

# Psychological Trauma: Theory, Research, Practice, and Policy

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B. Heidi Ellis, Jason Fogler, Susan Hansen, Peter Forbes, Carryl P. Navalta, and Glenn Saxe  
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# Trauma Systems Therapy: 15-Month Outcomes and the Importance of Effecting Environmental Change

B. Heidi Ellis  
Children's Hospital Boston

Jason Fogler  
Boston Medical Center

Susan Hansen  
Ulster County Department of Mental Health

Peter Forbes, Carryl P. Navalta, and Glenn Saxe  
Children's Hospital Boston

This study tracked the clinical course of 124 children receiving trauma systems therapy (TST). In addition, exploratory analyses compared hospitalization rates before and after implementation of the model and comparative cost savings were estimated. Children ages 3–20 who experienced potentially traumatic events received TST intervention. Measures of clinical course, children's psychiatric and psychosocial functioning, and social-environmental stability were taken at intake, 4–6 months, and 12–15 months. Exploratory analyses of cost savings were evaluated by comparing pre- and post-implementation hospitalization rates and lengths of stay for children under the care of the county mental health department. Emotion regulation, social-environmental stability, and child functioning/strengths improved significantly with treatment. Improvement in child functioning/strengths and in social-environmental stability significantly contributed to overall improvement in emotion regulation. Children who became stable enough to transition to office-based services during early treatment tended to stay in treatment and continued to improve. The number of children needing crisis-stabilization services at 15 months was reduced more than half for those who completed treatment. Poorer baseline emotion regulation was associated with hospitalization, and poorer social-environmental stability predicted fewer days-to-hospitalization. Exploratory analyses show that post-implementation hospitalization rates dropped 36% and average length of stay decreased by 23%, suggesting that further exploration of potential cost savings is warranted. These findings underscore the clinical importance of intervention and long-term treatment to stabilize the social environment of children and adolescents with posttraumatic stress, and emphasize the potential cost effectiveness of an intensive, community-based treatment approach at the county level.

*Keywords:* children, trauma, treatment, posttraumatic stress disorder, social environment

Trauma systems therapy (TST; Saxe, Ellis, & Kaplow, 2006) is a comprehensive method for treating posttraumatic stress (PTS) in children and adolescents that adds to individually based approaches by specifically addressing social-environmental factors that are believed to be driving a child's PTS symptomatology. TST conceptualizes child and adolescent PTS as the interface of two

conceptual axes: 1) the degree of emotional and behavioral dysregulation when a child is triggered by overt and subtle reminders of a trauma; and 2) the capacity of the child's social-ecological environment to protect the child from these reminders or help the child to regulate emotions in the face of such reminders. The treatment has its roots in Bronfenbrenner's (2005) ecological systems theory and in neuroscience research on the brain mechanisms that are believed to mediate emotional response (Rogosch, Cicchetti, & Aber, 1995; van der Kolk, Roth, & Pelcovitz, 1993).

This phase-based treatment recommends various treatment modules, depending on the child's degree of emotional/behavioral regulation and environmental stability (see Table 1). Children experiencing greater dysregulation of emotions and more unstable environments are assessed to be in a more acute stage and receive correspondingly more intensive interventions. Recommended treatment modules for the most acute problems include modules that focus specifically on aspects of the social environment that are believed to be impacting the child's symptomatology. For example, advocacy to gain more appropriate services within the child's system of care (such as a more appropriate school placement) or case management assistance for a family living in substandard housing might be included as part of a child's treatment plan.

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B. Heidi Ellis, Carryl P. Navalta, and Glenn Saxe, Department of Psychiatry, Children's Hospital Boston; Jason Fogler, Department of Psychiatry, Division of Child Psychiatry, Boston Medical Center; Susan Hansen, Ulster County Department of Mental Health<sup>2</sup>; Peter Forbes, Clinical Research Program, Children's Hospital Boston.

