a child's functional impairment, including family

communication, decision making, and support and bonding (CMHS, 2007). Respondents reported the frequency of positive family interactions and communication, time spent together, and conflict resolution in the last 6 months, using a 5-point scale (1 = never, 5 = always; CMHS, 2007). The mean of the items on this scale was used as the present study's indicator of positive family interactions. Cronbach's alpha was computed, using caregivers' responses at intake; alpha = .86.

2.3c Distal Variables

Caregiver Strain Questionnaire (CGSQ): The CGSQ is a 21-item measure designed to assess the extent to which caregivers are affected by the demands associated with caring for a child with serious emotional problems. It includes three subscales: (a) Objective Strain, or observable disruptions in family and community life such as interruption of personal time, lost work time, or financial strain; (b) Subjective Internalizing Strain, or negative ‘‘internalized’’ feelings such as worry, guilt, and fatigue; and (3) Subjective Externalizing Strain, or negative ‘‘externalized’’ feelings about the child such as anger, resentment, or embarrassment (Brannan, Heflinger, & Bickman, 1997). The CGSQ uses a 5-point scale (1 = not at all, 5 = very much), indicating the degree to which each item was a problem in the last 6 months. Global strain, the mean of all items (across subscales), was used as the study's indicator of stress related to caregiving. Each of the subscales have demonstrated adequate internal consistency; alphas = .73-.93.

Assessment of Social Connectedness (ASC): Via a measure designed to augment the National Evaluation protocol, caregivers were asked a series of questions about sources of support they received in the last six months, including neighbors, friends,

spouse or partner, family, service providers, faith community, family support groups or organizations, and coworkers (Cook & Kilmer, 2010b). If caregivers indicated that a source had provided support, they were then asked about the type and amount of support received, including information or advice, emotional, tangible (e.g., food, transportation), financial, or support in a crisis. For each type of support, caregivers rated the level on a 4-point scale (1 = not at all, 2 = a little, 3 = somewhat, 4 = very much). Additionally, caregivers were asked about how much *more* support they wish they had had in the last 6 months, using the same 4-point scale (Cook & Kilmer, 2010b). Given that previous research has suggested an indirect relationship between support related to caregiving duties and child functioning (e.g., Herwig et al., 2004), emotional and informational support were expected to be most important for this relationship. Average ratings were computed across two types (i.e., emotional and informational) and multiple sources (i.e., neighbors, friends, family, faith community, and coworkers) of support to create an indicator for the amount of informal support caregivers received.

2.4 Data Analysis

Longitudinal multilevel models were used to examine the change in youth adjustment over time (i.e., up to three years following SOC enrollment) and as a function of discharge and other predictor variables, as shown in Figure 2. Luke (2004) described the benefits of using this method to capture individual differences in the level of the dependent variable (i.e., baseline child functioning) and the trajectory (i.e., change in functioning) over time. There are several advantages to using multilevel modeling (MLM) with longitudinal data compared to traditional analytic methods, including the ability to address missing data more efficiently (i.e., without loss of data and power) and

handle unequal periods of follow-up among participants (Luke, 2004). MLM estimates growth across all available time points, without excluding cases due to missing interviews, which reduces the impact of attrition. Another advantage is that MLM is able to capture individual differences in growth, rather than simply dividing variance over time into an overall effect and error; therefore, MLM provides a better fit and improves power when individual trajectories vary widely (Luke, 2004).

In the present study, data were grand-mean centered in order to enhance interpretation of results and reduce multicollinearity. Additionally, it was necessary to center time at point of discharge, so that time relative to discharge would be coded similarly for all youth (i.e., such that -3, -2, and -1 time periods corresponded to 18, 12, and 6 months prior to discharge, and 1,2, and 3 time periods corresponded to 6, 12, and 18 months following discharge, respectively). Thus, the codes for time used here had the same meaning relative to discharge, regardless of the length of youth enrollment in the SOC.

MPlus software (Muthén & Muthén, 2007) was used to complete the analysis, which was done in a series of steps to examine the adjusted variance in adjustment trajectories accounted by each predictor. After examining the influence of time trends (i.e., linear and curvilinear), ecological predictors of post-discharge functioning were examined individually.

2.4a General Approach

The analytic approach used here mirrors that described by Kwok and colleagues (2008) for estimating predictors of longitudinal change in an outcome using MLM. Two levels were tested, one representing change (i.e., differences across time points), and one

representing individual differences (i.e., differences across youth enrolled in the SOC). Specifically, Level 1 (time level) tested whether the outcome changed over time, how, and whether changes occurred as a function of time-varying predictors in the model (e.g., natural support for caregivers, caregiver strain). Level 2 (youth level) tested whether there were differences between youth in these patterns of change and whether these differences varied according to fixed (i.e., time invariant) predictors in the model, including demographic variables (i.e., age, gender, ethnicity, and income) and the amount of time spent in home versus out of home over the course of SOC enrollment (i.e., the percentage of days of out-of-home care).

2.4b Level 1 Model

Level 1 components of models were tested in a hierarchical fashion, with the simplest pattern of change (i.e., the overall effect of time) tested first, followed by testing this pattern with progressively more complex patterns of change, and with each successive pattern controlling for those previously entered to maximize parsimony of the model. Specifically, terms (i.e., intercepts, main effects, and interactions, as in ordinary least squares regression) were entered in the following order: 1) time (change); 2) curvilinear time (change in trajectory following discharge); 3) predictor variables (e.g., main effects of natural support), 4) effects of time-varying predictors on overall change (predictor * time interactions), and 5) effects of time varying predictors on curvilinear change (predictor * time * time interactions).

The first step examined the overall effect of time (i.e., pre- and post-discharge) on youth functioning. It was expected that youth would improve in functioning generally, regardless of any trajectory change at discharge. The second step added a curvilinear

effect for time (time^2), which assessed changes in youths' trajectories following discharge. The curvilinear effect was a proxy for the effect of SOC discharge, as no specific variable was used to indicate discharge, but rather time points were transformed (i.e., re-coded) to align youths' trajectories according to the time of discharge. Plots of predicted values based on these first two steps were created to interpret curvilinear effects, which helped to illustrate whether or not trajectory change occurred at the same time as discharge, and to examine the extent to which change was characterized by stabilization versus relapse (specifically, if the resultant plot flattens or bends at zero).

The third step tested main effects of ecological predictor variables; significant findings for this step would indicate that functioning can be predicted from levels of the time-varying covariates of natural support, strain, and family interactions and risk factors (e.g., whether youth with fewer risk factors exhibit higher functioning overall). Because time-varying covariates were expected to correlate, these were introduced independently.

In the fourth step, the trends (i.e., slopes over time) for time-varying predictors were examined in relation to the slope of youth functional improvements. Cross-level interactions were completed by regressing the slope of youth functioning change over time onto the slope for predictor change over time. This step was expected to reveal predictors that changed in the same direction and at a similar rate as youth functioning. Similarly, Step 5 examined time-varying predictors for curvilinear trends (i.e., slopes over time that change following discharge) in relation to the curvilinear slope of youth functional improvements. This was expected to reveal predictors that changed similarly in time throughout treatment and following discharge. Cross-level interactions were completed by regressing the curvilinear slope for youth functioning change over time

onto the curvilinear slope of predictor change over time. The models dropped nonsignificant predictors in Steps 4 and 5.

2.4c Level 2 Model

For all models, demographic factors, including age, race, gender, and income, were tested at Level 2 to examine the relationship of these factors with functioning over time. Once Level 1 models were finalized using the procedures above, main effects at Level 2 were tested. One ecological predictor, proportion of days treated out-of-home, was tested for its main effect on functioning change over time. Similar to Level 1, the slope of change in functioning over time was regressed onto the predictor variable. A significant relationship would have indicated that changes in overall functioning depended on proportion of days treated out-of-home. Similarly, Step 5 examined whether or not trajectory change following discharge (i.e., curvilinear change) varied as a function of proportion of days treated out-of-home by regressing the slope of curvilinear change onto the predictor. Level 2 effects were tested independently and factors in the model were trimmed in a similar manner to that employed with the tests of Level 1 effects.

CHAPTER 3: RESULTS

The tested models estimate improvements in youth functioning over time and changes in youths' trajectories following SOC discharge. Means and standard deviations for key study variables are displayed in Table 1. On average, youth were enrolled at age 14, and were discharged a little over a year later. At enrollment, average youth functioning (with higher scores indicating greater symptom levels) was over one standard deviation above the norm-based mean, but slightly below clinical threshold. According to caregivers, most youth experienced relatively few familial risk factors and generally experienced positive family interactions. On average, caregivers reported low levels of informal support and moderate levels of strain in caring for their child.

The main analyses controlled for age, ethnicity, sex, the degree to which a youth was served inconsistently during enrollment, and post-discharge service receipt. Results are described in regards to three types of patterns in youth functioning: general relationships between predictor variables and youth functioning (i.e., relationship does not change over time), relationships over time (i.e., predicting youths' rate of improvement following SOC enrollment, including youth functioning prior to and following discharge), and relationships with trajectory change in youth functioning following discharge. Trajectory graphs aided in interpreting trends in youth functioning during enrollment (i.e., prior to the time of discharge) and post-discharge (i.e., following discharge).

Following these steps, additional analyses were conducted to examine groups of youth defined by discrepancies between SOC-reported date of discharge and service utilization reported by caregivers. Youth were categorized as either served consistently or inconsistently during enrollment and served or not served post-discharge. These "service group" categories were not mutually exclusive as, according to their caregivers, some youth experienced both a lack of services during enrollment and the receipt of additional services following SOC discharge. Service groups were examined for mean differences in age, days of enrollment, functioning at enrollment, functioning at discharge, and improvements during SOC enrollment. Changes in functioning between enrollment and discharge, discharge and 6 months post-discharge, and discharge and 12 months following discharge were also examined for each of the service groups.

3.1 Null Model

Youth functioning was modeled without predictor variables to determine whether the amount of systematic variance at Levels 1 and 2 warranted multi-level analysis, as suggested by (Luke, 2004). This "null" model computes an intra-class correlation (ICC), which represents the proportion of variance attributable to differences among children (Level 2) versus changes over time (Level 1); that is, it estimates the average relationship between dependent variable scores (i.e., child functioning) at different time points for each child. Results of the null model are found in Table 2. The ICC model indicated that 60.1% of the variance in youth functioning (CBCL) was due to child-level characteristics (i.e., Level 2, time invariant factors such as baseline functioning or demographic characteristics). The model also estimated a substantial amount of residual variance by time (39.2%; Level 1) In total, these findings indicated that there was sufficient

variability in youth functioning at both between and within person levels, providing a clear rationale for conducting the planned multilevel analysis.

3.2 Research Question 1

The linear relationship between youth functioning and time tested the extent to which youth improved over all time periods assessed. Including all time periods, average functioning was estimated to be 65.17 points, roughly 1.5 standard deviations above the normative mean and falling between borderline (T = 60) and clinical impairment (T = 70) thresholds, after accounting for differences related to sex, age, ethnicity, and the degree to which the caregiver reported a youth was served before and after discharge.

