

Individual and provider effects on mental health outcomes in child welfare: A three level growth curve approach

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Abstract

Approaches for treating children and adolescents with emotional and behavioral disorders within their communities have been implemented in counties, cities, and states throughout the United States. The goal of this study was to model course of improvement for individuals enrolled in a statewide community treatment program. Five hundred and sixty three children and adolescents (mean = 11.6 years at time of initial contact) receiving community-based services from 26 different agencies throughout Illinois were evaluated using the Child and Adolescent Needs and Strengths (CANS) measure. Hierarchical linear modeling (HLM) was applied to three levels of data: time (months in care), child-level (clinical, demographic data), and provider agency; the problem behaviors factor score of the CANS served as the measure of outcome. The results indicated that months in care, time 1 problem behavior score, caregiver needs and strengths, youth strengths, and school problems predicted course of improvement at the child level. Results also indicated that agencies (level 3) differed in client problem behavior reduction; however, this effect was much smaller than has been observed in other populations. Implications for service organization and delivery are discussed.

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1. Introduction

The past 20 years have brought greater clarity to the question of how best to conceptualize and organize mental health services for children and adolescents. Current thinking emphasizes that the child or adolescent's home community should be the centerpiece of any service system and should always be considered the treatment setting of first choice (Stroul & Friedman, 1986, 1994). According to the community-based perspective, services should (a) be delivered in the least restrictive environment (b) be individualized (c) be coordinated (d) be delivered as close to youths' home as possible, (e) involve all available adults in youths' lives, (f) recognize youth strengths, and (g) be culturally competent.

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In 2002, the Illinois Department of Children and Family Services (DCFS) used a system of care approach to address the problem of unstable foster care placements. A growing body of research was demonstrating that multiple moves were unhealthy for children (see [Budde et al., 2004](#)) and statewide data suggested that wards of the State of Illinois were often placed in many foster homes before they eventually ended up in out of community placements ([Zinn, DeCoursey, Goerge, & Courtney, 2006](#)). The System of Care (SOC) program, as it was called, was designed for children and adolescents that were capable of community functioning but were either at-risk of stepping up to specialized foster or residential care or were stepping down from these higher level placements. All clients that are admitted to the DCFS community-based program reside in the homes of relatives, traditional foster care placements, or DCFS managed foster homes.

For the SOC program, DCFS contracted with local providers (e.g., Community Mental Health Centers, foster care agencies) to serve eligible youth in circumscribed catchment areas known as Local Area Networks (LANs). These contracts are essentially “capitated” service agreements such that providers agreed to serve any eligible youth in the LAN who was referred by a caseworker. Each region of the state is divided into LANs ([State of Illinois DCFS, 2003](#)). The client’s caseworker refers the client to the provider serving the LAN within which the client resides. If the client is accepted into the program, the provider is responsible for planning, organizing, staffing, and administering an array of community-based positive youth development and therapeutic services. The agency may offer the services and interventions directly or may arrange selected services through subcontracts or other formal arrangements. Agencies are expected to provide a variety of services, ranging from traditional psychotherapy to mentoring to wraparound (e.g., boys and girls clubs memberships, music lessons etc.).

All clients receive what is termed an Individual Plan of Care (IPC). This written document specifies the client’s strengths, needs, service goals, service provider, and frequency and duration of service provision. A “Child and Family Team” helps to develop the IPC. The IPC is updated at a minimum of every six months, and it is revised to reflect the current needs and strengths of the client and to reflect current service needs. The program also calls for youth to be served in a manner that is culturally competent.

From the inception of the program, DCFS decided allow a great deal of flexibility with regard to the actual services provided by the agencies. However, DCFS worked with Northwestern University to implement an outcomes management system designed to monitor the progress of youth receiving services and to assure accountability among the agencies; the current study uses data from the first two years of the community-based program.

