

## Children in Foster Care: Adverse Childhood Experiences and Psychiatric Diagnoses

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*This study examined psychiatric diagnoses and adverse childhood experiences in a matched sample (n = 144) of children enrolled in standard or treatment foster care programs and their associations with discharge placement restrictiveness for children (n = 90) in treatment foster care. Medical record data were extracted on psychiatric diagnoses, adverse childhood experiences, and discharge placement restrictiveness. Children in treatment versus standard foster care had significantly more psychiatric diagnoses and adverse childhood experiences. The presence of bipolar and oppositional defiant disorder was associated with a more restrictive discharge placement. Even without standardized screening, children with more severe presentations are found in treatment versus standard foster care. These findings support the need for coordinated mental health services in treatment foster care.*

**Keywords** treatment foster care, adverse childhood experiences, child maltreatment

Over 500,000 children are currently in foster care in the United States (U.S. Department of Health and Human Services, 2008). More than 80% of children in foster care have a history of neglect and child abuse that has prompted their placement outside their biological family home (U.S. Department of Health and Human Services, 2005). Studies show that child maltreatment victimization is associated with the presence of domestic violence, poverty, homelessness, parental substance abuse, psychiatric disorders, HIV infection, and sociopathy (Brown, Cohen, & Johnson, 1998; Kelleher, Chaffin, Hollenberg, & Fischer, 1994; Rosenfeld et al., 1997). Collectively, these exposures to child maltreatment and parental dysfunction comprise adverse childhood experiences (ACE).

In over 50 peer-reviewed publications, Felitti and colleagues reported results from a large-scale retrospective investigation of ACE in adults enrolled in the Kaiser Permanente Health Appraisal Center (Anda et al., 2002, 2006; Dong, Anda, Dube, Giles, & Felitti, 2003; Felitti et al., 1998). The ACE studied in this research were emotional abuse, physical abuse, contact sexual abuse, household members with alcohol or substance abuse, mental illness, violence toward maternal figures, criminal behavior in the household, and parental separation or divorce. Results from these studies suggest that ACE place the individual at increased risk for the development of alcoholism, substance abuse, obesity, heart

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disease, and mental health disorders in adulthood (Anda et al., 2006; Felitti et al., 1998). Children in foster care with ACE exposure may also be placed at increased risk for developing physical and mental health disorders, alcoholism, and substance abuse.

Although the aforementioned ACE studies report adult mental health outcomes associated with ACE, current research documents a high incidence of mental health disorders in children in foster care, including attention-deficit hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), depression, conduct disorder, anxiety disorder, and bipolar disorder (Harman, Childs, & Kelleher, 2000). ACE exposures may precipitate symptoms of posttraumatic stress disorder (PTSD) and anxiety. Therefore, children in foster care are a major public health concern due to their high incidence of ACE exposure and mental health disorders (Halfon, Mendonca, & Berkowitz, 1995; Rosenfeld et al., 1997; Staudt, 2003).

Children with ACE and co-occurring mental health disorders may require more intensive mental health services while in the foster care setting. Traditionally, children with severe mental health and behavior disorders have received care in institutional and residential settings. With public health initiatives moving away from institutionalization, treatment foster care (TFC) was designed as an alternative therapeutic environment for children who no longer required institutional care but were unlikely to remain stable at home or in a standard foster care (SFC) home (Rosenfeld et al., 1997). TFC provides therapeutic family-based care in a less restrictive community-based setting than traditional residential centers. The goal of TFC is placement stability in the least restrictive environment for the child.

Child welfare agencies often try to place children with the highest needs in TFC. Many states, however, do not have standardized criteria for TFC enrollment and services. Therefore, children with a wide range of mental health needs may be placed in either SFC or TFC, depending on the availability of foster care placement slots.