On average, youth tended to improve in functioning approximately 1.5 points on the CBCL Total Problem Scale every six months; however, this improvement was not statistically significant (p = 0.084). At this rate of improvement, on average, youth improved approximately 9 points, nearly one standard deviation, over the course of three years. Significant covariates in the model included gender and the extent to which post-discharge services were reportedly received. Across all time periods, females tended to experience more severe symptomatology, as they scored about 3 points higher than males on the CBCL Problem Total Scale. Caregivers were more likely to report post-discharge services (i.e., mental health services received following County system's recorded date of discharge from the SOC) for youth who were more clinically impaired across all time points. Moreover, youth who reportedly received more post-discharge services experienced a lower rate of improvement over time compared to youth who received fewer post-discharge services.

3.3 Research Question 2

With the addition of the estimation of changes in the trajectory post-discharge (i.e., a curvilinear effect), Model 2 significantly improved the estimate of youth functional improvements. The change in trajectory following SOC discharge was significant (γ = -0.96, p = 0.005), and accounting for trajectory change following discharge improved the model's capacity to detect linear improvements over time (γ = -1.94, p = 0.051) by reducing random error. On average, youth tended to improve in functioning by 1.94 points per time period; thus, on average, youth improved just over one standard deviation (11.64 points) over three years. In addition, improvements in functioning tended to level off over time, such that the average trajectory of youth functioning was marked by a reduced rate of improvement (not a decline in functioning) following service discharge. Figure 3 displays graphs of estimated improvements over time.

Of the demographic covariates included, analyses detected differences across gender and age, and ethnicity trended toward significance. On average, across time points, males scored 3.33 points lower on the CBCL than females. There were not differences in the degree to which males versus females improved or reduced in their rate of improvement following SOC discharge. Although age did not relate to the degree to which youth improved on average (p = 0.98), it did relate to the change in trajectory following SOC discharge (i.e., the curvilinear effect; p = 0.007). Specifically, the rate of improvement differed for youth of varying ages prior to and following discharge, such that younger youth improved at a lower rate than older youth during SOC enrollment but improved at a greater rate than older youth following SOC discharge. Following SOC discharge, the rate of improvement among older youth tended to level off or decrease,

whereas the rate of improvement among younger youth tended to increase exponentially following service discharge. To illustrate the nature of these findings, Figure 4 includes estimated curvilinear effects for ages 11, 14, and 17. Differences in rate of improvement over time were not statistically significant ($p = 0.06$) between white youth and youth of minority backgrounds; however, white youth tended to improve more in functioning than their minority counterparts.

In this model of post-discharge trajectory changes, service delivery variables (i.e., for those served inconsistently during SOC enrollment and those served post-discharge) were also significant predictors of youth functioning. Youth whose caregiver reported that services were received inconsistently during enrollment improved more slowly than youth served consistently ($p = 0.005$). The relationship between youth trajectory change and the degree to which youth were served inconsistently during enrollment was not significant ($p = 0.085$); however, there was a trend such that youth who did not receive services at all time points during enrollment appeared somewhat less likely to continue improving following discharge than youth who received services at all time points. Youth who were served inconsistently did not significantly differ in their average level of functioning across time points compared to youth who were served consistently (i.e., at all time points during SOC enrollment). Figure 5 displays a graph of the final model's estimated trajectories, according to the number of times no services were received during enrollment. Note that the change in trajectory following SOC discharge (curvilinear effect) was not significant; although some absolute differences in trajectories are evident on the graph.

Youth who received post-discharge services tended to experience a more precipitous drop in rate of improvement (i.e., improvements slowed, although they did not tend to deteriorate in overall functioning) following SOC discharge than other youth. A graph of the final model's estimated trajectories according to the number of time points during which youth were reportedly served post-discharge is displayed in Figure 6. The graph illustrates that the symptom ratings for those who were served three time periods post-discharge, on average, leveled-off; that is, continued improvements post-discharge were minimal. Meanwhile, youth who were not served post-discharge continued to improve in functioning following discharge. While youth who were served post-discharge improved at a relatively slow rate following discharge, they also tended to evidence somewhat higher symptom levels across time points than youth who were not served post-discharge (i.e., without regard to change over time); however, greater impairment was only marginally related to the number of time periods a youth was served post-discharge ($p = 0.09$).

3.4 Research Question 3

Expected predictors of youths' post-discharge adjustment were examined in relation to the rate of estimated improvements and post-discharge trajectory changes. Changes in predictors' slopes and overall levels were included in models as it was expected that the predictor variables (e.g., caregiver strain, familial risk factors) would relate to improvements in youth functioning. Similarly, it was expected that the rate of improvement in the predictor variables would decline when services ended (i.e., post-discharge) and follow a similar change pattern as youth functioning (i.e., they would improve during SOC enrollment and stabilize post-discharge).

The role(s) of the following predictor variables are described within three patterns of relationships: the relationship between the predictor variable and overall youth functioning regardless of time (i.e., relationship does not change over time), the relationship between the rate of change in the predictor variable and the rate of improvement in youth functioning, and the relationship between the change trajectory of the predictor with a change in trajectory of functional improvement following discharge.

3.4a Proportion of Days Treated of Out-of-Home

Regardless of changes in functioning over time, there was no significant relationship between the proportion of days in out-of-home treatment (%Out-of-Home) and youth functioning. In addition, %Out-of-Home did not relate to improvements in youth functioning over time or to the change in rate of improvements following discharge.

3.4b Familial Risk Factors

Analyses identified a significant relationship between familial risk factors and youth functioning regardless of time, as youth who experienced more familial risk tended to experience more functional impairment overall. In this model, familial risk factors neither improved significantly over time nor decreased in their rate of improvements following discharge (i.e., there were no systematic changes over time). Moreover, there was no significant relationship between the changes in youth functional improvements and changes in familial risk factors.

3.4c Family Life and Positive Interactions

No relationship was found between positive family interactions and youth functioning generally, regardless of time. Family interactions did not change

meaningfully over time (i.e., did not improve or change trajectory following discharge). There was no significant relationship between the changes in FLQ scores and changes in youth functioning.

3.4d Caregiver Strain

No relationship was found between caregiver strain and youth functioning generally, regardless of time. Caregiver strain did not change meaningfully over time (i.e., did not improve or change trajectory following discharge). There was no significant relationship between the changes in caregiver strain and changes in youth functioning.

3.4e Informal Support to the Caregiver

Youth who exhibited lower functioning often had caregivers who reported greater informal support; however, this relationship was not statistically significant. Moreover, caregiver-reported informal support did not change meaningfully over time (i.e., did not improve or change trajectory following discharge). There was no significant relationship between the changes in informal support and changes in youth functioning.

3.5 Post-Hoc Analyses

Post-hoc analyses were conducted to explore differences across groups using the service status variables, such that youth for whom caregivers reported that no services were received during at least one time period (i.e., 6 months) of SOC enrollment were coded as “served inconsistently”, whereas youth who were served post-discharge for at least one time period following SOC discharge were “served post-discharge”. Table 3 summarizes descriptive statistics for each group and significant differences between groups. In order to examine the degree to which youth in each group improved during specific intervals, pair-wise *t*-tests were also conducted to examine changes in youth

functioning between enrollment to discharge, discharge to six months post-discharge, and discharge to twelve months post-discharge. Table 4 includes results of these analyses. All groups significantly improved in functioning between SOC enrollment and discharge.

3.5a Youth Served Inconsistently

Youth who were served inconsistently (i.e., those for whom caregivers reported that no services were received during at least one 6-month time period of system-documented enrollment) exhibited similar levels of functioning at enrollment and discharge as youth served consistently; these two groups of youth also improved similarly between enrollment and discharge. However, youth served inconsistently were enrolled significantly more days in the SOC (M = 504.89 days, SD = 271.79) and discharged later than youth receiving services at all time-points during enrollment (M = 379.76 days, SD = 314.88). Therefore, youth served inconsistently improved more slowly during SOC enrollment than youth who were served consistently. Additionally, post-discharge trajectories were markedly different between youth served consistently and inconsistently. Youth served consistently continued to improve significantly in functioning between discharge and one year following, whereas youth who were served inconsistently (i.e., not served during at least one time period of enrollment) did not continue to improve following SOC discharge (See Figure 7).

3.5b Youth Served Post-Discharge

Youth whose caregivers reported receipt of post-discharge services evidenced higher levels of problem behaviors and symptoms at enrollment and discharge than youth who did not receive post-discharge services. Youth who were served post-discharge were enrolled significantly fewer days in the SOC (M = 348.64 days, SD = 237.00) and

discharged earlier than youth not receiving services following discharge (M = 511.93 days, SD = 324.82). Over their SOC enrollment, youth who had received post-discharge services appeared to improve a similar amount compared to those youth who did not receive post-discharge services; however, these youth did not continue to improve six months following discharge, whereas those not receiving post-discharge services appeared to continue to evidence improvements (See Figure 8). Youth receiving post-discharge services did not significantly improve between discharge and the following 6 months; however, significant improvements were evident within 12 months following discharge. Youth who did not receive post-discharge services also did not experience significant improvements following discharge. Although trajectories depicted in Figure 8 appear to exhibit mean differences, a lack of power (N = 19, 12 months post-discharge), better functioning at discharge among those with 12 months post-discharge data (who reportedly exhibited higher functioning by approximately one-third of a standard deviation on a standardized scale of symptomatology), and wide variability in outcomes in this group reduced the likelihood that analyses would detect changes.

CHAPTER 4: DISCUSSION

The present study sought to examine the trajectories of youth enrolled and discharged from a SOC, as it was expected that SOC implementation would support the maintenance of treatment gains (i.e., gains made during SOC enrollment) by improving and expanding the sources of support youth and their caregivers receive, and by reducing environmental risk factors experienced by youth and their families. The study's key findings were: a) overall, youth who were enrolled in the SOC did not appear to improve significantly unless analyses accounted for post-discharge trajectory change; b) the rate of functional improvements (i.e., reductions in problem behaviors and symptoms) slowed following discharge; c) on average, youth enrolled in the SOC did not lose gains made during SOC enrollment following discharge but, rather, they tended to continue improving, even when controlling for discrepancies between the date of discharge reported by the SOC and services reported by the caregiver; d) youth who were older at enrollment experienced a greater rate of improvement during SOC enrollment than they experienced post-discharge, but younger youth experienced a greater rate of improvement post-discharge than they demonstrated during SOC enrollment; e) youth who were reportedly served consistently in the SOC tended to improve more than youth served inconsistently in the SOC – this difference was particularly evident following discharge, when youth served inconsistently slowed in their rate of improvement; and f) youth who reportedly received post-discharge services tended to evidence higher levels of symptomatology and problem behaviors at enrollment and across time, and their

trajectories differed from other youth in that they slowed in improvement upon SOC discharge, though their functioning did not deteriorate. The sections that follow consider these findings and discuss them separately for each research question.

4.1 Research Question 1: Youth Improvement over Time

A first model examined the extent to which youth enrolled in the SOC improved in functioning over time. Contrary to expectations, initial results suggested that youth did not evidence consistent improvement in functioning following SOC enrollment. These findings were unexpected and contrast with those of Vishnevsky and colleagues (2012), a notable outcome given that the present study selected a subsample from the same population of youth served in a SOC. Vishnevsky and colleagues (2012) found that youth experienced small significant improvements in functioning, but the present study detected only marginally significant improvements with a similar subsample of youth. This difference could reflect the present study's examination of more time points (i.e., a longer duration) following SOC enrollment than the Vishnevsky et al. work. The use of more time points increased the likelihood that post-discharge functioning was included in the estimate. Furthermore, because the rate of improvement slowed among all youth in the study following discharge, only estimating a constant rate of improvement over time (i.e., not accounting for trajectory change), appeared to add random error that reduced the ability to detect significant improvements in youth functioning. The present study also used a slightly different sample and methodology, which may have contributed to different estimates of improvements.