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Correspondence concerning this article should be addressed to B. Heidi Ellis, Children's Hospital Boston, 21 Autumn Street, 1st floor, Boston, MA 02115. E-mail: heidi.ellis@childrens.harvard.edu

Table 1  
*TST Assessment and Treatment Assignment Grids*

Social environment stability		
Self-regulation		
<u>Regulated</u>		
<u>Stable</u>	<u>Distressed</u>	<u>Threatening</u>
Transcending	Understanding	Enduring
Phase 5	Phase 4	Phase 3
<u>Dysregulation of emotion</u>		
Understanding	Enduring	Stabilizing
Phase 4	Phase 3	Phase 2
<u>Dysregulation of behavior</u>		
Enduring	Stabilizing	Surviving
Phase 3	Phase 2	Phase 1

Children move from one treatment phase to the next based on improvements in the stability of the social environment and/or emotional regulation. This approach allows the focus and intensity of the intervention to match the child's and family's present needs and allows flexibility in the event that new experiences or developmental changes lead to changes in PTS symptoms. As children transition to a more stable environment and demonstrate better emotional-regulation skills, the focus of the intervention plan shifts and may include more office-based work to help the child develop coping skills or cognitively process the trauma.

Throughout the various phases, the specific focus of treatment is oriented around priority problems. Within TST, priority problems are based on the interface between a traumatized child's emotional regulation problems and stressful/triggering stimuli in the environment. To identify and accurately define a priority problem, episodes of emotional or behavioral dysregulation and the stimuli that provoke them are ascertained by conducting moment-by-moment assessments. As the name suggests, these assessments track at a momentary level of analysis how a child transitions across distinct emotional states during a dysregulation episode. A precise and consistent pattern of how the child experiences dysregulation typically emerges after several of these assessments are conducted. If two or more patterns are identified, they are assigned priorities via clinical judgment of the amount of dysfunction that they cause. The priority problems are thus those patterns that are assigned the highest priorities (typically one to four problems in total). A treatment plan to address the priority problems is formulated via the clinically indicated treatment modules; the individuals who are responsible for carrying out the plan are identified as well (e.g., child, parent, outpatient clinician, home-based therapist, advocate, etc.).

For example, emotion regulation skills training is one module that addresses a priority problem, when an office-based setting is appropriate, that helps both parents and their child gain greater awareness of emotions and specific skills and strategies for regulation. The inclusion of parents is a requisite element of a priority "solution" to improve the child's social environment. This module is clinically indicated for children who can't yet talk about or be reminded of their trauma without experiencing overwhelming emotions or engaging in maladaptive (or even dangerous) behaviors. Once the child acquires sufficient emotion regulation abilities and the social environment is consistently stable, then treatment shifts to a cognitive-processing module centered on a priority

problem defined by emotion dysregulation triggered by trauma reminders. This module is about extinguishing the trauma response via direct therapeutic-exposure activities such as the creation of a trauma narrative, which is consistent with trauma-focused cognitive-behavioral therapy. Lastly, the final phase occurs when all priority problems have been solved. Treatment focuses on placing the trauma in a positive context as the child and family look toward the future. Activities during this phase are identified to help create lasting meaning about the traumatic event(s). This module also provides a time for saying goodbye to the therapist and helping the family transition to life beyond treatment.

In sum, TST is a phase-based, multimodal treatment whose modules are clinically indicated based on an elegant assessment of a child's emotion-regulation capacity, combined with the stability of the child's social environment, to delineate the priority problem(s) to be solved. In a 3-month open trial of TST, conducted with 110 children in two mental health centers in Boston and Ulster County, NY, we found significant improvements in the children's posttraumatic stress disorder (PTSD) symptoms, capacity to regulate emotion and behavior, and stability of their social environments with effect sizes in the medium range (Cohen's  $d = .20 - .37$ ; Saxe, Ellis, Fogler, Hansen, & Sorkin, 2005). Notably, we observed strong significant correlations between residual gain scores in children's psychosocial functioning and increased social-environmental stability. This finding suggests that increased environmental stability may be a key mechanism of action for symptom improvement under TST. Follow-up continued for children participating in the Ulster County TST program for up to 15 months. The current study has two goals: 1) to examine changes in environmental stability and symptoms across the 15 months and how changes in symptoms and environmental stability within early stages of treatment predict later outcomes; and 2) to conduct exploratory analyses examining changes in hospitalization and potential cost savings before and after implementation of the treatment model. Related to the first goal, we hypothesized that emotion regulation, social-environmental stability, and child's strengths would show improvement across the three time points of assessment, and that a higher proportion of families would be in less intensive treatment phases during late, as compared with early, treatment. We further hypothesized that residual gains in environmental stability and child strengths within the early stage of treatment (between assessment points 1 and 2) would predict overall improvement in emotion regulation from baseline to 15 months. Finally, we planned to conduct exploratory analyses examining the role of emotion regulation, child strengths/functioning, and social-environmental stability in predicting hospitalization. Related to the second goal, we planned to conduct exploratory comparative analyses of recorded hospitalizations and lengths of stay for the year and a half prior to, and following, implementation of the TST model in Ulster County NY, and to calculate potential cost savings based on changes in inpatient level of care needed for children under county care.