This research on children in SFC and TFC is divided into two studies conducted in a state that lacks standardized enrollment criteria for TFC. Study One examined differences between children enrolled in TFC versus children enrolled in SFC. The primary goal of Study One was to examine the frequency of psychiatric disorders and ACE in a matched cohort of children in different foster care settings to inform the pediatric mental health care community and foster care treatment program developers about risk factors associated with children enrolled in TFC compared to SFC. It was hypothesized that children in TFC would have exposure to a greater number of ACE types and psychiatric diagnoses compared to children in SFC. Study Two examined associations between ACE and psychiatric diagnoses and the restrictiveness of discharge placement following TFC; Study Two included only children enrolled in TFC. It was hypothesized that higher numbers of psychiatric diagnoses and types of ACE children would be associated with discharge to a more restrictive placement following TFC.

## **Method**

### ***Participants***

In Study One, data were analyzed from 144 children enrolled in urban-based foster care programs (72 in TFC and 72 in SFC) between and including the years 1990 and 2006. TFC was a program provided by a mental health center in a large mid-Atlantic city. This center also provided outpatient mental health services (psychotherapy, psychiatric services) to children in foster care who had experienced ACE. For Study One, children in

TFC were matched with a sample of children who were enrolled in an SFC program and simultaneously received trauma-focused mental health services through the aforementioned mental health center. Matching criteria were age, gender, race/ethnicity, and year of program entry. Race/ethnicity was determined by using the self-identified group (e.g., White, African American, Hispanic, Native American, multiracial). The average age of the children was 8.7 years ( $SD = 2.90$ ). The majority of children were male (72%) and African American (90%); the remaining sample was approximately 5% European American and 4% of mixed ethnicity. For Study Two, data on restrictiveness of placement at discharge were available for all children ( $n = 90$ ) discharged from TFC (equivalent discharge information was not available for children in SFC). The number of children in Study Two was greater than Study One because no children were lost through the matching process. The sample of 90 children who were discharged from the TFC cohort was 62% male, 80% African American, 16% European American, and 4% multiracial; and the average age was 8.8 years ( $SD = 2.9$ ).

### ***Foster Care Models***

*Treatment Foster Care Model.* All children enrolled in TFC (in both Study One and Study Two) were served in the conceptual framework of the Trauma Integrative Model, which is an integrated, developmentally based model for children in TFC who have experienced ACE and who exhibit emotional and behavioral disorders. The Trauma Integrative Model supports the development of therapeutic relationships among the TFC social worker, treatment foster parent, biological parent, and the child. The TFC social worker is the team leader and facilitates positive involvement of the treatment foster parent, the child, and the child's biological family to promote effective treatment and implementation of a permanency plan.

The Trauma Integrative Model uses a four-phase treatment approach: Engagement, Working Through, Integration, and Transition. In the Engagement phase, the treatment parent builds the attachments necessary for the development of a therapeutic relationship with the child and the biological family. Simultaneously in this phase, the TFC social worker engages the treatment parent in a therapeutic alliance with the biological family and the child to develop a comprehensive treatment plan. During the Working Through phase, the treatment parent supports the child's self-regulation while the child works through the effects of complex trauma and neglect. The social worker guides the treatment parent and biological parent in meeting of treatment goals and permanency planning. The Integration phase focuses on the development of the child's life skills. Concurrently, the social worker supports the treatment parent's abilities to foster the child's coping and life skills, including obtaining appropriate school services for the children with deficits, while providing a stable living environment during childhood. In the Transition phase, the child's continued adjustment into an adoptive home or reunification with family or kin is paramount. This may include supporting the youth's transition to successful independent adulthood by identifying necessary family and community supports.

*Standard Foster Care Services.* Children enrolled in SFC were placed either with a foster care parent or in kinship foster care. A department of social service worker provided case management services. Children in SFC received mental health treatment, as clinically indicated. Mental health services may have included family, individual, and group therapy and psychiatric services. The general clinical focus across all of the outpatient services

was to address attachment, regulation, trauma, coping skills, and remediation of functional deficits.