1.1. The present study

The current study uses multiple data points for a sample of youth in the community-based program with three or more assessments. Since data points were nested within child, and child was nested within agency, a statistical strategy was required for how to account for dependencies in the data. The adult psychotherapy literature has had significant success using multi-level modeling (e.g., HLM; [Bryk & Raudenbush, 1992](#)) strategies to model change as a function of time, patient-level characteristics, and recently, therapists ([Howard, Moras, Brill, Martinovich, & Lutz, 1996](#); [Kim, Wampold, & Bolt, 2006](#); [Lutz, Leon, Martinovich, Lyons, & Stiles, 2007](#)).

Modeling outcomes at three levels of analysis allowed us to answer three questions: (1) how much improvement is the average client in Illinois’ program achieving over time? (2) to what extent are the changes due to client level factors such as presenting problem type, severity, functioning, caregiver issues, and youth strengths? and (3) how much change in client outcomes is attributable to the agency coordinating and delivering services? The results of recent studies in the psychotherapy literature suggest that most of the variability in clinical severity data can be attributed to time (e.g., number of sessions), followed by time-invariant characteristics of the patient, and lastly, the therapist (e.g., [Lutz et al., 2007](#)). However, the therapist variable in psychotherapy studies has consistently accounted for approximately 8% of the variance in outcomes, suggesting that the provider of service can have a significant impact on mental health outcomes ([Kim et al., 2006](#); [Lutz et al., 2007](#)).

The overwhelming majority of predictors in behavioral health outcome studies have been at the client level (“level 2”). Demographic variables such as gender and age have been shown to be associated with children’s psychotherapy outcomes ([Ponton, 1993](#); [Weisz, Weiss, Han, Granger, & Morton, 1995](#)). Initial clinical variables, such as problem behaviors, symptom severity, and level of functioning, significantly influence treatment outcomes, are significantly associated with symptom scores after 12 months of SOC treatment ([Stephens, Holden, & Hernandez, 2004](#)), and can be used to successfully predict client improvement in psychotherapy ([Leon, Kopta, Howard, & Lutz, 1999](#); [Lutz et al.,](#)

2007). Therefore, using an instrument that measures clinical variables such as patient symptoms, well-being, and level of functioning is necessary when modeling outcomes in order to assess potential relationships between initial characteristics and improvement trajectories. The current study uses a reliable and valid measure of needs and strengths – the Child and Adolescent Needs and Strengths-Mental Health (CANS-MH) – as the measure of behavioral health needs, caregiver issues, and strengths.

2. Method

2.1. Participants

Five hundred sixty three children and adolescents referred to community-based SOC treatment through the Illinois Department of Children and Family Services (DCFS) between September, 1999 and December, 2004 were included in the present study. These children were a subgroup of 3950 children that were documented in the DCFS SOC system during this time period. Because the majority of the children and adolescents were only in the system for a short period of time while transitioning between placements, only the children and adolescents that were administered the outcome measurement at three or more time-points from the same agency during this period were included in the analyses. The sample demographics did not significantly differ from the overall population, although certain agencies were more likely to administer the measurement three or more times, a requirement for inclusion in the study. The clients in the sample received treatment from 26 different agencies.

The sample was 45% female and 55% male. The average age of the clients at the point of initial contact was 11.6 years old. Race/ethnicity was not reported in the vast majority of cases (90%); the demographics of the cases in which race was reported were: African American, 71%, European American, 21%, Latino/a, 4%, Asian American, 3%. Although diagnosis was often not made at initial point of contact, the most common diagnoses at the point of initial contact were Adjustment Disorder, Oppositional Defiant Disorder, and Attention Deficit/Hyperactivity Disorder.