## Method

One hundred twenty-four children enrolled between June 2004 and March 2006 in a Department of Mental Health/Department of Social Services program within Ulster County, New York. This program is called Neighborhoods Evolving by Connecting Indi-

viduals with Supports (NEXIS) and provides care under a TST model. For clarity, within this paper we will refer to the program as the TST program. Children enrolling in the program were assessed at intake, 4–6 months from intake (early treatment), and 12–15 months from intake (late treatment) using a clinician-report instrument called the Child and Adolescent Needs and Strengths-Trauma Exposure and Adaptation Version (CANS-TEA; Kisiel, Lyons, Saxe, Blaustein, & Ellis, 2002). Following the TST model (Saxe, Ellis, & Kaplow, 2006), clinicians also rated the children on a 5-point ordinal scale, corresponding to their level of emotional/behavioral regulation and environmental stability at each time point. Children could be judged to be in need of emergent crisis-stabilization services (1 = Surviving; 2 = Stabilizing), stable enough to receive such office-based interventions as mindfulness-based, emotion-regulation skills training (3 = Enduring), trauma-focused exposure and cognitive reappraisal (4 = Understanding), or ready to begin the process of termination, meaning making, and relapse prevention (5 = Transcending; see Table 2).

### Description of the Treatment Setting

Ulster County’s TST program is a collaborative effort among Ulster County’s Department of Social Services (DSS) and Mental Health Department (UCMHD) as well as a subcontracted agency, Family of Woodstock, Inc. (Hansen & Saxe, 2009). The TST team consists of five dyadic teams. Four of these teams include one UCMHD clinician and one DSS caseworker. One team includes an UCMHD clinician and a caseworker from Family of Woodstock, Inc who provides case management to families not presently open to DSS. The inclusion of one non-DSS caseworker serves as a way to prevent the need for entry into the DSS system whenever possible. Families and children are referred to the TST program from a host of sources, including child protective services, probation, school districts, community mental health practitioners, child service agencies, family court, and self-referrals. The dyadic teams provide the full array of TST services from in-home, intensive services included in the Surviving/Stabilizing phases through the more clinic-based, therapeutic interventions offered in the Enduring, Understanding and Transcending phases of the model. At the outset, when a family is referred to TST and requires the intensive services of the Surviving/Stabilizing phases, there is a greater need for case management, wraparound, and advocacy services. At this time in the intervention, services are often focused on safety and the caseworker partner within the dyad is typically more heavily involved in the delivery of services. As the family progresses through the phases of the TST model, the treatment moves toward

more clinic-based treatment. The dyadic teams create a plan and identify clear responsibilities for each partner of the dyad.

Multidisciplinary TST team meetings are held weekly. The team consists of the five dyads (10 staff), as well as three supervisors from the three agencies involved in the project, the staff child psychiatrist, and program administrators. In addition to attending the TST team meetings, staff members receive individual weekly supervision. Both the TST team meetings and individual supervision are intended to provide ongoing clinical support for managing the caseload, as well as providing oversight in maintaining fidelity to the TST model. TST fidelity is grounded in the “10 TST Principles” of TST with a corresponding form published in the TST manual (Fogler, Saxe, & Ellis, 2006). For the duration of this study, fidelity was monitored through expert consultation to the weekly team meetings by one of the developers of TST (Glenn Saxe); any drift from the model was corrected through ongoing consultation.

### Measures

In addition to general demographic information gathered as part of the standard intake, the CANS-TEA and TST Assessment grid (described below) were completed at intake, 4–6 months, and 12–15 months.

### CANS-TEA

The CANS-TEA (Kisiel et al., 2002; see also Lyons, Kisiel, Dulcan, Cohen, & Chesler, 1997; Lyons, Minter, Kisiel, & Shallcross, 1998) is a comprehensive, clinician-rated measure of a traumatized child’s history of traumatic events; psychiatric symptoms (including PTS); psychosocial impairments and strengths; and level of environmental support and stability at home, school, and in the community. The CANS-TEA differs from the original CANS (Lyons, Griffin, Fazio, & Lyons, 1999) in its focus on a child’s adaptation to trauma. The CANS-TEA includes new items assessing exposure to traumatic experiences, trauma-related responses, and social-environmental factors that are expected to relate to adaptation posttrauma, and reconfigured subscales that best capture needs, strengths, and adaptations of children exposed to trauma (for a complete description of instrument development and validation see Kisiel, Blaustein, Fogler, Ellis, & Saxe, 2009).