### ***Procedure***

Both Study One and Study Two were reviewed and approved by the Johns Hopkins Institutional Review Board. Information on demographic characteristics, psychiatric diagnoses, ACE, and restrictiveness of discharge placement (for TFC only) was extracted from paper medical records and two electronic databases: SumOne for Kids, which was a statewide outcome management database, and an electronic medical record developed for clinicians at the mental health center. Incomplete data were coded as missing and excluded from the analyses. A total psychiatric diagnosis score was created by summing the total number of different psychiatric diagnoses that appeared in the individual's medical record. A diagnosis was coded as present if the diagnosis appeared in the medical record or databases. A total ACE score was derived by summing the number of different types of adverse experiences noted as present in the medical record. ACE were operationally defined as the presence of physical abuse, sexual abuse, emotional abuse, neglect, abandonment, community violence, domestic violence, death of a parent/caregiver, maternal substance abuse, maternal alcohol abuse, maternal incarceration, and maternal mental illness.

The definition of ACE (used for both Study One and Study Two) was modified from the ACE definition originally described by Felitti et al. (1998). Modifications to Felitti's original ACE definition were the addition of neglect, abandonment, death of caregiver, and witnessing community violence and the omission of parental separation and divorce and paternal characteristics. Neglect is the most frequent form of child maltreatment and is associated with multiple negative child outcomes, including insecure attachment, poor intellectual and academic functioning, and social problems (Hildyard & Wolfe, 2002); therefore neglect was included in the expanded definition of ACE (Egeland, Sroufe, & Erickson, 1983; Erickson & Egeland, 2004; U.S. Department of Health and Human Services, 2005). Abandonment, death of a caregiver, and witnessing community violence were added to the ACE definition because these exposures were not uncommon occurrences among children in foster care in the city from which the sample was taken. In addition, these adverse events were hypothesized to adversely impact children's wellbeing. Information on parental separation and divorce were not available for the majority of the children in this sample and thus was excluded from this operational ACE definition. Paternal data were scant and also were excluded.

For Study Two's children in TFC, restrictiveness of placement was divided into three categories: less restrictive, equally restrictive, and more restrictive at discharge from the TFC program. Less restrictive discharge placements included SFC programs, an adoptive family, the biological family, kinship family, or independent living. Equally restrictive placements reflected discharge to another TFC program. More restrictive discharge placements included inpatient psychiatric hospitals, residential treatment centers, and group homes.

### ***Statistical Analyses***

In Study One, logistic regression models were used to compare children enrolled in TFC and SFC on psychiatric diagnoses and ACE. In Study Two, McNemar's test was used to compare the odds of a more restrictive placement at discharge relative to entry for the 90 children discharged from TFC. In addition, logistic regression models were used to

predict restrictiveness of discharge placement using presence of psychiatric disorders and ACE with age and gender as covariates.

## Results

### Study One

*Psychiatric Diagnoses in TFC and SFC.* Table 1 summarizes the presence of psychiatric diagnoses in TFC and SFC samples. The four most prevalent Axis I diagnoses, according to the *Diagnostic and Statistical Manual of Mental Disorders (DSM)*, for children in TFC were (in descending order) ADHD, ODD, depressive disorders, and PTSD (American Psychiatric Association, 2000). For children in SFC, the four most prevalent *DSM* Axis I diagnoses were depressive disorders, ADHD, anxiety disorders, and ODD. Children in TFC had more *DSM* Axis I diagnoses compared to children in SFC (see Table 1). Table 1

**Table 1**  
Psychiatric disorders and adverse childhood experiences of children in treatment foster care and standard foster care ( $n = 144$ )