2.2. Assessment

Child outcomes were assessed using the Child and Adolescent Needs and Strengths (CANS; Lyons, 1999). The CANS was primarily developed to guide service delivery for children with emotional and behavioral healthcare needs. This measure has been previously used with children with mental health needs, developmentally disabled children, and children in the child welfare system. The CANS instrument evaluates the needs and strengths of a child or adolescent across multiple domains and is used as an assessment, decision-support, and outcome measure instrument (State of Illinois DCFS, 2003). The CANS consists of 44 dimensions across six factors: symptoms, risk factors, functioning, care intensity and organization, placement/system factors (caregiver needs and strengths), and child strengths. The average score of the dimensions in each factor was used in the present study to obtain average factor scores across each of the five factors. The alpha levels and number of items included in each factor for the combined factors scores are as follows; Problem Behavior (.79, 10), Risk Factors (.61, 6), Functioning (.35, 7), Care Intensity & Organization (.49, 4), Placement Factors (.81, 8), Strengths (.84, 9). Due to the low alphas for the Functioning and Care Intensity & Organization factors, these factor scores were not included. Instead, the individual items comprising these factors were entered separately in the model. Severity ratings are based on a 0 to 3 scale. Across all dimensions, a score of 0 indicates no need for action, a 1 indicates the need for watchful waiting to see whether action is warranted, a 2 indicates need for action, and a 3 indicates the need for immediate or intensive action (see Appendix A). Detailed descriptions for what constitutes each numerical rating for each dimension are provided in the CANS manual (Buddin Praed Foundation, 1999).

The CANS has been documented to be a reliable and valid measure (Lyons, Rawal, Yeh, Leon, & Tracy, 2002). It is a useful tool for predicting the level of care that a child is placed in and is correlated with a similar measure of child outcomes (the Child and Adolescent Functional Assessment Scale (CAFAS); Hodges, McKnew, Cytryn, Stern, & Klein, 1982). It has also demonstrated to be sensitive to change, and therefore, is considered a useful outcome-monitoring tool.

In the Illinois DCFS SOC programs, the CANS is completed by SOC workers when a client is accepted into the program and when he or she is discharged from the program. In addition, the CANS is completed after the client's IPC is updated or reviewed, or after six months intervals of SOC service delivery. All Illinois DCFS SOC staff are expected to know how to administer the CANS. Northwestern University offers a CANS training, and each provider is expected

Table 1
Time 1 descriptive statistics

	Mean	SD	%
<i>Problem behavior</i>	6.93	3.13	
<i>Risk factors</i>	3.05	2.29	
<i>Functioning</i>			
Intellectual/developmental	0.38	0.61	
Physical/medical	0.28	0.62	
Family	1.62	0.96	
School/day care	1.28	0.91	
<i>Care intensity & organization</i>			
Monitoring	0.71	0.81	
Treatment	0.98	0.88	
Transportation	0.55	0.65	
Service permanence	1.14	1.01	
<i>Placement factors</i>	3.20	2.95	
<i>Strengths</i>	12.36	4.49	
<i>Demographics</i>			
Age	11.58	3.95	
Gender (female)			45%

to designate an individual to receive training to become a CANS Certified Trainer. This CANS Certified Trainer is then responsible for ensuring that all staff are trained on the use of the CANS.

2.3. Procedures

The completion of the CANS at multiple time-points allowed for the use of hierarchical linear modeling (HLM). HLM can be utilized to understand how people change over time and how that change may be related to key variables of interest (Bryk & Raudenbush, 1992). The dependent variable is the score on the outcome measure at the time of the measurement; the present study utilized problem behaviors on the CANS as the dependent variable. The independent variables included demographic, clinical, and agency/provider factors. These factors are used to predict individual differences in change. The level one model of HLM was a within-subjects model expressed as the equation of a line that best fits an individual time path. The slope of the line describes the rate of change in the outcome variable for every one unit increase in time (β_1). The intercept of the line is the outcome variable at baseline (β_0).

Each individual's slope at level 1 was predicted by the individual, time-invariant characteristics in the level two model. The goal of the second level analyses was to ascertain whether differences in the amount of change in the

Table 2
Fixed effects on intercept and slope (rate of change) of CANS-MH problem scores (trimmed model)

Fixed effect	Coefficient	SE	<i>t</i> ratio	<i>p</i> value
<i>Intercept terms</i>				
Intercept	6.37	.09	69.20	<.001
<i>Slope terms</i>				
Intercept (time)	-.09	.02	-3.80	<.01
First problem behavior score	-.11	.006	-20.40	<.001
First caregiver needs/strengths score	-.003	.002	-1.96	<.05
First youth strengths score	.003	.001	2.20	<.05
First school functioning item score	.01	.006	2.36	<.05

Table 3
Variance decompositions (slopes) from three-level analysis of CANS-MH scores

Random effect	Variance component	df	χ^2	<i>p</i> value
Level 1	1.68			
Level 2	.09	523	2288.35	<.001
Level 3 (provider mean slope)	.006	24	48.79	<.01

outcome measure can be explained by the other CANS-MH scales and individual items at time 1. The third level of the HLM analysis describes the amount of variance that can be attributed to the different service providers operating within the Illinois DCFS community-based SOC system.