In isolation, the results from the first model could be used to bolster criticisms such as those made by Bickman and colleagues (1999), who did not detect differing rates

of improvement among children enrolled in the SOC relative to children receiving treatment as usual. Bickman and colleagues (1999) criticized the magnitude of the improvements detected for those in the SOC relative to the comparison group. In a similar fashion, the findings from the present study's first model may heighten criticisms because youth did not appear to improve significantly.

4.2 Research Question 2: Changes in Youth Trajectory Post-Discharge

As a critical step, a next model went beyond investigating change over time and examined the extent to which youth improve after SOC enrollment and slow in rate of improvements following SOC discharge. It was hypothesized that youth would improve while receiving services and maintain these improvements post-discharge (i.e., functioning would not deteriorate). This hypothesis was supported as there was a significant curvilinear effect (i.e., change in improvement trajectory post-discharge), which improved the ability to detect improvements over time. On average, youth improved about one standard deviation on a standardized measure of functional impairment roughly three years following SOC enrollment. Improvements made during enrollment were typically maintained and youth often continued to improve beyond SOC discharge. The results of the present study are consistent with considerable previous research that has found that youth tend to maintain gains achieved during psychological and behavioral treatment (e.g., Hood & Eyberg, 2003; Ogden & Hagen, 2006; Weisz et al., 1987).

Although it was anticipated that youth would experience improvements in functioning between SOC enrollment and discharge, it was not expected that many youth would continue to improve in functioning, albeit at a lower rate, well beyond SOC

discharge. This finding mirrors that of Bickman and colleagues (1999), who found that advantages of SOC relative to treatment as usual were not evident until 24 months following SOC enrollment. If the SOC helps youth by improving short-term functioning and preparing them to continue improving following discharge, this would provide the additional justification for supporting SOCs, which critics say is necessary in light of the expenses associated with implementation (e.g., Bickman et al., 1999).

A central contribution of the present study was examining youths' trajectory changes (i.e., a reduced rate of improvement, or curvilinear change) post-discharge. In fact, doing so was essential to detecting improvements in youth functioning over time. This pattern of findings highlights the importance of accounting for discharge when estimating longitudinal improvements in functioning, which typically assume a constant rate of improvement over time. Because the rate of improvement was not consistent over time, merely accounting for linear change was not adequate for detecting significant improvements.

Accounting for discharge in the present study was challenging because youth varied in the duration of the services they received and the point in time at which they were discharged. Such variability in treatment regimens (and durations) reflects common practice, as youth in the "real world" vary in their needs for treatment and in the length of their involvement with service systems. Research in practice settings (e.g., community-based evaluations) may especially benefit from methods that account for discharge, given that children are often treated and released at different times and because not accounting for discharge dilutes the degree to which an effect can be detected.

4.3 Research Question 3: Predictors of Youth Functioning Trajectories

A third model tested the degree to which changes in predictor variables related to improvements in youth functioning. The present study was unable to detect relationships between youth functioning trajectories and trajectories of predictor variables over time, which may be attributable to low power, given that the models included a number of parameter estimates and considerable missing data. It bears mention that the time-invariant (i.e., level 2) predictor, proportion of days treated out-of-home, was also not significantly related to youth improvements or to a diminished rate of improvement post-discharge. These results are inconsistent with a body of research that indicates that youth experiencing greater restrictiveness during treatment tend to experience poorer post-discharge adjustment (see, e.g., Ringle et al., 2012).

There were also no significant relationships detected between the changes in hypothesized time-varying (Level 1) predictor variables with youth improvement trajectories. It was critical to measure systematic changes in predictor variables in order to test whether or not changes in predictor variables related to improvement trajectories. However, most of the tested predictor variables (e.g., positive family interactions, caregiver strain, and informal support to caregivers) did not systematically improve (i.e., at a stable rate over time) during SOC enrollment or diminish in rate of improvement following discharge. A lack of systematic changes in predictor variables over the course of SOC enrollment and following discharge limited the ability of predictor variables to account for improvements and post-discharge trajectory change. Alternatively, it may be that poor implementation of SOC principles limited the effectiveness of the system in general and its potential influence on this study's predictor variables, thereby hampering

capacity to detect systematic changes in predictor variables over time and in the context of discharge.

Overall, this set of findings was unexpected in the context of previous research. For instance, prior studies suggest that youth better maintain treatment gains when they experience positive family interactions (e.g., supporting and encouraging one another; Billings & Moos, 1985). In that same vein, the lack of relationship between caregiver strain and youth functioning runs counter to a number of studies that have found that youth tend to experience greater impairment when their caregivers experience greater strain caring for them (Blader, 2006; Feinfield & Baker, 2004; Jackson, 2000). Also unexpected was the lack of relationship between support to caregivers and youth functioning; this result contrasts with results found with a nationally-representative sample in which youth experienced more positive functioning when their mothers received higher levels of emotional support (Bandy et al., 2012). In the present study, youth whose caregivers reported greater informal support often reported higher levels of youth symptoms and problem behaviors; however, this relationship was not statistically significant. Nevertheless, this observed trend may reflect a greater need for informal support among caregivers of youth who exhibit more severe impairment.

Familial risk was the only predictor variable that significantly related to youth functioning. In general, youth who experienced fewer familial risk factors tended to experience less impairment; however, youth functioning did not improve as a function of reductions in familial risk factors[1]. The general relationship between familial risk and

[1] This may reflect an artifact of the study's data and method of analysis. A more parsimonious model (not presented here) using these data detected significant

youth functioning was consistent with a significant body of research (Buckner, Mezzacappa, & Beardslee, 2003; McWhirter et al., 2007), as youth who experienced the most risk factors exhibited the highest level of functional impairment. This is consistent with literature that describes dysfunction in the youth's home and/or family, including abuse, neglect, homelessness, parental arrest, domestic violence, caregiver substance abuse, and parental psychopathology, as proximal risk factors for youth impairment (e.g., Buckner et al., 2003; McWhirter et al., 2007).

Additional predictors, not central to the study's aims, were included as covariates in the tested models. These predictors of youth functioning included age, gender, and the degree to which services were received prior to and following SOC discharge. Analyses identified age differences in trajectory, as youth who were younger at the time of enrollment tended to improve at a slower rate than older youth during SOC enrollment, accelerated in improvement after discharge, and improved at a faster rate than older youth following discharge. In contrast, older youth tended to improve more quickly during SOC enrollment than younger youth and their rate of improvement slowed following discharge.

Although it is not possible to understand exactly why these patterns of results occurred for children of different ages, these results seem to suggest an exponential benefit of SOC discharge to younger children, and future research is necessary to understand why this was the case. It could be that younger youth are slower to respond to

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improvements in familial risk over time, but these improvements became non-significant after estimating additional predictors and changes in predictors in relation to youths' trajectory of functional improvements.

services, but over time, the system is able to better prepare them for a robust recovery and continued improvements beyond SOC enrollment. If services better prepare younger children for continued adjustment following discharge, this would support the case for early intervention, because SOC services may have a greater long-term benefit for younger youth. This interpretation would be consistent with previous research indicating that the long-term success of therapeutic interventions tends to be greater for younger children than adolescents (McMahon, 1994; Weisz et al., 1987).

Alternatively, it could be that this system was better equipped to serve older youth than younger youth during SOC enrollment, yet better equipped to prepare younger youth for continuing functional improvements following discharge. Perhaps direct services for youth were most age-appropriate for older youth while SOC interventions that improved family conditions broadly were more salient to younger youths' longer-term functioning (e.g., improved family interactions may be more salient for younger youth who are less independent). That said, these conclusions are not supported by the available data; the data available on family environment for the present study were not sufficient for detecting improvements over time.

The trajectory differences between older and younger youth may have also been consequence of developmental trends in youth functioning. For example, one cross-sectional study examined functioning among a nationally representative sample of youth ages birth to 21 years at the time of SOC enrollment and found that youth between ages 10-12 years exhibited the highest levels of externalizing and internalizing problems, while youth outside that age range experienced less severe difficulties (Walrath et al., 2009). The results from that study suggest that youth functioning varies by age and imply

that youths' level of impairment may be subject to maturation effects. The youngest youth in the present study's sample were nine years of age at the time of enrollment; thus, they were approaching the peak ages of externalizing and internalizing symptomatology described by Walrath and colleagues (2009). Interpretation of that prior work is limited by its cross-sectional methods; however, it is possible that the varying trajectories exhibited by youth of different ages in the present work may be due to maturation effects, with varying patterns of youth adjustment reflecting developmental trends in functioning.

Accounting for youths' gender also contributed significantly to estimates of youth functioning, as girls evidenced higher symptom levels (about one-third of a standard deviation higher) than boys. Given that the measure of youth functioning (CBCL) accounts for national gender norms, it is noteworthy that caregivers reported that female youth experienced substantially lower functioning (i.e., higher levels of problem behaviors) than males. This may suggest that girls in this SOC had to demonstrate more emotional and behavioral problems than boys in order to become identified for and enrolled in the SOC. Perhaps the tendency for boys to be more likely to exhibit externalizing symptoms (Lewinsohn et al., 1993) increases the visibility of impairment among boys, thereby increasing the likelihood that they are identified for services even when they may be relatively less impaired than girls (who tend to experience greater internalizing symptoms; Twenge & Nolen-Hoeksema, 2002). These findings suggest a need for systematic screening of children to identify youth who are experiencing less visible challenges and may benefit from therapeutic services. Despite overall differences in symptomatology and functional impairment, boys and girls did not differ in the degree to which they improved or changed in trajectory following discharge. That said,

internalizing and externalizing symptomatology were not examined separately in the present study; therefore, it is unknown to what degree differences in problem presentation might have contributed to the present findings.

While demographic factors such as age and gender were related to youth functioning, the predictive power of service consistency is a noteworthy finding given the potential implications for this SOC's implementation of service provision. Youth whose caregivers reported no services received during enrollment for at least one time point (about six months; i.e., served inconsistently) improved at a lower rate during enrollment than those served consistently. While all youth evidenced a similar amount of improvement during enrollment, youth served inconsistently were enrolled more days than youth served consistently; thus, they improved more slowly during SOC enrollment. This may reflect a tendency for service providers (and, more broadly, those on child and family teams) to attempt to compensate for inconsistent service by lengthening the duration of enrollment and eligibility for service receipt.

Following discharge, youth who were served consistently, on average, improved more than youth served inconsistently, contributing to greater improvements overall for youth served consistently. Trends measured in post-hoc analyses (illustrated in Figure 7) suggest that youth served consistently were more likely to continue improving post-discharge than youth served inconsistently. In sum, it appears that youth served consistently fare better as they tend to improve more quickly and continue to improve post-discharge. In contrast, youth served inconsistently improve more slowly, are enrolled for a longer duration, and appear to discontinue improving following SOC discharge.