Following a standard intake interview and supplementary contact with important collaterals in a child’s life, clinicians rate items pertaining to each domain along a 4-point continuum ranging from 0 (*no need for clinical intervention*) to 3 (*requires emergent*

Table 2  
*Phases of Treatment*

Phase	Surviving	Stabilizing	Enduring	Understanding	Transcending
<b>Module</b>					
Stabilization on site	***	***	—	—	—
Advocacy	***	**	*	*	*
Skills-based Psychotherapy	*Emotion regulation	**Emotion regulation	***Emotion regulation	***Cognitive processing	***Meaning making
Psychopharmacology	***	**	*	*	*

— not used or contraindicated. \* occasionally helpful. \*\* often helpful. \*\*\* essential.

*clinical intervention*). For the purposes of these analyses, three subscales were developed. Frequencies were calculated for the original 50 items and items that were missing for more than 14% of the cases were removed (12 items). In addition, one item with very poor variability was removed. The remaining 37 items were divided into three groups based on face validity: child strengths/functioning, emotional regulation, and social-environmental stability. Item-scale correlations were examined for each of these scales and items that correlated with the full scale less than 0.2 were removed. This process continued in an iterative fashion until all item-scale correlations were greater than 0.2. As a result of this process, four items were removed from each of the child functioning and emotion regulation scales, and three from the social-environment stability scale. Final scales and Cronbach's alphas are presented in Table 3.

### TST Assessment Grid

Following a standard clinical interview, the intake clinician met with the TST clinical team and, in accordance with the TST treatment manual (Saxe et al., 2006; see Table 1), assigned a child to one of the five TST treatment phases based on their level of emotional/behavioral regulation and environmental stability: Surviving, Stabilizing, Enduring, Understanding, or Transcending. For statistical analyses, we translated these phases into a dichotomous outcome measure for nonparametric repeated-measures analysis (Cohran's  $Q$ ): 1 = crisis stabilization, 2 = office-based and more advanced treatment phases.

### Frequency of and Time to Hospitalization From Time of Enrollment

Fifteen children (12.1%) were hospitalized during the 15 months of the study. We operationalized time to hospitalization as number of days from time of enrollment to first hospitalization.

### Data Management and Analytic Strategy

**Statistical procedures.** Our planned analyses were as follows: Repeated-measures analysis of change in phase of treatment on the TST Assessment Grid from intake to the second and third time points (Cochran's  $Q$ ) and in CANS-TEA-assessed variables (repeated-measures ANOVA), and prediction of treatment status

(i.e., completing or dropping out of treatment) [logistic regression], and prediction of time to hospitalization (survival analysis/Cox regression).

Residual gain scores  $[(Z_{\text{Time } 1} - Z_{\text{Time } 2}) \times r_{\text{Time } 1, \text{Time } 2}]$ ; Steketee & Chambless, 1992] were calculated for each CANS-TEA subscale. Previous findings (Saxe et al., 2005) suggest that our analyses were most likely to produce results with medium effect sizes. Our sample size exceeded Cohen's (1992) recommendations for the sample size needed to observe these effects with adequate statistical power.

Exploratory analyses of hospitalization and treatment status were run on the entire sample ( $N = 124$ ), whereas analyses of change in treatment phase and CANS-TEA subscales were run on the 49 children for whom we had complete data.

## Results

### Description of the Sample

We assessed 56 girls and 68 boys with a mean age of 10.74 years (standard deviation [ $SD$ ] = 3.29). Seventy-three children self-identified as Caucasian (58.9%), 14 as biracial or multiracial (11.3%), 13 as White Hispanic (10.5%), eight as African American (6.5%), six as Black Hispanic (4.8%), one as Native American, and nine as "other" (7.3%). Seventy children (56.5%) were assessed to have two psychiatric diagnoses at intake, and 33 were assessed to have three or more diagnoses at intake (26.6%).