3. Results

HLM was conducted to analyze the differences in maladaptive behaviors over time. The problem behaviors factor of the CANS was utilized as the outcome measure. Time (months of service) was entered at level 1, and time 1 CANS-MH scales or items, along with age and gender, were entered at level two. Since there were no level 3 predictors, only random effects were derived for agency. Due to the large number of level 2 variables, a trimming strategy was employed such that only statistically significant variables remained in the final model. Descriptive statistics for all of the variables used in the analyses can be seen in Table 1.

Table 2 presents results of the fixed effects for the final, trimmed model. The following variables predicted slope terms: time in service, time 1 problem behaviors, caregiver needs and strengths, youth strengths, and school functioning. Since higher CANS-MH scores indicate more problems, regardless of the domain, a negative slope effect for a variable in terms of its effect on the problem behaviors scale suggests that as the value of the scale increases, more improvement occurs over time.

The results indicate that it takes 10 months for the average youth to experience a decrease of approximately one point on the CANS-MH problem behavior scale ($\gamma = -.09$, $t = -3.80$, $p < .01$). Examining the CANS-MH, higher time 1 problem behaviors predicted a more rapidly declining slope ($\gamma = -.11$, $t = -20.40$, $p < .001$), which most likely reflects a regression to the mean effect. More time 1 problems on the caregiver needs and strengths scale were also associated with lower slopes ($\gamma = -.003$, $t = 1.96$, $p < .05$). However, higher scores on the youth strengths scale (indicating fewer youth strengths) were associated with less improvement on the problem behavior scale ($\gamma = .003$, $t = 2.20$, $p < .05$). Finally, higher school functioning problem scores at time 1 were associated with less improvement in the problem behavior scale over time ($\gamma = .01$, $t = -2.36$, $p < .05$). Overall then, youth improved modestly on the problem behaviors scale over time. The average score at time 1 was 6.37, and the average youth can expect to experience a 1 point drop in his or her score in 10 months. Further, youth with more problem behaviors and who had caregivers with more needs and fewer strengths experienced more improvement over time. However, youth who entered care with fewer strengths and more school functioning problems experienced less improvement over time.

Table 3 presents results of the random effects for the conditional model. Consistent with previous research in the psychotherapy literature, level 1 (time) predicts the most variability in outcomes, followed by client-level variables (level 2) and then agency (level 3). However, the variance component at level 3, while statistically significant ($\chi^2 = 48.79$, $p < .01$) is quite small. Calculating the effect size in variance explained terms, the variance component at level 3 suggests that less than 1% of the variance in outcomes is attributable to the provider. On the other hand, the child level of analysis is associated with over 5% of the variance in outcomes over time.

4. Discussion

The purpose of the study was to assess improvement over time for children and adolescents in a statewide community-based treatment program in order to evaluate course of improvement at the individual and the provider level of analysis. The results of the HLM analysis suggest that children and adolescents receiving community-based services improve over time, although the gains are modest. According to the coefficient obtained from the study, it takes the average child about 10 months to experience a decrease of just short of point in the problem behaviors dimension of the CANS-MH, the outcome variable used in the study. These results are in line with previous meta-

analytic findings and community-based evaluations of system of care and similar programs, suggesting that therapeutic treatment for children and adolescents are beneficial in general, but that the effects are relatively weak (Bickman, Summerfelt, & Noser, 1997; Bickman, Noser, & Summerfelt, 1999; Weisz et al., 1995).