Despite different patterns of service utilization, it is noteworthy that youth who were served inconsistently did not differ from youth served consistently in the severity of problem presentation and symptoms at the time of enrollment. Potential disparities in race and socio-economic status were examined as well, but the examined youth characteristics did not predict the consistency of service provision. In turn, the factors that may have contributed to different patterns of service receipt are unclear. Given that complaints about ineffective case managers were frequently heard by interviewers during the evaluation of this SOC, this raises questions about whether or not differences in quality of key SOC agents contributed to inconsistent service provision. If indeed the inconsistency in service provision was related to quality of case management, this marks a striking area of potential growth in this SOC. Improving quality of case management may have the potential to improve youths' trajectories markedly. This possibility is consistent with the results of another study conducted in this SOC that found that youth improved more when they received case management services in the first year of their enrollment (Vishnevsky et al., 2012).

Previous research has illuminated factors that contribute to the quality of case management; specifically, characteristics of service providers and provider organizations may contribute to youth engagement in services (e.g., help seeking, keeping appointments, active participation, and adherence to treatment recommendations). One study that examined engagement among transition-aged youth (i.e., those aging into adulthood) who were eligible to receive behavioral health services found that youth were more engaged when case managers had fewer cases and when there were fewer barriers to receiving services (e.g., difficulties with inter-agency coordination; service delay due

to transition between services; Kim, Tracy, Biegel, Min, & Munson, 2014). Organizational factors related to youth engagement included a supportive work environment, trust among employees, and less internal competition for power among employees (Kim et al., 2014).

Alternatively, the relative advantages youth who were served consistently experienced compared to youth served inconsistently may be explained by a third variable – self-efficacy of caregivers. For example, previous research has found that children of caregivers who felt empowered to help their child (i.e., perceived greater knowledge, skills, and access to services and resources that could help their child) had children who exhibited greater behavior improvements during SOC enrollment (Graves & Shelton, 2007). When parents are empowered by skills and resources, they may be more likely and better able to advocate for consistent services that they expect will help their child. Furthermore, parents' perceived empowerment and skills for helping their child during SOC enrollment may be highly correlated with general parenting self-efficacy (PSE; i.e., perceived competency in the parenting role), and a substantial body of research suggests that PSE promotes child adjustment, as children of parents with greater PSE tend to evidence fewer behavior problems and more positive socio-emotional functioning (Jones & Prinz, 2005). Therefore, it may be that parents with greater PSE were more likely to advocate for consistent services throughout SOC enrollment, and their PSE continued to influence youths' functioning positively following discharge, which would explain why post-discharge trajectories were favorable for youth who were served consistently. The present data do not shed light on this possibility; however, it is a

noteworthy possibility and warrants investigation in subsequent research on the effectiveness of SOCs.

Service provision following SOC discharge was also significantly related to youth functioning trajectories. Youth who reportedly received post-discharge services were more likely to experience higher levels of symptomatology at enrollment, discharge, and overall. They also tended to improve quickly relative to youth who did not receive post-discharge services, as their absolute gains (i.e., mean difference) between enrollment and discharge were similar, but youth who received post-discharge services were enrolled fewer days. The briefer enrollment period among youth who had reportedly received post-discharge services was surprising given that their symptoms were rated as more severe at enrollment and at discharge. Perhaps relatively prompt improvements during SOC enrollment influenced the decision to discharge; however, these youth still experienced greater severity in symptomatology at the time of discharge, which may have contributed to their return to services post-discharge.

The relative severity of symptomatology among those youth who received post-discharge suggests that youth and their caregivers may have sought services following SOC services because they were not satisfied with the degree to which emotional or behavioral challenges remained, even though significant improvements had been achieved during enrollment and youth functioning did not deteriorate following discharge. If the youth or their caregivers expected greater improvement (or desired more ongoing support), they may have been more likely to seek additional services.

Taken together, these findings raise questions regarding whether or not youth who received services following SOC discharge may have been inappropriately (i.e.

prematurely) terminated from services, before they were “ready”, because these youth continued to experience greater impairment and were discharged more quickly than other youth. That said, the reason for SOC discharge is unknown for the youth in this study, and it may have been the youth or caregiver’s dissatisfaction with services that ultimately led to terminating SOC enrollment. Consumer-directed discharge due to dissatisfaction may have contributed to later service seeking outside of the SOC. Regardless of whether the decision for discharge was made by service providers or consumers, unmet needs were quite apparently perceived by the youth and/or their caregivers. Therefore, it stands to reason that a systematized process for discharge could improve SOC services by (a) assessing youth “readiness” for discharge, perhaps by using a standardized measure of symptomatology and employing a semi-structured interview about potential remaining needs and impairment; and (b) collecting information about the reason(s) for discharge and/or dissatisfaction, which could inform additional improvements to SOC services.

Some of the present study’s findings are consistent with reports from previous work that suggests individuals experiencing more severe symptomatology at intake also tended to experience greater severity of symptoms twelve months following service entry (e.g., Billings & Moos, 1985). However, the present study’s findings also contrast with those reported by Billings and Moos (1985) because youth in the present study who received post-discharge services tended to maintain treatment gains, rather than deteriorate, even though they experienced greater severity in symptomatology overall relative to those who did not receive post-discharge services. Although youth who were served post-discharge did not experience absolute declines in functioning, perhaps perceived “relapse” (i.e., perceived worsening of symptoms) contributed to seeking

additional services post-discharge. The present data suggest that, rather than experiencing declines in functioning, youth who received post-discharge services evidenced a slowing, or a plateau, in their rate of improvement, depending on the degree to which their caregivers reported receiving post-discharge services. In contrast, youth who did not receive additional post-discharge services appeared to continue improving. Differing post-discharge trajectories may have also contributed to perceived relapse; hence, youths' families may have sought additional services when youths' improvements waned post-discharge, whereas in contrast, other youth continued to exhibit improvements.

4.4 Study Contributions

The present study contributes meaningfully to the literatures on SOCs and the effectiveness of youth mental health services. First and foremost, it provides information about youths' long-term functioning during and following enrollment in a SOC. Youth served in this SOC tended to evidence incremental improvements following enrollment and continued to improve following discharge, albeit at a slower rate than the improvements made during enrollment. Moreover, study findings have several implications for service provision in this SOC, most of which point to needs for data-driven steps that ensure that youth receive services that meet their needs. For instance, data-based guidance is essential for ensuring that youth receive consistent services during SOC enrollment, as many caregivers of youth reported that services were not received for substantial lengths of time between SOC enrollment and discharge, which predicted poorer long-term functioning among youth. Service provision data should be collected and regularly examined by service providers and administrators to reduce service gaps for youth enrolled in the SOC.

It is noteworthy that many youth in this SOC appeared to have faced unmet needs that contributed to the pursuit of additional services following SOC discharge. Findings suggest that a pre-discharge assessment may be useful for identifying youth with unmet needs because youth who received post-discharge services tended to experience a greater level of impairment at the time of discharge compared to other youth. Such an assessment should include a measure of youths' improvement and norm-based functioning to inform whether or not a youth has progressed substantially and evidences functioning that is within a desired and normative range of youth behavior (e.g., using norm-based cutoff scores). The post-discharge assessment should also collect information about the reason for discharge, the degree to which caregivers and youth were satisfied with services, and the services, supports, or system processes that consumers believe would have improved the care they received.

Another implication for service system improvement is based on the finding that female youth tended to exhibit greater levels of symptom severity than male youth, even though the national norms for this measure accounted for normative differences in functioning between genders. This suggests that girls tend to experience greater impairment prior to becoming identified for services in this SOC; therefore, a broad-based screening process (e.g., through public schools) may be useful for identifying youth, especially girls, who are struggling with emotional and/or behavioral difficulties.

Finally, the results of the present study imply a need for improving services and supports that align with SOC principles and are expected to improve environmental factors that contribute to youths' adjustment. Several ecological factors that are expected

to be addressed through SOC service provision were examined in the present study through repeated caregiver ratings over time; however, few of those factors systematically improved over time or during SOC enrollment. These results imply that SOC leaders may improve service provision by examining the degree to which practices demonstrate fidelity to SOC principles, particularly focusing on aspects of service provision that are expected to improve the stability and support in children's family environment, reduce caregivers' strain caring for their child (e.g., respite care), and build networks of natural support for the youth and family.

In addition to providing potentially useful information to service system leaders in the SOC, the present study also helps to address several gaps noted in the literature. The existing literature is limited by the degree to which longer-term outcomes are examined among youth with SED. This limitation is particularly salient in the context of SOCs, as a thorough review of the literature revealed no previous research that examined the sustainability of treatment gains among youth enrolled in a SOC. Furthermore, study findings contribute to the support for the SOC philosophy, as results indicate that youth who were served consistently in the SOC continued to improve significantly in functioning one year following discharge. Although the present study's results are not able to support any conclusion about the benefit of SOC relative to traditional service provision, the findings suggest that children in this SOC continue to improve following discharge, which is not a widely recognized trend among youth who have received traditional services. That said, continued improvements may not be widely generalizable to youth served in other SOCs; that is unknown, as the author found no other studies that examined post-discharge trajectories of youth served in SOCs.

The study also stands in contrast to existing studies assessing the degree to which treatment effects are sustained among youth because previous studies have tended to categorize individuals according to diagnostic criteria rather than examining adjustment on a continuum, which restricts the ability to detect changes in symptom levels that do not cross clinical thresholds (Shapiro et al., 1995). In contrast, the indicator of youth functioning used in the present study is relatively sensitive to the fluctuations of youth's symptomatology because outcomes were measured along a continuum rather than a discrete threshold for categorizing the presence of a disorder (or the lack therof). Therefore, the present study contributes to what is known about youths' post-discharge adjustment by using a sensitive indicator for symptomatology, as subtle changes in symptomatology can impact youths' quality of life.

The study also helps to address gaps in the literature regarding the treatment of youth in real-world settings (Ash & Weis, 2009), enhancing the potential generalizability of findings to practice settings, in which the youth served tend to differ in their levels of functioning, diagnosis, and treatment intensity and duration. The present study's approach for assessing improvements and the degree to which improvements were sustained following treatment completion may also be employed in future research in community-based settings. Although a review of related literature did not reveal analytic approaches that assessed both improvements during treatment or service enrollment and trajectory change following program completion, measuring the sustainability of treatment effects is essential to documenting the long-term value of youth services. Although simple estimations of long-term improvements are essential in the evaluation of youth programs, not accounting for diminishing rates of improvement following

discharge or completion of a program could reduce the ability to detect significant improvements because such estimation assumes that subjects exhibit a constant rate of improvement that continues after discharge. Therefore, the omission of post-discharge trajectory change produces random error that can mask treatment effects.

The present study's approach enables assessment of longitudinal changes, uses all available evaluation data, and includes all youth for whom the system had a discharge date. The inclusion of all available time points, as opposed to restricting the sample to youths who completed all seven interviews, helps to reduce the likelihood that youth experiencing less stability in residence, functioning, or methods of contact (e.g., in many cases, disconnected phones contributed to attrition in the SOC evaluation sample) were excluded from analyses. Using multilevel modeling to assess patterns of functioning over time reduces the limitations associated with missing data, and therefore provides valuable insight about the sustainability of treatment gains among all youth who were enrolled in a SOC.