Children in this sample experienced between three and nine potentially traumatic events, specifically traumatic grief or separation (91.9%), emotional abuse (87.9%), neglect (83.1%), experiencing natural or man-made disasters (84.7%), witnessing violence between family members (81.4%), physical abuse (72.6%), witnessing community violence (57.3%), sexual abuse (28.2%), and medical trauma (e.g., a frightening experience while receiving emergency medical care, 28.2%). PTSD was the most common primary diagnosis (36.3%) and diagnostic codes designating relational problems between the child and his or her parent or sibling (e.g., V61 codes, reactive attachment disorder) were the most common secondary diagnoses (33.9%). Depressive disorders, including major depression, dysthymia, and mood disorder not otherwise specified, were consistently the second most frequently assigned primary (17.7%) or secondary (11.3%) diagnosis. Re-

Table 3  
CANS-TEA Short Scales and Alphas

Emotion regulation (10 items)	Social environment stability (10 items)	Child strengths/functioning (six items)
$\alpha = .69$	$\alpha = .79$	$\alpha = .72$
Avoidance	School	Functioning at school/daycare
Anxiety	Caregiver depression	Social functioning
Depression	Caregiver PTSD	Intellectual development
Affect dysregulation	Caregiver Substance abuse	Interpersonal strengths
Physical/verbal aggression	Caregiver monitoring and supervision	Community involvement
Suicidal behavior	Caregiver knowledge	Psychological strengths
Behavioral regression	Caregiver organization	
Attention difficulties	Safety	
Self-harm	Resources	
Sexually provocative behavior	Residence permanence	

garding child functioning, moderate to severe impairment was noted in social functioning for 42% of the children and at school or daycare for 40% of the sample.

The most frequent source of social-environmental instability involved a lack of resources; 64% of children were noted to face moderate to severe resource problems. In addition, caregiver impairment was prevalent, with 50% of the children being noted as experiencing moderate (27%) to severe (23%) levels of parental PTSD, and 45% experiencing moderate to severe levels of parental depression.

At time of analysis, 93 children had completed 4–6 months of treatment, and 54 of the 124 children had completed 12–15 months of treatment. In total, there were 11 lost to follow-up in the early stage of treatment (children leaving treatment before their Time 2 assessment), and 12 lost to follow-up in the late stage of treatment (children leaving treatment before their Time 3 assessment).

### Comparison of Families Who Remained in Treatment Versus Those Who Dropped Out

There was a trend for families who dropped out of treatment to be in need of crisis stabilization services at intake ( $\chi^2 = 7.40, p = .06$ ), and a trend for treatment completers to be in Enduring or higher phases of treatment at 4–6 months ( $\chi^2 = 4.89, p = .09$ ). In addition, children who dropped out of treatment ( $n = 23$ ) were more likely to have higher scores on environmental instability and child functioning/strengths at intake compared to those who remained in treatment ( $n = 54, t(72) = -2.31, p < .05$  and  $t(71) = -2.98, p < .01$ , respectively). No statistically significant differences were found between those who dropped out versus those who completed treatment on gender, ethnicity, or age. Cells were too small to compare early to late dropouts.

### Change in TST Treatment Phase

Cochran’s *Q*, a repeated-measures nonparametric test, indicated a statistically significant change from baseline through assessment periods 2 and 3 in the proportions of children needing crisis-stabilization services versus office-based services ( $Q = 11.79, p < .005$ ). Over half of the children (53.7%) needed crisis-stabilization services at intake versus 37.0% at Time 2, and 25.9% at Time 3.

### Change in CANS-TEA Subscales

A within-subjects repeated-measures ANOVA was conducted for each of the three scales. There were significant main effects for

Table 4  
*Descriptive Statistics and Results of Repeated Measures ANOVA for the Three CANS-TEA Subscales*

CANS-TEA subscale	Score at intake ( <i>M, SD</i> )	Score at 4–6 m ( <i>M, SD</i> )	Score at 12–15 m ( <i>M, SD</i> )
Emotion regulation	1.05 (.36)	.85 (.31)	.88 (.50)
Stability of social environment	1.11 (.06)	.93 (.06)	.85 (.07)
Child’s strengths/functioning	1.37 (.06)	1.19 (.05)	1.15 (.06)

Note. *N* = 49.

emotion regulation,  $F(2) = 7.096, p < .01$ , social environment,  $F(2) = 9.546, p < .01$ , and child functioning/strengths,  $F(2) = 6.772, p < .01$ . Mean scores are presented in Table 4.