Diagnoses and ACE	TFC ( $n = 72$ )	SFC ( $n = 72$ )	OR	95% CI	$p$ -value
<i>Psychiatric disorders (M, SD)</i>	3.3; 1.8	2.5; 1.4	1.4	1.1–1.7	<0.01
	<i>n (%)</i>	<i>n (%)</i>			
ADHD	56 (77.8)	28 (38.9)	5.5	2.6–11.4	<0.001
ODD	40 (55.6)	26 (36.1)	2.2	1.1–4.3	<0.05
PTSD	26 (36.1)	16 (22.2)	2.0	0.9–4.1	0.069
Adjustment disorder	25 (34.7)	23 (31.9)	1.1	0.6–2.3	NS
Depressive disorder	34 (47.2)	35 (48.6)	0.8	0.5–1.8	NS
Bipolar disorder	15 (20.8)	4 (5.6)	4.5	1.4–14.2	<0.05
Mood disorder	20 (27.8)	21 (29.2)	0.9	0.5–1.9	NS
Anxiety	23 (31.9)	28 (38.9)	0.7	0.4–1.5	NS
<i>ACE (M, SD)</i>	5.2; 2.2	3.7; 1.8	1.5	1.2–1.7	<0.001
	<i>n (%)</i>	<i>n (%)</i>			
Physical abuse	49 (68.1)	34 (47.2)	2.4	1.2–4.7	<0.05
Sexual abuse	33 (45.8)	27 (37.5)	1.4	0.7–2.7	NS
Emotional abuse	15 (20.8)	10 (13.9)	1.6	0.7–3.9	NS
Neglect	61 (84.7)	51 (70.8)	2.3	1.0–5.2	<0.05
Abandoned	33 (45.8)	22 (30.6)	1.9	1.0–3.8	0.061
Witness domestic violence	25 (34.7)	14 (19.4)	2.2	1.0–4.7	<0.05
Witness community violence	26 (36.1)	2 (2.8)	19.8	4.5–87.4	<0.001
Death of a parent/caregiver	11 (15.3)	3 (4.2)	4.1	1.0–15.6	<0.05
Maternal substance abuse	56 (77.8)	50 (69.4)	1.5	0.7–3.3	NS
Maternal alcohol abuse	27 (37.5)	23 (31.9)	1.3	0.6–2.5	NS
Maternal incarceration	23 (31.9)	13 (18.1)	2.1	1.0–4.6	0.057
Maternal mental illness	14 (19.4)	16 (22.2)	0.8	0.4–1.9	NS

*Note.* TFC = treatment foster care; SFC = standard foster care; ACE = adverse childhood experiences.

also displays the results of logistic regression analyses computed with foster care status as the dependent variable and psychiatric diagnoses as the independent variables (and demographic information as covariates). Children in TFC were significantly more likely to be diagnosed with ADHD, ODD, and bipolar disorder than the SFC children. The other psychiatric diagnoses did not significantly predict foster care group status.

*Historical ACE Exposures for Children in TFC and SFC.* The four most prevalent child maltreatment experiences for children in TFC were (in descending order) neglect, physical abuse, sexual abuse, and abandonment, which occurred at equal rates. Neglect, physical abuse, sexual abuse, and abandonment were most frequently reported for children in SFC. Children in TFC were almost 2.5 times as likely to experience physical abuse or neglect compared to children in SFC. Children in TFC were approximately twice as likely to experience abandonment and domestic violence, four times more likely to experience the death of a parent or caregiver, and were approximately 20 times more likely to witness community violence than children in SFC. Overall, children in TFC had exposure to a greater variety of ACE (including parental risk factors) than did children in SFC,  $t(142) = -4.51$ ,  $p < .001$ .

Approximately one third of the biological mothers of children in TFC and SFC had a history of alcohol abuse, and approximately one fifth of the biological mothers in TFC and SFC had a history of mental health disorders (see Table 1). Over 69% of the mothers of children in TFC and SFC have a history of illicit substance abuse. Differences in the occurrence of maternal illicit drug use, alcohol abuse, and mental health disorders between TFC and SFC groups were not statistically significant. A trend was observed for a greater percentage of biological mothers who had a history of incarceration having children enrolled in TFC than children enrolled in SFC.

There was a positive correlation between the number of ACE types and the number of psychiatric disorders,  $r = 0.38$ ,  $p < .001$ . For each ACE that the child experienced, the child was 45% more likely to be enrolled in TFC,  $p < .001$ . For each psychiatric diagnosis given, the child was 37% more likely to be enrolled in TFC,  $p < .01$ .