4.5 Limitations

Although the present study certainly contributes to a scant literature base regarding post-discharge outcomes among youth experiencing a wide range of difficulties in a community-based, practice setting, there are several limitations to consider. First, even though analyses focused on changes in youth functioning over time, it not possible to draw causal conclusions about the nature of the observed relationships. For instance, it is unknown whether patterns of treatment (e.g., post-discharge treatment) affected youths' functional trajectories, or if the youth's pattern of functioning may have led to changes in the patterns of services received. Further, the family's perceptions about the

reason for discharge are unknown; therefore, it is difficult to discern why youth who went on to receive services following discharge appeared to be discharged before adequate improvements had been made. It could be that the family was unsatisfied with services and sought assistance elsewhere; alternatively, it could be that case managers perceived adequate improvements among youth even though the family perceived unmet needs.

It was also not possible to determine the factors that contributed to the different trajectories among youth of different ages. For example, maturation effects or developmental trends in youth functioning may have contributed to youths' trajectories, which would help explain differences exhibited between older and younger youth. It is not possible to draw causal conclusions about the degree to which youth experienced continued improvements as a consequence from SOC enrollment without comparing youths' adjustment trajectories to youth who were not enrolled in a SOC (e.g., treatment as usual or no treatment).

In addition, because the study's sample was drawn from Charlotte, NC, a medium-sized city in the southeast U.S., it may differ substantially from other SOC populations; therefore, the generalizability of results is limited. It is not possible to draw conclusions about SOCs more broadly based on the present study, or to infer that the present results would be apply to youth served in another SOC.

The present study is also limited by considerable missing data and a large number of estimated trends and relationships in the tested models, which ultimately reduced the power to detect relationships. For instance, because some youth (13.8%) in the selected sample were enrolled for at least two years, they were not eligible to complete at least three post-discharge interviews (2.5% of youth in the sample were enrolled in the SOC

for 3.5 years and, therefore, were not eligible for any post-discharge interviews). Fortunately, 96% of the youth in the sample were discharged within two years following enrollment and were eligible to complete at least two post-discharge interviews, which reduced the risk of interpreting post-discharge outcomes based on a small and unrepresentative group of youth. Nevertheless, a lack of power was particularly salient in later models that examined predictors of youth functioning trajectories following discharge – the models' fit indices were strained, and error variance increased as more parameters were included in the model; consequently, the models' ability to detect effects of expected predictors was reduced. A more parsimonious method of testing these relationships may have increased the ability to detect relationships involving expected predictors; however, simplifying the model would most likely require examining pre-discharge and post-discharge trajectories separately to eliminate the need to estimate changes in trajectory following discharge (i.e., curvilinear estimation). While this would effectively simplify the model for estimating either pre- or post-discharge trajectories, it would preclude the use of data from all time points and the estimation of more complete youth trajectories, from enrollment through up to over two years post-discharge, which would reduce the degree to which estimates were a realistic depiction of youths' functioning and experiences.

Finally, the study's ability to detect relationships may have also been hindered by weaknesses in some of the measures, including a lack of demonstrated reliability or validity. For instance, the Family Life Questionnaire had not demonstrated psychometric utility prior to its inclusion in the National Evaluation protocol. The measure taps into aspects of family interactions that may not be completely congruent with measures used

in previous research that established a connection between family environment and post-discharge functioning. Additionally, the data available for the date of discharge were incomplete and occasionally invalid (e.g., date of discharge was listed as prior to date of enrollment). Although cases containing invalid dates of discharge were dropped from analyses, a large proportion of the remaining cases included caregiver-reported service data that did not match the system's report of SOC enrollment duration. Inconsistencies raised question about the accuracy of the date of discharge provided by the SOC, and prompted the calculation of service-related covariates that controlled for discrepancies between caregiver and system reported services received.

Additionally, the discharge date and available data added complexity by necessitating the approximation of youth functioning at the time of discharge using caregivers' reports at the interview most immediately following the date of discharge. Interviews were not scheduled in reference to discharge dates (e.g., immediately following), but rather were held approximately every six months following enrollment. Therefore, youth functioning at the time of discharge was estimated using ratings from the interview that immediately followed the date of discharge. In turn, some youth were discharged at the beginning of the six month period that denoted functioning at discharge; in contrast, other youth were discharged closer to the end of the six month period that denoted functioning at discharge. This makes estimating youth functioning at the time of discharge approximate at best.

4.6 Future Directions

The study's limitations point to potential future directions that would strengthen the knowledge base regarding youth functioning trajectories following SOC discharge.

First, the generalizability of findings could be enhanced by examining these research questions with a more representative sample such as that obtained via the National Evaluation. The larger number of youth included in this database would also increase the power to detect relationships with predictor variables. Examining predictors of post-discharge trajectories is still a much needed research endeavor, as little is known about the factors that contribute to sustained treatment effects over a long period of time (Burns et al., 1999). An immediate step that can be taken to advance the research about predictors of post-discharge functioning would be to estimate youth trajectories as a function of time-invariant predictor variables (e.g., rating at the time of discharge, average rating during SOC enrollment, or gross change between enrollment and discharge) rather than as time-varying. This would make the model more parsimonious and, in turn, increase the ability to detect relationships. This would also test slightly different questions, such as whether a greater level of a particular resource (or alternatively, a lower level of a particular risk factor), regardless of change in the resource over time, predicts higher youth functioning post-discharge.

In addition to the potential predictors described in the review and assessed in the present study, future research would be strengthened by investigating the specific nature of the services and supports that relate to functioning over time, including post-discharge. Objective service use data (e.g., services that were billed using Medicaid) would be an asset for examining different patterns of service use between youth who continue to improve post-discharge and those who plateau or discontinue improving post-discharge.

Finally, a more distal future direction that would advance this research is to compare post-discharge trajectories of youth enrolled in a SOC with a “treatment as

usual" group. It may be possible to use archival data of previous studies that examined improvements of youth enrolled in a SOC in comparison to a control group; however, discharge data must supplement those used in previously published studies. Future research designs should include a plan for tracking data regarding the specific date of discharge, timely exit interviews subsequent to discharge, and additional post-discharge follow-up interviews. This would allow more precise examination of the extent to which treatment effects are sustained and would overcome the limitation of approximating youth functioning at the time of discharge.

4.7 Conclusions

The present study indicates that SOC-enrolled youth improved in functioning and, in most cases, continued to improve following SOC discharge. The degree to which they were served during SOC enrollment was predictive of the degree to which they improved, particularly following discharge. Therefore, those operating within the system should strive to overcome gaps in service provision because youth who were served consistently tended to fare better long-term. Those implementing SOCs should also seek to meet the needs of youth who experience a high level of symptomatology and impairment, as these youth are more likely to go on to receive post-discharge services when they are discharged relatively early and continue to experience greater levels of symptomatology compared to other youth. These results suggest that service seeking following discharge may be consequent to dissatisfaction with the degree to which symptoms have diminished.

Although the present study's findings do not support clear conclusions regarding how factors relevant to the family and broader post-discharge environment contribute to

post-discharge adjustment, this effort contributes to the literature about post-discharge outcomes among diverse youth in a community sample. Study findings largely support the maintenance of treatment gains among youth receiving services in a SOC, and unexpectedly, suggest that many youth who were enrolled in the SOC continue to improve following discharge. The study also draws attention to the need for measuring post-discharge trajectories, especially because not accounting for discharge could reduce the ability to detect improvements over time. This need may be particularly salient for community programs in which duration of treatment and time of discharge vary. This makes estimating systematic improvements in functioning more difficult because youth who are not discharged at the same time may improve at different rates, depending on when they are discharged. The present study presents one method that evaluations of community programs may utilize to estimate youth improvements and account for changes in trajectory post-discharge.

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APPENDIX A: TABLES

Table 1: Descriptive statistics for key study variables

	L1 N	Mean (SD)	Minimum	Maximum
Age at Enrollment	1421	13.93 (2.22)	9.42	18
Days Enrolled	1421	440.34 (299.52)	39	1659
Functioning at Enrollment	1421	68.90 (8.43)	43	88
Family Life Questionnaire	896	3.50 (0.73)	1.40	5
Family Risk Factors	931	0.52 (0.81)	0	6
Global Caregiver Strain	882	9.93 (2.61)	3	15
Informal Support	729	1.67 (0.54)	1	3.40
% Out-of-Home	1414	0.12 (0.25)	0%	100%

Note: L1 = Level 1. Functioning at enrollment = Baseline score obtained on the Child Behavior Checklist (CBCL); higher scores indicate greater impairment. % Out-of-Home = proportion of days treated that the youth resided outside of the home.

Table 2: Results of multilevel models assessing youth functioning trajectories over time

Parameter	Model 1 Time	Model 2 Time^2	Model 3 %Out-of-Home	Model 4 FLQ	Model 5 CGSQ	Model 6 Nat. Sup.	Model 7 Fam. Risk
Level 2 (child specific)							
Age	0.01 (0.27)	-0.17 (0.30)	-0.19 (0.30)	-0.166 (0.34)	-0.17 (0.34)	-0.18 (0.29)	-0.21 (0.35)
Boy	-3.06** (1.19)	-3.33** (1.32)	-3.24** (1.32)	-3.33* (1.62)	-3.38* (1.62)	-3.37** (1.31)	-3.28* (1.60)
White	2.13 (1.77)	2.21 (1.94)	2.21 (1.96)	2.18 (2.60)	2.18 (2.77)	2.24 (1.93)	1.83 (2.70)
Served Inconsistently	0.17 (0.70)	0.04 (0.77)	0.07 (0.80)	0.03 (0.97)	0.03 (0.99)	0.11 (0.76)	0.10 (1.03)
Served Post-discharge	1.26* (0.52)	0.96† (0.57)	0.93† (0.57)	0.96 (0.69)	0.96 (0.69)	0.96† (0.56)	1.00 (0.68)
Level 2 Predictor	--	--	0.91 (2.56)	--	--	--	--
Time*Age	-0.01 (0.06)	0.00 (0.07)	0.00 (0.70)	0.00 (0.08)	0.00 (0.08)	0.00 (0.07)	0.00 (0.08)
Time*Boy	0.26 (0.27)	0.34 (0.29)	0.40 (0.29)	0.34 (0.35)	0.31 (0.35)	0.33 (0.29)	0.35 (0.36)
Time*White	0.51 (0.44)	0.89† (0.48)	0.92† (0.49)	0.85 (0.61)	0.72 (0.64)	0.95* (0.48)	0.76 (0.59)
Time* Served Inconsistently	0.15 (0.15)	0.52** (0.19)	0.52** (0.19)	0.52* (0.22)	0.52** (0.21)	0.52** (0.19)	0.51** (0.21)
Time*Served Post-discharge	0.29** (0.11)	0.14 (0.12)	0.12 (0.13)	0.14 (0.20)	0.16 (0.20)	0.15 (0.13)	0.14 (0.19)
Time*Level 2 Predictor	--	--	0.69 (0.60)	--	--	--	--
Time^2*Age	--	0.06** (0.02)	0.06** (0.02)	0.06* (0.03)	0.06* (0.03)	0.06** (0.02)	0.06* (0.03)
Time^2*Boy	--	0.08 (0.09)	0.09 (0.09)	0.09 (0.12)	0.09 (0.12)	0.08 (0.09)	0.10 (0.12)
Time^2*White	--	0.13 (0.14)	0.12 (0.14)	0.12 (0.20)	0.06 (0.19)	0.13 (0.14)	0.11 (0.21)
Time^2*Served Inconsistently	--	0.09† (0.05)	0.08† (0.05)	0.09 (0.07)	0.10 (0.07)	0.09† (0.05)	0.08 (0.07)
Time^2*Served Post-discharge	--	0.10** (0.04)	0.10** (0.04)	0.10* (0.04)	0.10* (0.04)	0.10** (0.04)	0.09* (0.4)
Time^2*Level 2 Predictor	--	--	0.19 (0.19)	--	--	--	--
SlopeTime*SlopePredictor	--	--	--	-15.45 (624.82)	-1.58 (3.28)	-19.12 (14.92)	-6.74 (28.06)
SlopeTime^2*SlopePredictor	--	--	--	-15.44 (331.13)	0.82 (1.16)	4.83 (4.03)	1.57 (2.30)
Pseudo R^2							