We conducted a linear regression analysis to determine whether changes in social-environmental stability and child strengths/functioning predicted overall change in emotion regulation across the 15-month time period. Residual gain scores for social environment and child strengths/functioning from Time 1 to 2 and Time 2 to 3 were entered as independent variables, with gender and age as covariates. The overall model predicted 63% of the variance (adjusted  $R^2$  60%), and was significant at the  $p < .01$  level,  $F(4, 42) = 17.47$ . Residual gain of child strengths/functioning both from Time 1 to 2 and Time 2 to 3 contributed significantly to the model as well as residual gain of social-environmental stability from Time 1 to 2 (but not 2 to 3). Gender also contributed significantly to the variance, with boys showing greater improvement than girls.

### Prediction of Hospitalization and Time to Hospitalization From Intake

Logistic and Cox regressions were conducted with baseline emotion regulation, social environment, child strengths/functioning, age, and gender as independent variables, and hospitalization or time to hospitalization as the dependent variables. Results indicate that poorer baseline emotion regulation alone predicted whether a child was hospitalized during the course of treatment, Wald = 9.16,  $p < .01$ , and earlier time to hospitalization from intake was predicted by poorer baseline levels of social-environmental stability (Wald = 7.60,  $p < .01$ ).

### Exploratory Comparison of Hospitalization and Estimated Cost Savings Pre- and Post-Model Implementation

Hospitalizations and length of stay for youth under Ulster County Department of Mental Health care in the 12 months prior to implementation of the Nexis/TST program was gathered from clinical treatment records ( $n = 197$ ). This data was then compared with hospitalization and rates of stay for children during the 12 months following implementation of Nexis/TST ( $n = 96$ ). Due to the decreased numbers of youth in care under the TST program as compared with the year prior to TST implementation, all cost analyses were adjusted for sample size in order to provide an estimate of cost savings that occurred per 96 children served.

The number of hospitalizations for children receiving TST was smaller than prior to TST implementation by 36%. Cost saved due to decreased number of hospitalizations was calculated by multiplying the rate of hospitalization during year 1 by the total number of children served in year 2, yielding the number of children expected to be hospitalized ( $n = 20$ ); the actual number hospitalized under TST ( $n = 13$ ) was then subtracted from the expected number. This number ( $n = 7$ ) was then multiplied by the average cost per stay (\$30,000). Not taking into account changes in length of stay, the total dollars saved by preventing hospitalizations was approximately \$210,000. It should be noted that the data available on prior hospitalizations for this group was not complete due to the fact that hospitalizations were not routinely recorded in the clinical treatment records before this study began. Therefore, the number

of prior hospitalizations is probably underrepresented, and the overall and county savings would likely be greater.

In the TST program, the average length of stay per hospitalization was 23% shorter than the year prior to implementation, or from approximately 40 days per event to 31 days per event. At a rate of \$750/day, the projected dollar savings per hospitalization is approximately \$6,750. Cost savings related to length of stay was calculated by multiplying average savings per stay (\$6,750) by number of hospitalizations ( $n = 13$ ). Not taking into account the change in the overall number of hospitalizations, the savings related to shorter length of stay alone was approximately \$89,000.

Combining the effect of change in the number of hospitalizations and the length of stay in the hospital per event, Medicaid expenditures for hospitalizations were estimated to be reduced by \$299,000 (51%).

## Discussion

This study tracked the outcome of 124 children receiving TST (Saxe et al., 2006) over a 15-month period. As expected, fewer children needed intensive crisis-stabilization services as they progressed through the 15 months of treatment. Indeed, whereas more than half of the children required intensive services at baseline, only a quarter of them required these services at the 15-month assessment. This finding suggests that children receiving TST typically progress through phases of treatment and require fewer resources to treat over time. This data is echoed by the decreased rates of hospitalization before and after implementation of the treatment model. Although this study does not determine whether the implementation of TST contributed to, or caused, the decrease in hospitalizations, decreased hospitalization rates and lengths of stay in the year after TST was implemented as compared with the year prior results in Medicaid costs decreasing by more than half.

Also as expected, families showed improvement in their children's emotion regulation, environmental stability, and children's strengths/functioning over the 15-month period during which they received TST. Although the overall change in these three domains was positive, improvements in emotion regulation were not linear.