Why did the individuals in this child welfare sample improve at such a moderate rate? One explanation involves factors unique to the child welfare population, such as the stress of removal from their home, as well as abuse or neglect that may have occurred prior to their removal. Because of these factors, children in foster care are at an increased risk for psychological problems. Estimates indicate the youth in the child welfare system are as much as 8 times more likely to have a mental health diagnosis than the population overall (Burns, et al 2004; Landsverk & Garland, 1999). Research suggests that the possibility of multiple foster placements, disrupted medical and educational services and the potential for abuse while in foster care all place wards at risk for increased adversity and concomitant psychiatric symptomatology (Benedict, Zuravin, Somerfield, & Brandt, 1996; Newton, Litrownik, & Landsverk, 2000; Roberts, 1993). Therefore, the youth in this sample are highly disadvantaged and in this respect even slight improvement might be encouraging.

Another explanation for the lower rates of change over time may have to do with the types of care that were provided to the youth in the sample. In the Illinois community-based model, agencies are free to choose the treatments they will provide, which may suggest that they are providing similar types of service mixes found by Weisz and Weiss (1989). These researchers conducted a study of treatment as it normally occurs in typical community settings. Unlike studies of established treatments conducted in more controlled research settings (e.g., Multisystemic Therapy; MST; Henggeler & Borduin, 1990; Henggeler, Melton, Smith, Schoenwald, & Hanley 1993) their results did not show significant main effects for therapy. The authors argued that “treatment as usual” leads to negligible treatment effects. Extrapolating to the present study, it is possible that the youth in the current sample were receiving “community care as usual”.

The individual children and adolescents in the present study who received community-based services improved at significantly different rates. The level two results assessed differences in slopes that could be attributed to baseline clinical severity and demographic factors. Several initial clinical factors were significantly related to outcomes. Higher initial problem behavior scores were associated with increased rates of improvement, most likely reflecting a regression to the mean effect. Caregiver needs and strengths also predicted youths’ slope values; more problems on this domain at intake actually predicted more improvement. The items that comprise this scale reflect the caregiver’s ability to be fully engaged in the youth’s life on behalf of his or her best interests (e.g., supervision, involvement, physical/behavioral health issues). It may be that caregiver issues exacerbate youth problems, and that the component of their problems that is associated with the caregiver are more amenable to change than other issues. For example, if youth behavior problems are being exacerbated by poor supervision on the part of the caregiver, then psycho-education, respite, and better coordination among the foster parents and family members might be expected to have a relatively quicker impact on outcomes.

Youth who entered care with more school functioning deficits had poorer prognoses, on average. Although there is evidence to suggest that youth involvement in a community-based system of care is associated with improved school functioning (Anderson, Wright, Smith, & Kooreman, 2007; Burns & Goldman, 1999), there is a lack of research on variability in school functioning as a predictor of outcomes in community-based treatment.

Youth who have fewer personal strengths, in domains including vocational, spiritual/religious, creative, and interpersonal, also had poorer average prognoses. Overall, there has been a relative lack of research on the impact of strengths on clinical outcomes (e.g., Weise, Maser, Blehar, Akiskal, 1996), and the finding in this study supports continued focus on child strengths and strength development as an integral component of community-based treatment. This finding is particularly important given the principles of community-based treatment and recent practice parameter guidelines advocating for youth strengths as a core component of treatment planning (Winters et al., 2007).

Finally, this study found that the agency coordinating and paying for services is significantly associated with outcomes; however, the effect is too small to be clinically meaningful. This finding is inconsistent with results found in the adult psychotherapy literature, where therapists have accounted for up to 8% of the variability in treatment outcomes (Kim et al., 2006; Lutz et al., 2007). However, this difference may be due in part to differences in treatment effects in the adult versus child welfare populations. Adult psychotherapy studies often report large effect sizes for treatment (e.g., Smith & Glass, 1977) and this may impact the amount of variability that can be influenced by the treatment provider. As stated above, youth in the child welfare system are a high-need population, and as a

result, may be less impacted by services. As empirically supported technologies designed specifically for this population continue to evolve, we might expect providers and coordinators of care to have more of an impact on outcomes.