Table 2 (continued)

Parameter	ICC	Model 1 Time	Model 2 Time^2	Model 3 %Out-of-Home	Model 4 FLQ	Model 5 CGSQ	Model 6 Nat. Sup.	Model 7 Fam. Risk
Level 1 *N*	920	906	906	904	918	906	919	906
Level 1 (time-varying)								
Change over Time (Time)	--	-1.59† (0.94)	-1.94* (0.99)	-1.86† (1.00)	-2.11 (7.62)	-2.37 (1.94)	-1.96* (1.02)	-1.96 (1.30)
Change in Trajectory (Time^2)	--	--	-0.96** (0.34)	-0.95** (0.34)	-1.18 (5.24)	-0.90† (0.50)	-0.92** (0.34)	-0.93* (0.40)
Level 1 Predictor	--	--	--	--	-0.02 (0.48)	0.03 (0.03)	1.09† (0.58)	0.91** (0.36)
Predictor over Time	--	--	--	--	-0.01 (0.12)	-0.31 (0.51)	0.00 (0.01)	-0.01 (0.02)
Predictor over Time^2	--	--	--	--	-0.02 (0.05)	0.00 (0.29)	0.00 (0.01)	0.00 (0.01)
Pseudo R^2		0.19	0.31	0.31	0.31	0.31	0.32	0.31
Intercept (CBCL)	65.576** (0.59)	65.168** (4.04)	67.93** (4.44)	68.10** (4.47)	67.89** (5.12)	67.89** (5.12)	67.97** (4.41)	68.38** (5.31)
Random effects								
τ_{00}	59.04** (6.84)	54.90** (6.57)	66.57** (8.20)	66.81** (8.25)	67.69** (7.97)	66.17** (8.16)	65.55** (8.11)	65.07** (7.91)
τ_{11}	--	0.94** (0.34)	1.00* (0.44)	1.02* (0.45)	0.60 (16.15)	0.48 (1.58)	0.41 (0.78)	0.95 (0.61)
τ_{12}	--	--	0.11** (0.04)	0.11** (0.04)	0.08 (0.70)	0.07 (0.10)	0.08† (0.05)	0.11* (0.04)
σ^2	39.20** (2.06)	31.63** (1.92)	27.14** (1.73)	27.00** (1.73)	27.08** (1.47)	26.87** (1.29)	26.81** (1.72)	27.04** (1.26)
Overall Model Test								
−2LL	6388.73	6180.50	6131.40	6115.78	10351.03	12997.76	7237.79	8197.90
AIC	6394.73	6212.50	6181.40	6171.78	10421.03	13067.76	7307.79	8267.90
BIC	6409.20	6289.44	6301.62	6306.37	10589.81	13236.08	7476.61	8436.22

Note: Level 2 N = 197; FlQ = Family Life Questionnaire; CGSQ = Caregiver Strain Questionnaire; Nat.Sup. = Natural Support; Fam. Risk = Family Risk; CBCL = Child Behavior Checklist; σ^2 = Variance in Level 1 residual; τ_{00} = Variance in Level 2 residual for models predicting variance in intercept; τ_{11} = Variance in Level 2 residual for models predicting variance in slope of improvements over time; τ_{12} = Variance in Level 2 residual for models predicting variance in trajectory change. † $p \leq 0.10$. * $p \leq .05$. ** $p \leq .01$.

Table 3: Mean differences between service groups' age, days enrolled, functioning, and improvements

	Served Consistently	Served Inconsistently	*t*	Served Post-Discharge	Not Served Post-Discharge	*t*
N	93	107		89	114	
Age at Enrollment	13.57 (2.27)	14.26 (2.15)	2.13*	13.4 (2.3)	14.35 (2.07)	-2.94**
Days Enrolled	379.76 (314.88)	504.09 (271.79)	2.97**	348.64 (237.0)	511.93 (324.82)	-3.69**
Functioning at Enrollment	69.06 (8.36)	68.79 (8.63)	-2.32	70.30 (8.53)	67.87 (8.34)	2.02*
Functioning at Discharge	66.47 (8.55)	64.10 (9.07)	1.76	67.25 (8.22)	63.8 (9.09)	-2.60**
Improvements During SOC Enrollment	2.24 (6.22)	0.88 (5.40)	-1.18	1.82 (6.04)	1.92 (6.05)	-0.10

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

Table 4: Paired samples t-tests for each service group

	N	Enrollment	Discharge	6 Mo. Post-Discharge	12 Mo. Post-Discharge	*t*
Served Consistently						
Improvements in the SOC	89	69.01 (8.32)	64.35 (10.02)			6.21**
Change 6 mo. After Discharge	64		64.64 (10.35)	63.70 (11.72)		1.01
Change 12 mo. After Discharge	56		63.95 (9.78)		61.77 (10.86)	2.39*
Served Inconsistently						
Improvements in the SOC	45	67.44 (8.20)	64.93 (8.72)			1.98*
Change 6 mo. After Discharge	30		64.97 (7.29)	65.30 (8.87)		-0.27
Change 12 mo. After Discharge	23		63.83 (8.92)		63.65 (7.67)	0.11
Served Post-Discharge						
Improvements in the SOC	72	69.57 (8.24)	65.69 (9.09)			4.40**
Change 6 mo. After Discharge	63		66.03 (8.62)	65.71 (10.28)		0.32
Change 12 mo. After Discharge	60		65.17 (9.29)		63.25 (10.27)	2.10*
Not Served Post-Discharge						
Improvements in the SOC	62	67.23 (8.21)	63.21 (10.01)			4.02**
Change 6 mo. After Discharge	31		62.13 (10.59)	61.16 (11.56)		0.90
Change 12 mo. After Discharge	19		59.95 (9.17)		59.37 (8.71)	0.36

* $p \leq 0.05$ ** $p \leq 0.01$

APPENDIX B: FIGURES

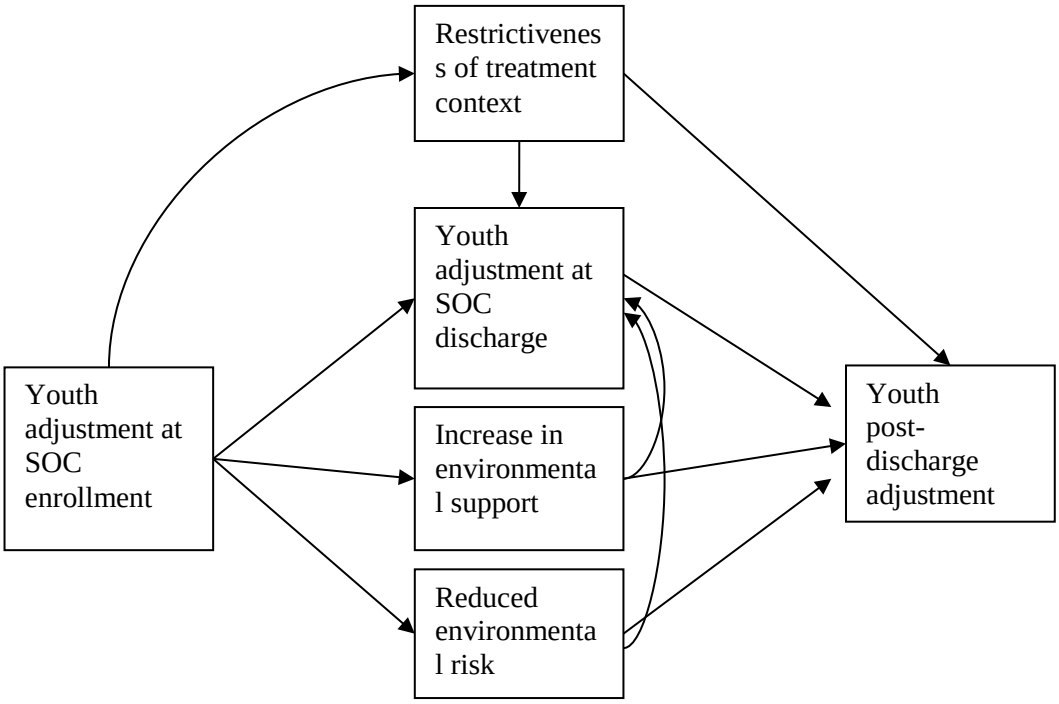

Figure 1: Theoretical model for promoting adjustment following SOC discharge by addressing aspects of youths' ecology during SOC enrollment

Note: After a child is treated, it is expected that increased environmental support and decreased environmental risk factors, along with the restrictiveness of treatment context, will be related to post-discharge adjustment.

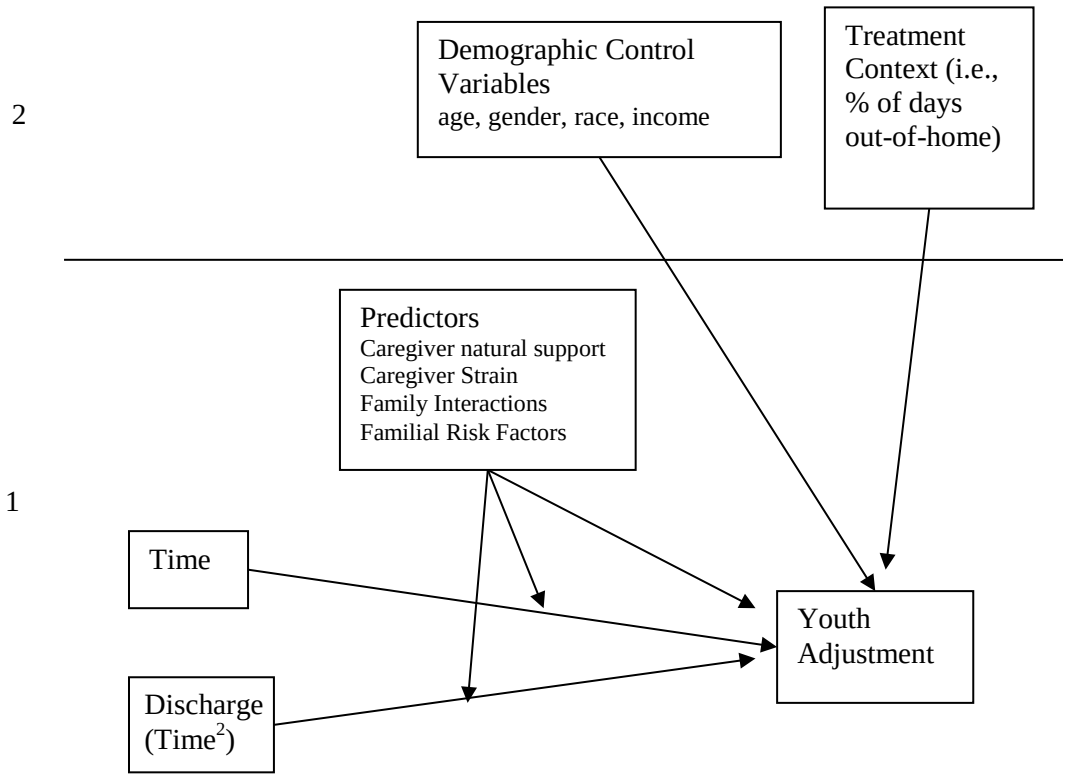

Figure 2: Predicting change in youth post-discharge adjustment

Note: Time measures the linear trend of adjustment between enrollment and subsequent follow-ups, whereas Discharge ($Time^2$) measures the curvilinear trend of adjustment over time, which can be attributed to service discharge.