### **Study Two**

Data from 90 children discharged from TFC were analyzed to examine restrictiveness of placement at discharge. The majority of children (60%) enrolled in the TFC program were discharged to a less restrictive placement (Table 2). Of the children who entered the TFC program from a more restrictive placement, 60% were discharged to a less restrictive placement (Table 3). Analyzing only the children with more or less restrictive discharge categories (i.e., excluding children discharged to an equally restrictive setting), the odds of having a more restrictive placement at entry is 2.6 times greater than having a more restrictive placement at discharge (95% CI: 1.3 to 5.5;  $p < .01$ ).

Psychiatric disorders and ACE types were examined as possible predictors of discharge placement restrictiveness for children in TFC. Age and gender were included as covariates in the regression model with total number of psychiatric diagnoses and total number of ACE types as independent variables (see Table 4). Girls were less likely than boys to be discharged to a more restrictive placement. Older children were more likely than younger children to be discharged to a more restrictive placement. ODD and bipolar disorder diagnoses yielded an almost 20 times and 5 times the risk of discharge to a more restrictive placement, respectively. Neither counts of psychiatric diagnoses or ACE predicted restrictiveness of discharge placement.

**Table 2**  
Living environments at discharge for children in treatment foster care (n = 90)

Discharge environment	Children by placement restrictiveness n (%)	Children by discharge placement n (%)
More restrictive	33 (37)	
Inpatient psychiatric hospital		9 (10)
Residential treatment center		3 (3)
Group home		14 (16)
Group emergency shelter		5 (6)
Runaway		2 (2)
Equally restrictive (TFC)	3 (3)	3 (3)
Less restrictive	54 (60)	
Standard foster care		8 (9)
Home (family friend/relative, adoptive/preadoptive, biological/step-parent)		35 (39)
Independent living		10 (11)
Military		1 (1)

Note. TFC = treatment foster care.

**Table 3**  
Entry and discharge living environments for children in treatment foster care (n = 90)

Entry environment	Discharge environment			Total n (%)
	More restrictive n (%)	Equally restrictive n (%)	Less restrictive n (%)	
More restrictive	21 (40)	0 (0)	31 (60)	52 (100)
Equally restrictive	0 (0)	1 (50)	1 (50)	2 (100)
Less restrictive	12 (33)	2 (6)	22 (61)	36 (100)
Total	33 (37)	3 (3)	54 (60)	90 (100)

Note. Rows denote living environment at entry. Columns denote living environment at discharge. McNemar's test,  $\chi^2(2, N = 90) = 8.73, p < 0.05$ .

## Discussion

Children in foster care are likely to have multiple ACE. ACE may place children at risk for physical and mental health disorders in adulthood. As hypothesized, children in TFC had exposure to a greater variety of ACE and more co-occurring mental health diagnoses compared to children in SFC. Exposure to multiple ACE places children at risk for psychiatric, social relationship, addiction, and physical health disorders as adults (Anda et al., 2006; Dong et al., 2003; Dube et al., 2003). As ACE exposure increases, the risk of developing physical and mental health disorders during adulthood increases in a dose response

**Table 4**  
Associations between adverse childhood experiences, psychiatric disorders,  
and treatment foster care discharge placement restrictiveness

Covariate and predictor variables	OR	95% CI	<i>p</i> -value
Age	1.21	1.02–1.45	<0.05
Gender (referent: girls)	0.35	0.13–0.96	<0.05
Psychiatric diagnoses			
Adjustment disorder	0.29	0.09–0.93	<0.05
ODD	19.90	4.25–93.11	<0.001
Bipolar disorder	5.03	1.06–23.91	<0.05
Total number of psychiatric diagnoses	1.30	0.94–1.80	NS
Total number of ACE types	1.06	0.83–1.35	NS

manner (Anda et al., 2002; Dong et al., 2003; Dube et al., 2003; Felitti et al., 1998). Studies suggest that experiencing greater than four ACE may place an individual at 4 to 17 times the risk for developing psychiatric disorders in adulthood compared to those without ACE exposure (Anda et al., 2006).