4.1. Limitations

The CANS problem behaviors factor score is the only outcome measurement utilized in the study. Although the CANS protocol is familiar to the majority of Illinois SOC professionals, and it has sufficient reliability and validity (Lyons et al., 2002), it has historically been used for decision support (e.g., appropriateness of admission to versus deflection from the hospital) and has not previously been used to monitor outcomes on the scale used here. Previous research has used intraclass correlations to establish the reliability of domain scores for the CSPI, a similar measurement tool to the CANS (Lyons et al., 2002). Future research should establish the internal consistency and construct validity of the CANS scales used here through exploratory and confirmatory factor analysis. In addition, adding more objective, criterion-referenced indices such as placement stability, the probability of “stepping up” to higher levels of care (i.e. from community based SOC treatment to a residential treatment facility or psychiatric hospitalization), contact with a SASS (Screening, Assessment and Support Services) worker (Snowden, Leon, Bryant, & Lyons, 2007), contact with law enforcement, or educational attainment (Greenbaum et al., 1998) would be important as a complement to the CANS.

Another limitation is the lack of fidelity checks to assess program implementation at the agency level. Although the providers utilized in the study purport to adhere to the SOC model as prescribed by the state of Illinois, without a fidelity check it cannot be certain that they actually did this in practice. A tool for measuring the degree to which service and support planning and delivery is consistent with SOC values, the System of Care Practice Review (SOCPR), has recently been developed (Hernandez, Worthington, & Davis, 2005). The SOCPR may be used in future studies for assessing the adherence to the SOC model and for providing constructive feedback to the service provider regarding implementation of SOC concepts.

The results indicate that agencies differ in the amount of client improvement and initial clinical characteristics. However, beyond the fact that there are differences between agencies, the present study does not include information on other facets of the SOC providers. Specific agency variables such as organizational climate, use of empirically supported treatments, and implementation of SOC principles may be related to improved outcomes, and should be included in future research. In addition, the multi-level models only take into account one service provider, although several youths utilized more than one service provider. The influence of coordinating agencies and multiple service providers is not accounted for within the model.

4.2. Future directions

The present study has several implications for both future research directions and program implementation in applied settings. The finding that children and adolescents involved in the Illinois DCFS community-based program improve over time at a very modest rate argues for a push to understand the services being delivered in Illinois’ communities, and for more research establishing empirically supported treatments for the complicated, multi-need child welfare population. Future research should first establish the extent to which Illinois’ DCFS service delivery and coordination is consistent with the SOC model (Stroul & Friedman, 1994), followed by an examination of the extent to which the actual services delivered are empirically supported. Answers to these questions can inform and direct DCFS’ expectations of its providers and how and where it offers quality improvement resources.

This research also points to differential rates of change for different youth presenting characteristics. For example, youth who present with significant caregiver issues demonstrate more improvement, a finding which may reflect the unique child welfare population studied here. The finding that the time 1 strengths scale predicted outcomes argues for the importance of engaging youth strengths in treatment planning. On the other hand, youth who have significant school problems have worse prognoses. Future research should determine the extent to which this finding reflects challenges inherent in working with youth with problems across multiple domains, such as school, or whether this finding might reflect service coordination challenges unique to Illinois’ system.

Appendix A. Child and Adolescent Needs and Strengths (CANS) — example

Attention deficit/impulse control

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

Rating	Description
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0	This rating is used to indicate a child with no evidence of attention/hyperactivity problems.
1	This rating is used to indicate a child with evidence of mild problems attention/hyperactivity or impulse control problems. Child may have some difficulties staying on task for an age appropriate time period.
2	This rating is used to indicate a child with moderate attention/ hyperactivity or impulse control problems. A child who meets DSM-IV diagnostic criteria for ADHD or an impulse control disorder would be rated here.
3	This rating is used to indicate a child with severe impairment of attention or impulse control. Frequent impulsive behavior is observed or noted that carries considerable safety risk (e.g. running into the street, dangerous driving, or bike riding). A child with profound symptoms of ADHD would be rated here.

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