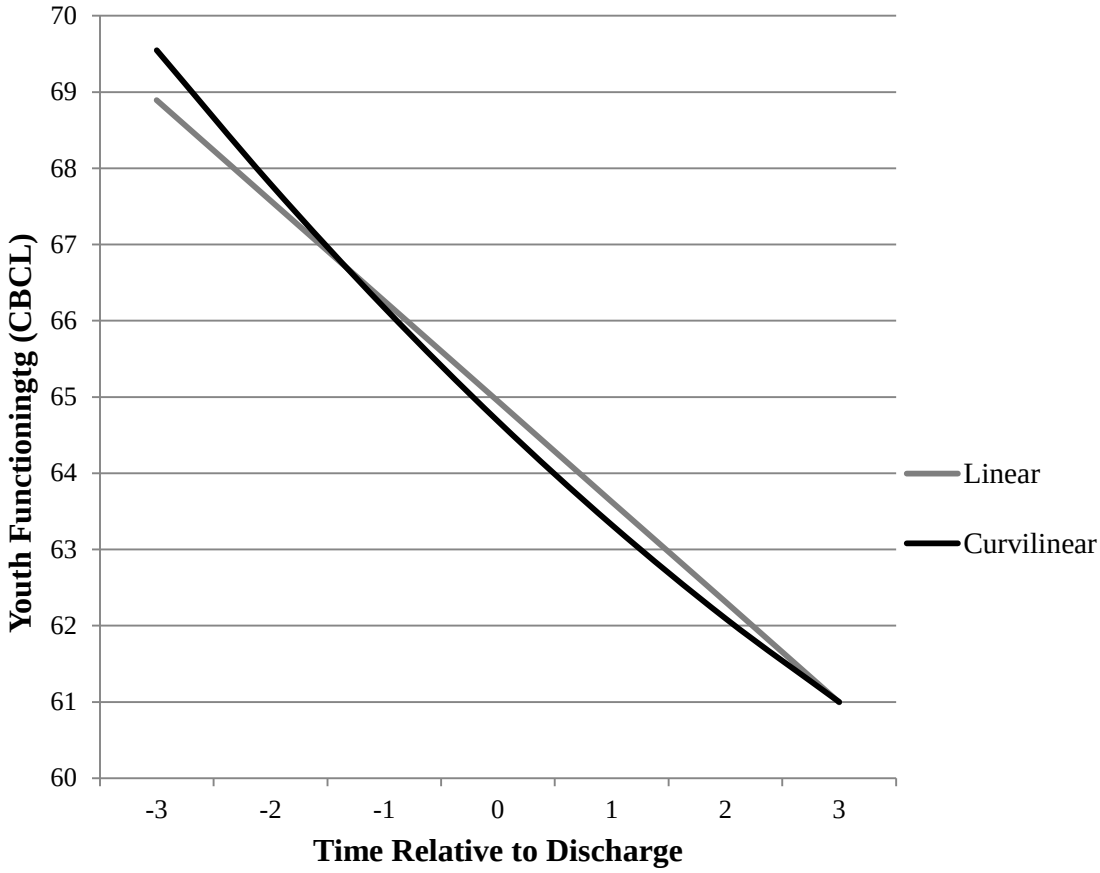

Figure 3: Youth functional improvements over time

Note: CBCL scores range from 24-100. Range was restricted here to display the separate lines clearly. The x-axis illustrates time, which was centered so that all youths' time of discharge = 0; time points prior to discharge are negative, and time points following discharge are positive. Time points are 6-month intervals.

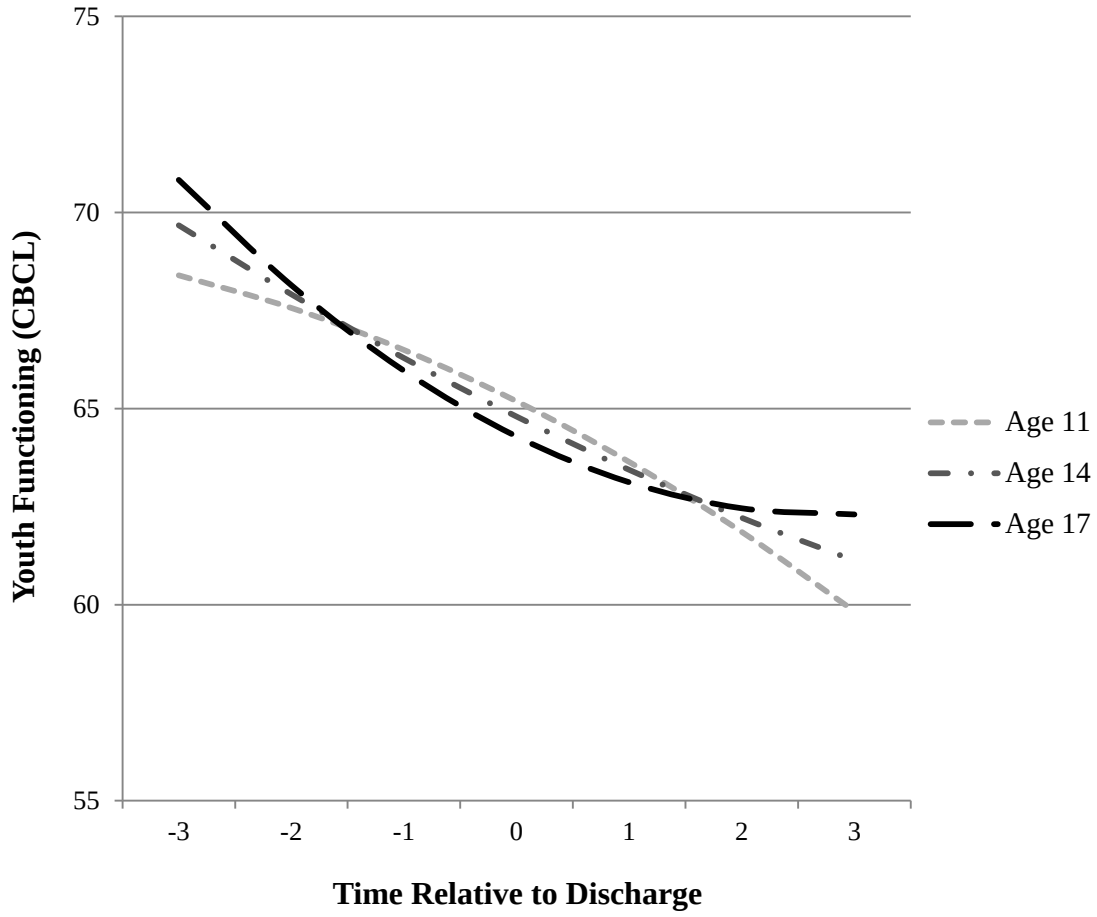

Figure 4: Youth functioning trajectories by age

Note: CBCL scores range from 24-100. Range was restricted here to display the separate lines clearly. The x-axis illustrates time, which was centered so that all youths' time of discharge = 0; time points prior to discharge are negative, and time points following discharge are positive. Time points are 6-month intervals.

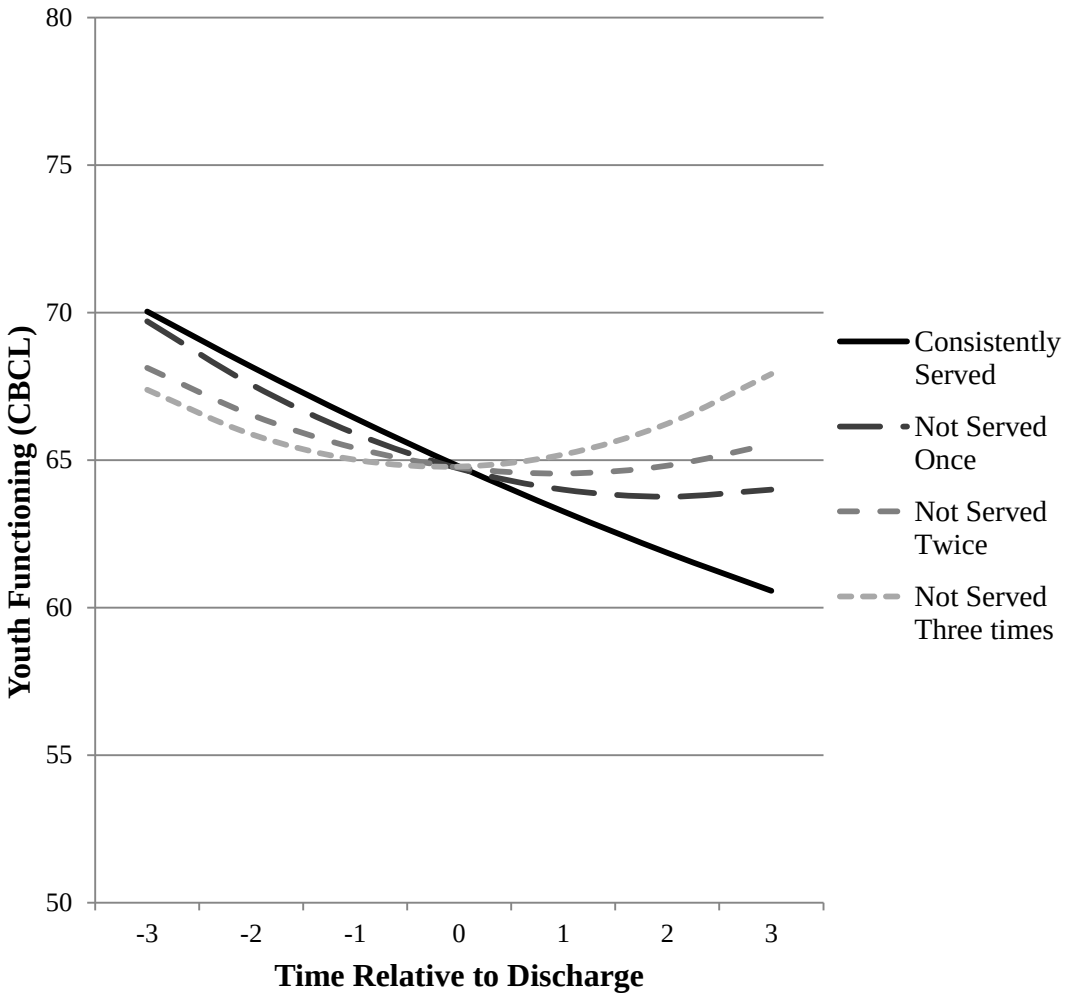

Figure 5: Youth functioning trajectories by services received during enrollment

Note: CBCL scores range from 24-100. Range was restricted here to display the separate lines clearly. The x-axis illustrates time, which was centered so that all youths' time of discharge = 0; time points prior to discharge are negative, and time points following discharge are positive. Time points are 6-month intervals.