In Study One, children in TFC had an average of over five ACE compared to almost four ACE for children in SFC. Greater than four ACE may not only portend increased risk for adult physical and mental health disorders but in childhood may be a proxy for children who are likely to require more intensive trauma-informed mental health services. The current study documents a positive association between ACE exposure and psychiatric disorders, suggesting that the association between ACE and psychiatric disorders found in adulthood may have its origins in childhood traumatic exposures. In addition, multiple placement changes or placement in more restrictive environments, such as residential care or TFC, may be a consequence of co-occurring psychiatric disorders associated with ACE. This is evidenced in the current study by the increased odds of being enrolled in TFC for each ACE. Early identification and effective trauma-informed mental health treatment and support for children with multiple ACE may reduce the need for more restrictive residential placements.

Importantly, children in TFC experienced approximately twice as many acts of violence in the home and 20 times as many acts of violence in the community as children in SFC. In addition, children in TFC were more likely to experience traumatic loss and grief as evidenced by their being four times as likely to experience the death of a parent or caregiver and twice as likely to be abandoned. These environmental exposures may have a long-term impact on the child's relationships, emotional wellbeing, and development.

Parent-based ACE, namely alcohol and drug use, incarceration, and mental health problems, increase the probability of the child having poor mental and physical health outcomes as an adult (Bauer et al., 2002; Butz et al., 2001; Dong et al., 2003; Dube et al., 2003; Felitti et al., 1998; Walsh, Jamieson, & MacMillan, 2002). Approximately 70% of foster children (both TFC and SFC) in Study One had biological mothers with histories of illicit drug use. Maternal drug use, while treatable, may be associated with neglect, violence exposure, maternal mental health disorders, and inconsistent parenting strategies (Accornero, Morrow, Bandstra, Johnson, & Anthony, 2002; Barnard & McKeganey, 2004; Bauer et al., 2002; Butz et al., 2001).

Maternal incarceration and mental health disorders were each present in approximately one fifth of the children in this study. Parental mental health disorders place the



child at both genetic and environmental risk for the development of emotional and psychiatric disorders. Parental incarceration may cause traumatic loss and grief for a child who may be present when the parent is arrested. Although disruption of family due to parental incarceration has different effects on the child based on the child's developmental age, the effects are generally reported to be deleterious (Dong et al., 2003). Thus, enrollment in foster care may be a sentinel indicator of children who are at high risk, not only from environmental exposure to ACE but from genetic, prenatal, and postnatal environmental exposures as well.

The TFC data presented in Study Two are consistent with previous studies that found that TFC enrollment is associated with discharge to a less restrictive environment for the majority of children (Graham-Bermann & Seng, 2005; Kendall-Tackett, Williams, & Finkelhor, 1993; Reddy & Pfeiffer, 1997). Compared to their entry living environment status, children in the current study were more than two times as likely to be discharged to a less restrictive placement, despite having experienced more ACE and a higher number of psychiatric disorders compared to children in SFC. The significant association between the presence of ODD and greater odds of a more restrictive discharge placement reflects prior findings that behavior problems are a risk factor for multiple placement changes and more restrictive care settings.

This study has several limitations. This is a comparative descriptive study of children enrolled in urban TFC and SFC programs and, as such, may have limited generalizability to children in other foster care programs around the nation. In addition, longitudinal data on children following discharge from TFC were not obtained. Therefore, the long-term success or failure of the immediate discharge placement could not be examined. It is of note that other TFC outcome studies, to date, have not included the detailed descriptions and analyses of children who were included in this study. A design limitation was that although diagnoses were made by licensed clinicians (child psychiatrists, psychologists, and social workers), there was no uniform procedure for assigning psychiatric diagnoses for the study population. Reports of children's experiences of community violence and maternal risk factors (substance abuse, incarceration, and mental illness) were largely secondhand reports by different informants (e.g., child welfare case managers and relatives). Data on mothers (e.g., mental illness, incarceration, and substance abuse) were not subject to objective verification (e.g., maternal medical record review or correctional facility reports) and were based on data obtained from the child's medical record. These limitations reflect the reality of working with clinical populations of children in foster care.