Children's improvement in emotion regulation across treatment was predicted by their residual gains in child strengths/functioning during both early and late treatment periods. In addition, improvement in emotion regulation was predicted by the stability of the social environment during early treatment. This evidence suggests that targeting social-environmental change may be an important dimension in the initial stages of treatment. Early treatment gains in environmental stability may have long-term positive effects in improving a child's emotion regulation and minimizing the need for intensive, crisis-oriented treatment. Children who did not show significant treatment progress within the first 3 months of treatment were unlikely to show improvements later, suggesting that attention needs to be paid to early treatment trajectories.

Neither emotion regulation nor environmental stability was significantly associated with treatment retention. Because the program delivering TST in this study was part of the Department of Social Services and the Department of Mental Health, many youth have family court involvement or social service plans that stress the need for services; this may outweigh the importance that clinical or social-environmental factors might play in treatment retention.

As one might expect, greater emotion dysregulation at baseline was associated with being hospitalized. It is interesting that poorer environmental stability at baseline, but not emotion regulation, was associated with fewer days from intake to hospitalization. This finding suggests that clinicians may move to hospitalize a child rapidly if the social environment is perceived to be unstable, regardless of the child's emotion regulation and functioning. Further studies examining why clinicians move to hospitalize a child may provide important information about whether clinicians sometimes use hospitalization as a means of removing a child from an unstable environment, and if so, whether hospitalizations could be diverted if funds were devoted to stabilizing the social environment. Particularly given the decreased rates of hospitalization and length of stay postimplementation of the model, further exploration of what factors contributed to this decrease could help illuminate whether one of the core mechanisms for improvement under TST is its contribution to stabilizing the social environment.

## Limitations

There are several methodological limitations to this study. This study was not designed to test the effectiveness of TST. Although we were able to observe improvements in symptoms over time in children receiving TST, the lack of a comparison group makes it impossible to determine if these changes were due to the treatment or some other factor, such as child maturation or the passage of time. The discussion of factors relating to positive child outcome takes place within this limitation. Future research will not only need to replicate these phenomena, but also attempt to identify whether improvements are a result of receiving TST. Additional limitations of this study include the lack of structured diagnostic instruments. Data for this study is primarily clinician report, and thus subject to reporter bias. That is, although the CANS-TEA has been shown to be a reliable and valid clinician-rated measure of child functioning (Kisiel et al., 2009), clinicians' expectations and bias toward positive outcomes while completing the CANS-TEA cannot be ruled out. Future studies examining the effectiveness of TST within a controlled design utilizing multimodal assessments of child functioning and environmental stability will be necessary to replicate and further validate these findings.

Hospitalizations and estimated cost-savings before and after implementing the model were derived from naturally occurring groups and thus the observed between-groups differences need to be understood in this context. Cohort effects, changes in the characteristics of children referred for county care, or simply reduced caseloads could be responsible for some of the differences. In order to fully understand whether changes in hospitalization and estimated cost of care can be attributed to implementing the model, a randomized controlled trial will need to be conducted. Such a trial is necessary to firmly establish that decreased hospitalization rates and associated cost-savings are directly due to TST and not the result of factors including, but not limited to, the nature and intensity of services provided; fiscal and third-party payer influences; availability of hospital care; and availability and use of other services (e.g., case management, special education, mentoring, etc.). The effects of such variables on child and family outcomes would be difficult to ascertain without a controlled study design or more extensive data for conducting multivariate analyses. In particular, a better under-

standing about how TST affects hospitalizations would help move the field forward as little is known about factors influencing hospital admission (Blanz & Schmidt, 2000).

### Clinical Implications

This study provides preliminary support for the idea that changes in the social environment may be important targets in treatment. This study suggests that improvements in psychiatric and psychosocial functioning seen in children receiving TST over a 15-month period are in part explained by changes in the stability of the social environment. Thus, although treatments that target individual child coping, such as trauma-focused cognitive-behavioral therapy, provide important elements of intervention, treatments that also specifically target social-environmental instability may have even greater leverage in reducing the symptoms of traumatized children. TST is promising as it 1) specifically addresses both individual and environmental factors within treatment; and 2) has demonstrated preliminary success in improving both environmental stability and child outcomes.

### Policy Implications

The exploratory finding of cost decrease post-program implementation suggest that further study of potential cost saving through implementing an intensive, community-based program at a county level is warranted. Although initial services required are more intense and may demand more resources, the benefit of this investment may be seen within a relatively short time frame both in terms of improvements in child functioning and a decreased need for the highest, and most expensive, level of care.

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