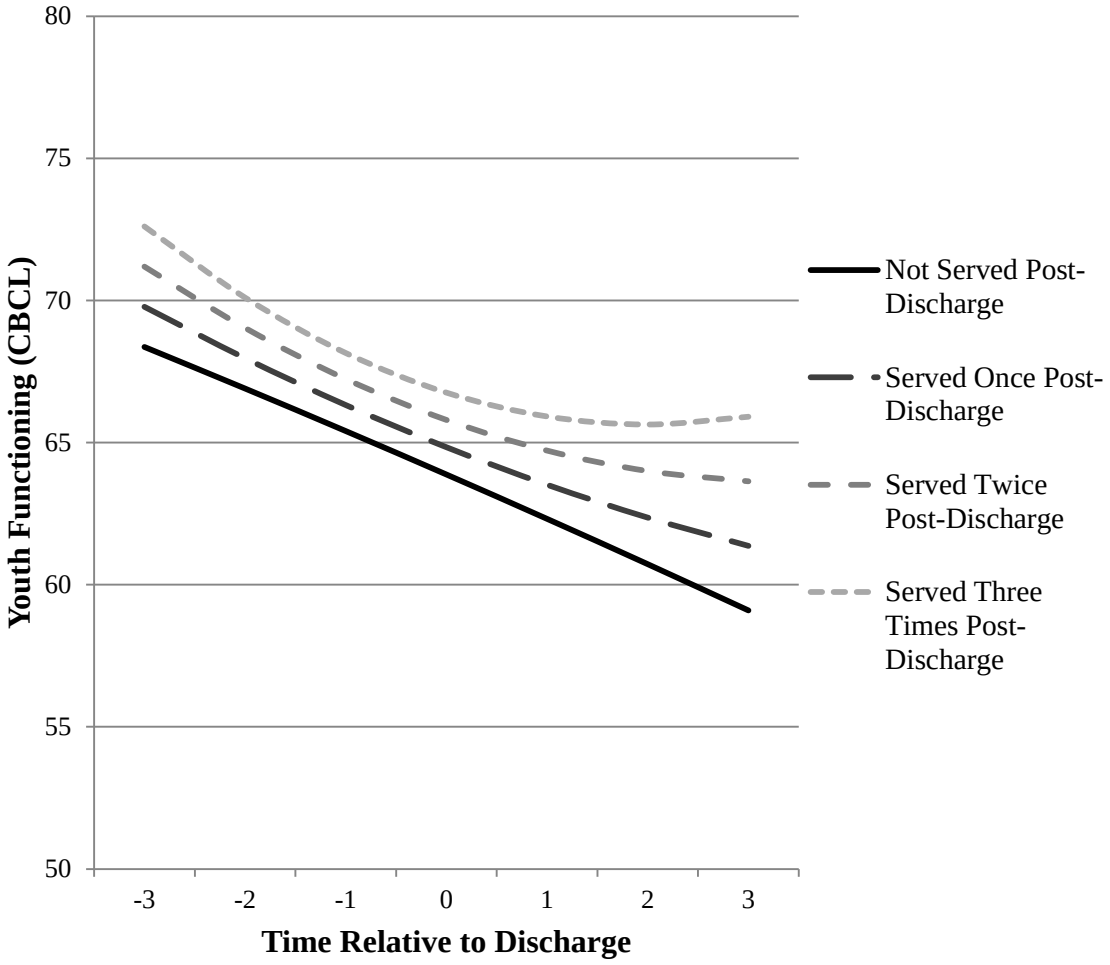

Figure 6: Youth functioning trajectories by services received post-discharge

Note: CBCL scores range from 24-100. Range was restricted here to display the separate lines clearly. The x-axis illustrates time, which was centered so that all youths' time of discharge = 0; time points prior to discharge are negative, and time points following discharge are positive. Time points are 6-month intervals.

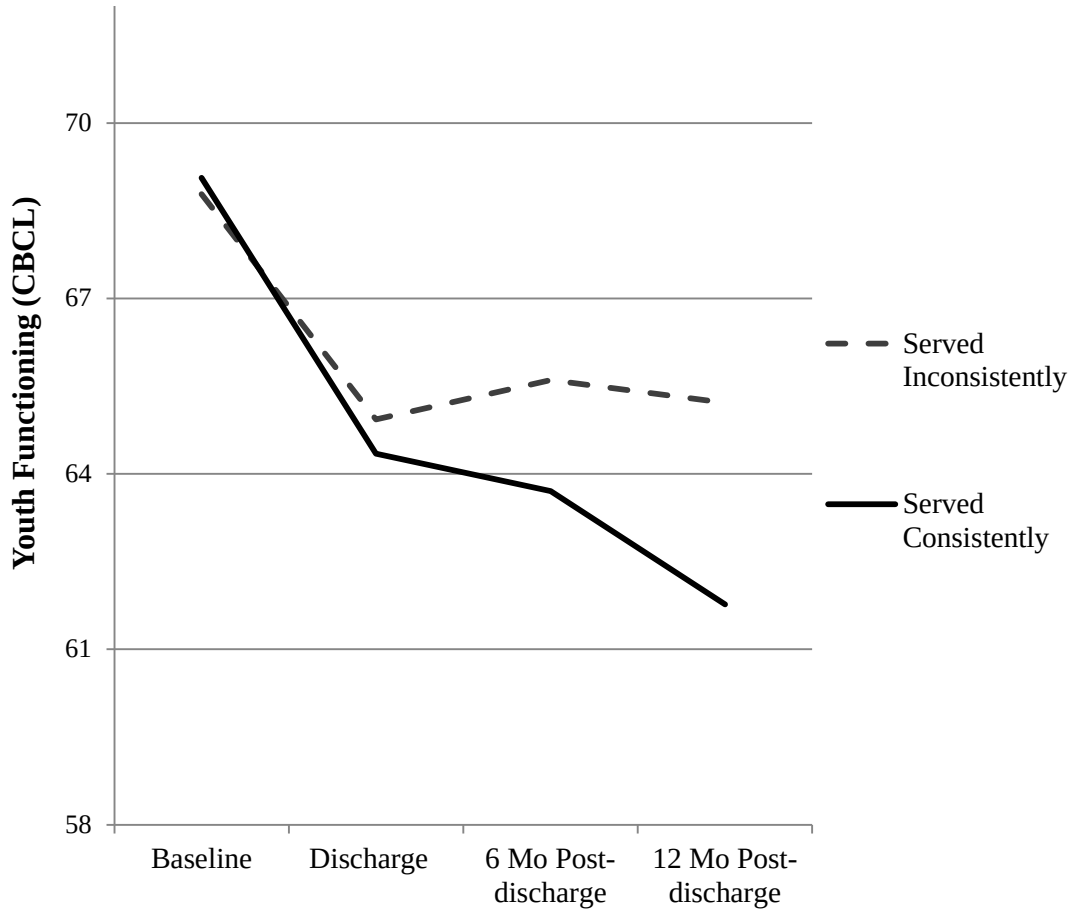

Figure 7: Youth functioning over time and consistency of service receipt in the SOC

Note: CBCL scores range from 24-100. Range was restricted here to display the separate lines clearly. The x-axis illustrates data from interviews that did not necessarily occur in equal intervals from one another, as the time between Baseline (i.e., the time of enrollment) and Discharge varied between youth.

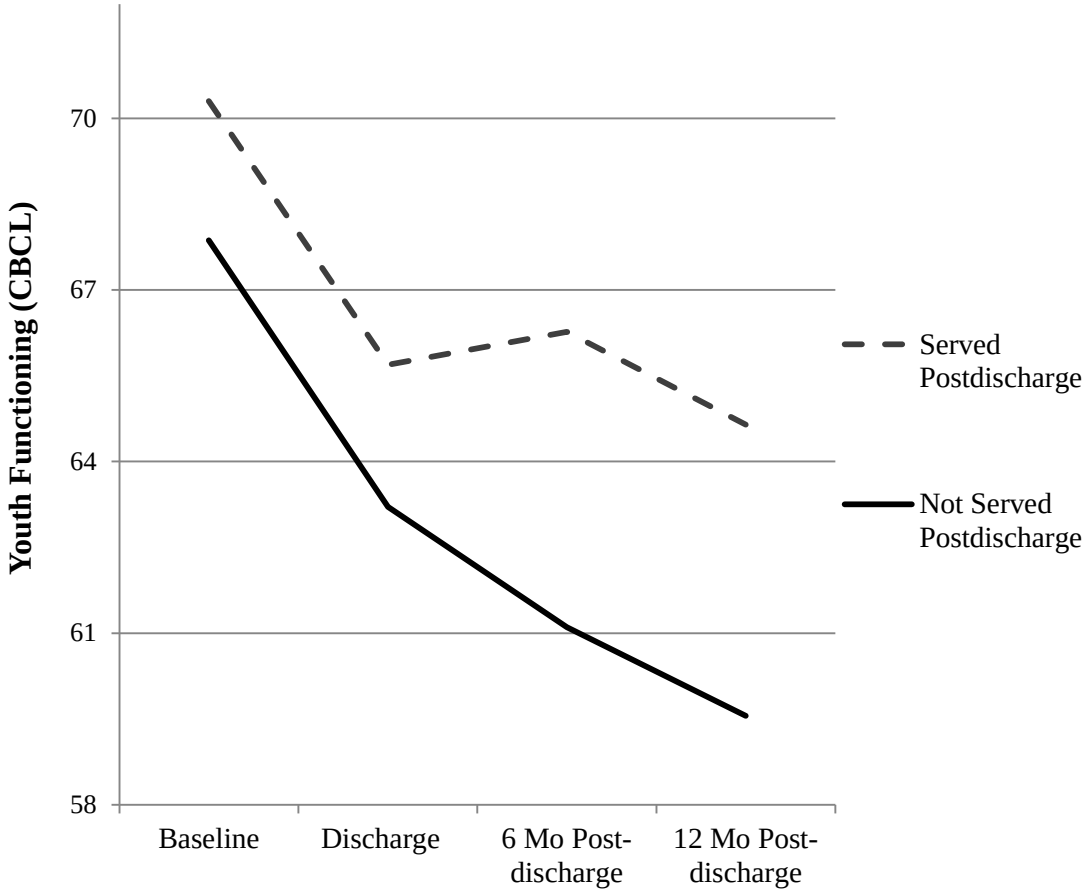

Figure 8: Youth functioning over time and post-discharge services

Note: CBCL scores range from 24-100. Range was restricted here to display the separate lines clearly. The x-axis illustrates data from interviews that did not necessarily occur in equal intervals from one another, as the time between Baseline (i.e., the time of enrollment) and Discharge varied between youth.