This study adds to the literature on children in SFC and TFC by providing a detailed description of ACE and psychiatric diagnoses for children enrolled in SFC compared to TFC. It is interesting to note that while the state in which the study was performed had no standard guidelines for enrolling children in TFC, children in TFC had higher rates of ACE exposure and psychiatric diagnoses. Thus, children with more severe clinical profiles are likely to be placed in the more intensive treatment environment of TFC. Understanding the full scope of ACE and psychiatric disorders may inform pediatric care providers and mental health clinicians about the development of community-based treatment services that optimize children's long-term outcomes. For pediatric care personnel, increased knowledge of the scope of co-occurring ACE and mental health disorders found in children in foster care, particularly TFC, may lead to improved monitoring and advocacy and more effective and comprehensive pediatric and mental health treatment planning.

In summary, children in TFC were exposed to a greater variety of ACE types than were children in SFC. Children in TFC were more likely than children in SFC to be exposed to physical abuse, abandonment, maternal incarceration, domestic violence, community

violence, and the death of a caregiver. Children in the present TFC sample had more psychiatric diagnoses than children in the SFC sample. Importantly, a higher rate of ODD and bipolar disorder were noted for children in TFC compared to children in SFC and was associated with a more restrictive discharge placement. Integrated therapeutic developmentally-focused and trauma-informed TFC interventions that incorporate clinical staff, foster parents, and biological families may facilitate positive outcomes for children who have experienced considerable adversity. Future longitudinal prospective research is needed to repeat the findings in this study, document long-term outcomes of children in foster care, and develop strategies to systematically identify and treat diagnoses that may warrant specialized trauma-informed services. Larger studies examining the association between ACE and psychiatric disorders, placement stability, restrictiveness of discharge placement, and long-term outcomes for children in TFC are indicated. Long-term outcome measures should include education, employment, criminal justice involvement, and family functioning data on the foster care participant. Randomized studies of comprehensive trauma-informed mental health models for children in foster care who have significant ACE and psychiatric disorders are needed to determine the best models to promote placement stability and successful reunification with biological or integration into adoptive families.

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### References

- Accornero, V. H., Morrow, C. E., Bandstra, E. S., Johnson, A. L., & Anthony, J. C. (2002). Behavioral outcome of preschoolers exposed prenatally to cocaine: Role of maternal behavioral health. *Journal of Pediatric Psychology, 27*, 259-269.
- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders*. (4th ed.). Washington, DC: Author.
- Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B. D., et al. (2006). The enduring effects of abuse and related adverse experiences in childhood. A convergence of evidence from neurobiology and epidemiology. *European Archives of Psychiatry and Clinical Neuroscience, 256*, 174-186.
- Anda, R. F., Whitfield, C. L., Felitti, V. J., Chapman, D., Edwards, V. J., Dube, S. R., et al. (2002). Adverse childhood experiences, alcoholic parents, and later risk of alcoholism and depression. *Psychiatric Services, 53*, 1001-1009.
- Barnard, M., & McKeganey, N. (2004). The impact of parental problem drug use on children: What is the problem and what can be done to help? *Addiction, 99*, 552-559.
- Bauer, C. R., Shankaran, S., Bada, H. S., Lester, B., Wright, L. L., Krause-Steinrauf, H., et al. (2002). The maternal lifestyle study: Drug exposure during pregnancy and short-term maternal outcomes. *American Journal of Obstetrics and Gynecology, 186*, 487-495.
- Brown, J., Cohen, P., & Johnson, J. (1998). A longitudinal analysis of risk factors for child maltreatment: Findings of a 17-year prospective study of officially recorded and self-reported child abuse and neglect. *Child Abuse & Neglect, 22*, 1065-1078.

- Butz, A. M., Pulsifer, M., Marano, N., Belcher, H., Lears, M. K., & Royall, R. (2001). Effectiveness of a home intervention for perceived child behavioral problems and parenting stress in children with in utero drug exposure. *Archives of Pediatric & Adolescent Medicine, 155*, 1029–1037.
- Dong, M., Anda, R. F., Dube, S. R., Giles, W. H., & Felitti, V. J. (2003). The relationship of exposure to childhood sexual abuse to other forms of abuse, neglect, and household dysfunction during childhood. *Child Abuse & Neglect, 27*, 625–639.
- Dube, S. R., Felitti, V. J., Dong, M., Chapman, D. P., Giles, W. H., & Anda, R. F. (2003). Childhood abuse, neglect, and household dysfunction and the risk of illicit drug use: The adverse childhood experiences study. *Pediatrics, 111*, 564–572.
- Egeland, B., Sroufe, L. A., & Erickson, M. (1983). The developmental consequence of different patterns of maltreatment. *Child Abuse & Neglect, 7*, 459–469.
- Erickson, M., & Egeland, B. (2004). Linking theory and research to practice: The Minnesota Longitudinal Study of Parents and Children and the STEEP-super (TM) program. *Clinical Psychologist, 8*, 5–9.
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., et al. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) study. *American Journal of Preventive Medicine, 14*, 245–258.
- Graham-Bermann, S. A., & Seng, J. (2005). Violence exposure and traumatic stress symptoms as additional predictors of health problems in high-risk children. *Journal of Pediatrics, 146*, 349–354.
- Halfon, N., Mendonca, A., & Berkowitz, G. (1995). Health status of children in foster care: The experience of the Center for the Vulnerable Child. *Archives of Pediatric & Adolescent Medicine, 149*, 386–392.
- Harman, J. S., Childs, G. E., & Kelleher, K. J. (2000). Mental health care utilization and expenditures by children in foster care. *Archives of Pediatric & Adolescent Medicine, 154*, 1114–1117.
- Hildyard, K. L., & Wolfe, D. A. (2002). Child neglect: Developmental issues and outcomes. *Child Abuse & Neglect, 26*, 679–695.
- Kelleher, K., Chaffin, M., Hollenberg, J., & Fischer, E. (1994). Alcohol and drug disorders among physically abusive and neglectful parents in a community-based sample. *American Journal of Public Health, 84*, 1586–1590.
- Kendall-Tackett, K. A., Williams, L. M., & Finkelhor, D. (1993). Impact of sexual abuse on children: A review and synthesis of recent empirical studies. *Psychological Bulletin, 113*, 164–180.
- Reddy, L. A., & Pfeiffer, S. I. (1997). Effectiveness of treatment foster care with children and adolescents: A review of outcome studies. *Journal of the American Academy of Child & Adolescent Psychiatry, 36*, 581–588.
- Rosenfeld, A. A., Pilowsky, D. J., Fine, P., Thorpe, M., Fein, E., Simms, M. D., et al. (1997). Foster care: An update. *Journal of the American Academy of Child & Adolescent Psychiatry, 36*, 448–457.
- Staudt, M. M. (2003). Mental health services utilization by maltreated children: Research findings and recommendations. *Child Maltreatment, 8*, 195–203.
- U.S. Department of Health and Human Services. (2005). *Child maltreatment 2003*. Washington, DC: Author, Administration on Children, Youth and Families.
- U.S. Department of Health and Human Services. (2008). *The AFCARS report (No. 14)*. Washington, DC: Author.
- Walsh, C., Jamieson, E., & MacMillan, H. (2002). The relationship between parental psychiatric disorder and child physical and sexual abuse: Findings from the Ontario Health Supplement. *Child Abuse & Neglect, 26*, 11–22.